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GOVERNMENT OF THE
REPUBLIC OF
NAMIBIA

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WATER SUPPLY & SANITATION POLICY COMMITTEE

RECOMMENDATIONS ON A FUTURE WATER SUPPLY AND SANITATION POLICY FOR NAMIBIA

DATE: JUNE 1991

BURMEISTER VAN NIEKERK & PARTNERS VENNOTE
CONSULTING ENGINEERS

INTER-CONSULT
NAMIBIA (PTY) LTD.
Groundwater and Engineering Consultants

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1. INTRODUCTION

1.1 Objective of Report

The objective of this Report on Water Supply and Sanitation Policy for Namibia is two-fold :

- Firstly, to make firm recommendations to the Cabinet in respect of key sector policy decisions to be made.
- Secondly, to analyze a comprehensive range of issues relevant to the sector, arriving at guidelines for continued sector development following the above policy decisions.

Three particularly important areas have been identified for consideration and decision by the Cabinet, namely :

i) Community involvement, participation and responsibility for the various types of water supply and sanitation services, including principles for a tariff policy.

ii) Allocation of responsibility for the respective functions to be undertaken by Government authorities and other actors in pursuance of the sector policy.

iii) Co-ordination of these actors for efficient and national sector development.

The Report is the result of the work undertaken by the inter-ministerial Water Supply and Sanitation Policy (WASP) Committee. This WASP Committee was convened in response to the instructions given to Department of Water Affairs for the formulation of a sector policy. A Consultant was appointed to assist the Committee.

1.2 The Terms of Reference

The Terms of Reference (TOR) dated 18 February 1991 calls for the preparation of a policy paper as outlined above. The main emphasis is placed on the responsibility allocation with reference to water supply and sanitation functions, consumer or user groups and responsible authorities or representatives which will play a part or be a factor in the sector development. The TOR gives a tentative listing of the respective functions, consumers/users and responsible institutions/representatives to be considered.

With a view to facilitate the formulation of a national water supply and sanitation policy, the TOR states that the following aspects also have to be addressed :

- The existing water supply and sanitation situation.
- Existing water resources and supply schemes.
- Existing sanitation schemes.
- Future consumer involvement.
- Affordable solutions.
- Grouping of specialized knowledge.
- Technical responsibilities.
- Decentralization of functions.
- Allocations of functions.
- Appropriate water supply and management systems.
- Recommendations for creating the necessary structures.

The consultancy based on these TOR was awarded to Burmeister, Van Niekerk & Partners as per letter of award dated 18 February 1991, issued by the Department of Water Affairs. This Namibian company entered into agreement with an individual consultant, Mr Tore Lium, facilitated through the standing cooperation with Interconsult A/S Consulting Engineers of Norway.

The TOR stipulates a deadline of 7 June 1991 for submission of the final Report, subject to final discussions between the WASP Committee and the Consultant having resulted in general acceptance.

1.3 Procedures of Report Preparation

Based on preparations made by the Department of Water Affairs, a workshop was held at Swakopmund 5 - 7 March 1991. Following this key event which addressed the allocation of functions in particular, two more WASP committee meetings were convened on the 27 March and 16 May respectively before presentation of the draft Report.

After the report of the Swakopmund Workshop had established the basic framework of task and responsibility distribution, the Consultant conducted in-depth discussions with WASP Committee members, other officials, institutions and resource persons on specific issues. The background information required to address the various policy issues was gradually developed in the course of this process.

Drafting of the Report, based on a number of working papers and on the ensuing discussions, took place during May 1991. Close contact was maintained in particular with the appointed liaison officer in the Department of Water Affairs, Mr. P. Hamman.

This Report should be seen as the first step in the process of developing a sustainable water supply and sanitation sector for independent Namibia. The procedure of preparing the Report has emphasised involvement of all key authorities at the central level.

Hopefully this has contributed to an understanding of relevant issues such that policy updating, sector strategy formulation and development of sector action plans are facilitated. It is essential that this work can be made from a common platform and within a framework which will continue to be consistent.

2. GENERAL BACKGROUND INFORMATION

2.1 Topography and Climate

The total land mass of Namibia is 824,269 km, bordered by the Atlantic Ocean coastline to the west and adjoining Angola in the north, Zambia and Zimbabwe in the north east, Botswana in the east and the Republic of South Africa in the south.

Topographically Namibia may be divided into four main regions :

- The Namib desert, occupying about 15% of the land
- The interior plateau and mountains rising from the desert and constituting about 50% of the land
- The plains of the North, in Owambo, Kavango and Caprivi
- The semi-arid Kalahari zone along most of the eastern border

The main annual rainfall ranges from less than 50mm in the western region (Namib desert) to as high as 700mm in the north eastern Caprivi. The plains in the north get a reasonably good rainfall of 400mm and more in an average year. The typical annual precipitation declines towards the south and west.

Precipitation occurs mainly during the months of November through April. The problem of low annual rainfall is further compounded by its low reliability, particularly in the most arid zones.

The north eastern area is classified as sub-humid. The northern districts have a mean annual temperature of 22°C with a maximum of 34°C during the hottest summer months. The central plateau is characterized by warm, sunny days and cool nights. Influenced by the cool waters of the Benguela current, temperatures rarely exceed 21°C in the arid coastal belt.

The potential evaporation varies in an average year between 3,700mm in the central southern area to 2,600mm in the north. Hence, much of the rainfall is rapidly lost due to evaporation.

2.2 Demographic Structure

Until the census to be held in September 1991, the estimates of Namibia's population and its distribution remain unreliable. Recent estimates suggest however:

- A total population of about 1.8 million

- Of this population about 70% reside in rural areas (about 1,3 million)
- Almost 60% of the population reside in the northern areas

An attempt has been made to compile a breakdown of the population based on various sources, including National Planning Commission, direct contacts with some of the municipalities, the 1981 census, various estimates made by UN agencies (ref ?....) and finally by interpreting water supply consumption records. Even with cross-checking, these figures should be seen as indicative only.

Type of Settlement	Population
Municipalities	295,000
Peri-urban towns	30,000
Towns, communal regions	209,000
Rural/village residents (communal)	1,057,000
Commercial farms (owners + workers)	235,000
Total	**1,826,000**

This figure should be rounded off to 1,8 million.

The population distribution in communal regions is of particular importance as more efforts and resources will be diverted to improve situation in these areas. The following table has been derived from the same sources as the above figures. Again it is cautioned against possible errors as the base data are unreliable. Urban figures are taken as the estimates of population residing in the 14 towns specified in the Department of Water Affairs Annual Report.

DISTRICT	URBAN	RURAL	TOTAL
Owambo	83,000	747,000	830,000
Kavango	41,000	131,000	172,000
Nama	5,000	18,000	23,000
Damara	20,000	20,000	40,000
Herero	18,000	67,000	85,000
Rehoboth	30,000	14,000	44,000
Tswana	1,000	6,000	7,000
Bushman	1,000	2,000	3,000
Caprivi (E)	10,000	52,000	62,000
Grand Totals	**209,000**	**1,057,000**	**1,266,000**

It should be noted that Herero includes also the Kaokoland as per past and present administrative arrangements.

Despite regional differences, ranging from about 5 persons/km² in the north to less than 1 person/km² in the rest of the country, the overall population density of about 2 persons/km² is extremely low. This entails high infrastructure costs, in particular for services which are logistics intensive. Notably, government operation and maintenance of individual water supply facilities serving all the dispersed settlements would become an unsurmountable task.

The last census in 1981 showed an age distribution with about 42% being below 15 years of age. This age distribution is now further skewed towards a higher percentage below 15. The United Nations Statistical Office and Population Division estimated that the proportion of children would be :

	0 - 4 years	0 - 15 years
Year 1988	18,4%	47,8%
Year 2000	17,6%	47,3%

In terms of policy development, including the Water Supply and Sanitation Policy, this age structure is indeed significant, implying :

- High dependency ratios
- Likelihood of growing unemployment
- Need for extensive increase in service provision

The capital city, Windhoek, accounts for approximately 1/3 of the urban population. The influx of people to Windhoek over the last couple of years may illustrate the potential future pressure on urban services :

- It was estimated that the city population grew by about 25,000 to 145,000 during 1990
- A similar growth of an additional 25,000 is expected for 1991
- This implies a 41,7% growth over two years (or 19,2% p.a.)

Projections prepared by the UN suggests 7% growth amongst urban populations and 11% for peri-urban areas. Considering the current trend in Windhoek and the age distribution quoted above, the urban influx may well become substantially higher than these projections.

There is a need to embark on contingency planning within the Water Supply and Sanitation Sector to be able to mobilise the required resources to address the ensuing situation. The first step should be to carry out sociological and

socio-economic studies in sample areas of at least Windhoek, Oshakati and in a few selected smaller towns in order to gain an understanding of the current situation.

2.3 Administrative Structure

The current administrative structure is the result of two major factors :

- Firstly, the South African rule imposed ethnic segregation and confined the black/coloured rural population to 10 districts, each with its own administration (the so-called 2nd tier)

- Secondly, at independence these ethnically based 2nd tier administrations were abolished and responsibility for services transferred to the respective central government ministries

In practice the same boundaries are still being used to describe the respective areas of Namibia, but they have little administrative significance for the time being.

As a result of the abolishment of the geographically and administratively unified 2nd tier authorities, it is now up to the respective ministries to decide on their own decentralized structure. Being determined by their respective service functions, the uniformity that could facilitate decentralized planning, does not exist. Hence, an unduly centralised management structure has developed during the last year.

The Constitution makes provision for the immediate creation of Regional Councils which will form the basis for a future decentralized administration structure. The boundaries of these regions are as yet not decided, but are among the issues to be considered by the Delimitation Committee.

For the Water Supply and Sanitation Policy this is a key issue as the sector development cannot proceed successfully without interministerial, multi-disciplinary co-operation. It is of utmost importance, in particular for the rural sub-sector, that the administrative structure be resolved in a unifying manner.

The existing local authorities, in particular the well-functioning municipalities, constitute an exception to the above. They have a unified administration providing the full range of services under the auspices of their respective councils. An intermediate solution has long existed for smaller local authorities which cannot afford to have its own fully fledged administration. These are managed by the Peri-Urban Development Board.

2.4 The Macro-Economic Context

The post-independent Namibia inherited an economy of sharp contrasts. With its average per capita income of about US $ 1.200 (R3,300) it is classified as a middle-income country, thus one of the richest in sub-Saharan Africa. The physical infrastructure and the public administration are among the best in the region.

However, with the skewed income distribution, a minority enjoys incomes and public services at levels comparable to those of a Western European country. The vast majority lives in conditions that are barely above subsistence level and suffers from highly inadequate public services. Water supply and sanitation form no exceptions, in particular for the rural population in communal areas and possibly for the farm workers.

At independence the economy was stagnating with an unemployment rate estimated at 30%. After rapid expansion at 9% per year during the sixties, the economic growth fell to nil during the seventies. The early eighties saw a severe recession until recovery started in 1985. Growth again stopped in 1989.

Owing to continued population growth, the per capita GDP in real terms declined without interruption during the past decade, being 23% lower at independence than in 1980.

There are three main economic challenges facing the Namibian Government, namely to :

- Reactivate the economy;
- Reduce income disparities;
- Restrain and redirect public expenditure.

The strategy that will be adopted to address these challenges is of key importance also for the water supply and sanitation sector. Expectations among the majority for rapidly improving living standards include improved water supply in particular, and improved sanitation will inevitably become an implication of the desire to upgrade public health status and housing.

The macro-economic picture calls for a trade-off; the resources that may be able to lead the economic growth must continue to receive incentives to do so and the equity issue has to be resolved at the same time through transfer of resources and provision of opportunities. A World Bank team (ref, ??) cautioned against the too-quick, too-expensive type of solutions which have undermined the economies of many other countries in the African region.

The Namibian Government's general policy statement of last year implies a commitment towards supporting improved public health and nutrition, ensuring all citizens' access to public services, guaranteeing equal opportunities for woman, and protection of ecosystems and natural resources. All these four policy goals are of direct relevance to the water supply and sanitation sector, in particular guiding the objectives to be adopted for further development.

Another aspect of the Government's general policy is of equal importance for the water supply and sanitation sector; that is the intention to increase the efficiency of the public services and to make them more broadly available, while also stepping up maintenance and investment expenditures to protect and extend the country's existing infrastructure. Hence, the protection and expansion of those water supply and sanitation sector areas which have performed well in the past are part of the general policy goals.

The question is whether the means to pursue these goals will be available. The report of the above referenced World Bank team is clearly positive; after a couple of years with high deficits, in the range of R250 - 350 million (or about 5 - 7 % of GDP), the situation will improve due to increasing revenues and a reduced wage bill. The projected deficit level of 3 - 4% of the GDP is assessed to be clearly sustainable.

Investments in the water supply and sanitation sector, just as well as in the other priority sectors of health and education, have a **long pay-off period** before benefits make a positive contribution to the economy. In conclusion, sector investments should be sought from domestic revenue sources and during the transition period, from donors on grant or mixed grant/soft loan basis.

Needless to say, the financial performance of the water supply and sanitation sector itself will be an important determinant of its own future. Key issues in relation to the macro-economic context are cost containment, recovery of expenditure where affordable, conservation of resources and mobilisation of resources other than those of the Namibian Government.

2.5 Socio-Economic Characteristics:

The socio-economic characteristics prevailing in Namibia reflect upon the inherited forms of structural inequality. This is manifested in the income distribution skews :

- Top 5% of the population account for 71% of the GDP
- Poorest 55% control just 3% of the GDP

- Average GDP per capita is about R40 000 for the top 5% and about R900 for the remaining 95%

- Recent income surveys show per capita annual income levels of about R300 and R850 for rural and peri-urban dwellers respectively in northern Namibia.

- Average per capita income in Katutura, Windhoek (urban low income area) found to be about R1 600 per year.

Behind these figures is also a further disparity within the poor groups. In all urban areas the unemployment rates are substantially higher for "coloureds" and "blacks" than for "whites". A survey in Windhoek (1990) showed unemployment rates of 8.2%, 19.1% and 0.0% respectively for these three groups.

Poverty, resulting from lack of purchasing power or ecological factors in the rural areas, is causing widespread food insecurity and contributes to poor health. For example, surveys have shown that the poorest 20% of households spend more than 40% of their income on maize - the staple food - alone. This leaves virtually no financial resources to be spent on lasting improvements of the life situation, including water supply and sanitation facilities.

Community based organisations which could assist in self-development are reasonably well established in urban areas, although mostly under-financed and -managed. Such organisations are more scarce in rural areas, facing such constraints as resistance from the traditional leadership and lack of organisational skills.

A survey carried out by UNDP identified 21 indigenous non-governmental organisations (NGO's) which were involved in community development work. In the north, these are almost exclusively church based. Hence, the potential for community based projects is limited unless determined efforts to sensitise, mobilise and organise communities are undertaken. Pilot projects are, however, reported to have revealed enthusiasm for water and food production as priority mobilisation issues in the rural areas.

The rural communities have in many cases been affected by the interaction between poverty and a degrading environment. With increasing poverty, there has been no option, but to make a depleting use of their immediate environment. These deep rooted problems often relate to water supply, but cannot in most cases be solved through provision of water alone.

The socio-cultural status of women vary between the various cultural /ethnic communities; in some the widow will be dispossessed of the deceased husband's property. However, as in other African countries, the women play

the key role in family health and food matters; they bring up the children and there is a high ratio of women headed households throughout Namibia; 36% in Katutura, about 45% in Ovambo and ranging from 20 - 57% of urban non-white households in the central and southern part.

The above points at women's important role for the development in broad terms of the water supply and sanitation sector. Their economic and social empowerment is a prerequisite for an equitable society and the sector should facilitate their active involvement as a means to make interventions more efficient. Experience form other African countries is supportive of such a strategy.

The recent UNICEF Situation Analysis (March 1991) identified several groups in extreme poverty :-

- Namibians internally displaced by conflicts and war activities;
- Farm workers on low wages and their dependents; estimated at 30,000 workers and 210,000 in total;
- Remote area populations (e.g. San and Himba) which are particularly vulnerable in a developing society;
- Adults (and their families) facing income collapse as a result of the demilitarisation; estimated at 120,000 including dependents;
- Victims of war and former exiles, in particular those who are disabled;
- Victims of family breakdown.

When discussing tariff policy issues and expected contributions from individual community members, it is essential to consider how the most needy groups can be ensured access to services. On the whole, the socio-economic profile of the Namibian population poses a constraint to the sector development in the short term as the experience of community based resource mobilisation is limited.

This situation, on a positive note, should be seen as an approriate guide as to what types of activities need to be allocated priority. One obvious area is to **develop the support mechanisms for community based water supply and sanitation activities.**

2.6 Water Sector History:

The first steps to develop water sources in Namibia other than easily accessible water from springs and shallow wells, were made by the German Government about 100 years ago. The first boreholes were drilled in 1904 and hydrological knowledge gradually became available so as to enable advice to farmers for dam construction.

After Namibia came under the control of the Union (later : Republic) of South Africa, formal structures were gradually established. A separate Division of Water Affairs was created under the Administration for South West Africa in 1957 and later became a directorate under the Department of Water Affairs in the Republic of South Africa in 1969.

It was from 1969 onwards that greatly increased resources were made available for water development in the present Namibia. In real terms annual investments reached levels ranging from 1.5 to 2.5 times the levels that have prevailed for the last 2 - 3 years. Investments peaked in 1978 when more than R30 million were expended on capital works. Department of Water Affairs, more or less in its present form, was established on 1 July 1980 as a fully fledged department in the government service of Namibia.

After the creation of ethnically based districts in 1964 (the Odendaal Commission) services in these districts were discharged by the 2nd tier administrations established there. Department of Water Affairs continued to implement much of the works and also operated bulk supplies, while the district administrations developed and maintained local distribution systems and rural area water points. These administrations existed up to independence when they were abolished and their tasks and staff allocated to the concerned central government authorities.

Local authorities with their own political assembly (Council) and a high degree of autonomy have existed since 1909 when the town status was enacted. Windhoek became a municipalicty with City Council status in 1962. There are now 15 municipal authorities which provide water supply and sanitation services. In addition, there are also 22 smaller Local Authorities managed by the Peri-Urban Development Board, providing the same type of services to its inhabitants.

The Local Authorities have so far not been much affected administratively by independence except that the last remains of segregated administration of various townships will of course be fully abolished.

3. PRESENT WATER SUPPLY AND SANITATION SERVICES

3.1 Responsible Authorities

In the current situation responsible authorities can be divided into central government agencies (i.e. Ministries with their departments and directorates) and the local authorities (including municipalities and those managed by the Peri-Urban Development Board).

The envisaged introduction of Regional Authorities as provided for in the constitution, may change this picture, in particular in the communal regions and to some extent also in other rural areas.

NGOs and formally constituted consumer groups established on a voluntary basis at community level play a limited role so far. With the Government's emphasis on broadening the opportunities for the entire population, local initiatives are likely to be encouraged and supported. As a consequence, formally organised groups of consumers may at their respective local levels come to serve as an "authority". More detailed aspects of present tasks, responsibilities and modes of operation will be discussed later in the Report.

3.1.1 Central Government

The main actors and their most important responsibilities related to water supply and sanitation are as explained in the following.

Ministry of Agriculture, Water and Rural Development

This ministry, encompassing three of the key priority areas of Government's development strategy, is obviously important. For instance, the Water Act provides for a wide range of powers to the Minister.

The two departments having executive responsibilities are :

Department of Water Affairs; excercising control over the natural water resources, including water resource investigations and management, pollution control and planning for meeting of the water demand by various consumer groups. The department has a particular responsibility for developing and operating bulk water supplies, some of which are large regional schemes. The water is delivered in accordance with specific agreements to consumers ranging from Windhoek City Council and large mining enterprises to individual farms and communal water points. All water is sold through water meters at approved tariffs.

The Department of Agriculture and Rural Development; consisting of three directorates, for Agriculture, Rural Development and Training Services

respectively. The department took over responsibility for water supply to farmers in the communal regions after the 2nd tier administrations were abolished at independence. **Directorate of Rural Development** is now responsible for rendering these services and is also preparing for its role as supporter of community based projects in general. **Directorate of Agriculture** is involved in the development and running of irrigation schemes, often based on water supplied in bulk by department of Water Affairs. The Agricultural Training Colleges, where also certain water supply skills are taught, fall under the **Directorate of Training Services**.

Ministry of Local Government and Housing:

This is the parent ministry for all local authorities constituted in accordance with the legal provisions for such authorities. In addition, it has become directly responsible for provision of services in 37 towns in the communal regions. The ministry is also responsible for approval, and in the case of communal towns preparations, of physical development plans. Of particular importance for the water supply and sanitation sector is :

Division of Communal Towns Administration; responsible within the Ministry for all municipal services in the 37 communal towns, providing clerical and technical staff. Plans are in hand to upgrade about 10 of these towns to local authority status. The largest towns are in the range of 30,000 - 45,000 people (Oshakati, Rehoboth, Rundu). The total urban population could be in the range of 300,000 (no reliable information available).

Ministry of Works, Transport and Communications

The Ministry is responsible for the provision of government facilities such as schools, office buildings, hospitals and clinics, roads, telecommunication systems, etc. The ministry's active arm in relation to water supply and sanitation services is :

Department of Works; responsible as the government's agent for construction and maintenance of accommodation facilities and other buildings with associated infrastructure where this is not already provided by other authorities. The department comprises of the **Directorate of Works (Projects)** and the **Directorate of Maintenance**, dealing with new developments and maintenance of the facilities respectively. For Department of Works it is considered a last resort to take on responsibility for off-site infrastructure such as bulk water supply and sewage disposal. Until recently (April 1991) the department was also responsible for maintenance of infrastructure services in communal towns in the north, now falling under the Ministry of Local Government and Housing.

Ministry of Health and Social Services:

The ministry is not operatively involved in water supply and sanitation at present, except for what has upto now been a minor health inspection task. With the introduction of a new policy aiming at a much broader outreach, in particular as regards primary health care, this situation is likely to change. The active arm of the ministry will be :

Directorate of Primary Health Care which has a Division of Epidemiology and Public Health. Within this division is a Public Hygiene Unit with four programmes - Water and Sanitation; Vector - Borne Disease Control; Food Hygiene, and Health Assistant Training. The Regional officer, of which there are four (North West, North East, Central and South), will also have a Primary Health Care Division with a unit for epidemiology and environmental health services supervised by a District Health Inspector and/or a Technical Assistant (Health Assistant). The Ministry is at present negotiating to set up a Health Assistant Training School to train 20 Environmental auxiliaries in a two year course. An increasing recognition of the complementarity of primary health care interventions (e.g. health education) and technical water supply/sanitation facilities will make the Directorate of Primary Health Care important.

3.1.2 Local Authorities

Local authorities so far only exist for urban settlements outside the communal area regions. The provisions made in the Constitution for Regional Authorities may result in a completely new situation once such institutions have been established and capacitated. For the time being there are local authorities of two categories :

Municipalities; comprise a total of 15 local authorities with an estimated total population of about 300,000 people, out of which Windhoek alone has 145,000. The municipalities have a fully autonomous status and are required to provide all water supply and sanitation services on a full cost recovery basis. Four of them supply their own water (Grootfontein, Omaruru, Outjo, Tsumeb) whereas the remaining 11 receive bulk supply from Department of Water Affairs.

Small Local Authorities; comprise of a total of 25 small towns managed by the Peri-Urban Development Board. The total population of these towns is just over 30,000, Luderitz being the largest one with about 8,000. The technical services are provided by the Board and water is supplied in bulk by the Department of Water Affairs for all except a few of the smallest towns. As the objective is to prepare the towns for municipal status, each town is accounted for separately.

3.1.3 Other Concerned Authorities

Other government actors can be divided in two broad groups :

- **Active users** of water supply and sanitation services for their main activities;
- **Facilitators** which provide the overall framework within which the prime sector agencies operate.

Active Users

- **Ministry of Lands, Resettlement and Rehabilitation**; advice and services for the promotion of new settlements.
- **Ministry of Trade and Industry/Mines and Energy**; facilitating water supply and wastewater services on attractive terms for investors in new enterprises.
- **Ministry of Wildlife, Conservation and Tourism**; services for conservation areas, game parks and resorts (often through the Department of Works.

Facilitators

- **National Planning Commission**; assessing priorities within a national development context and co-ordinating the overall planning of projects to ensure efficient and complementary use of resources.
- **Ministry of Finance**; making funding for capital and recurrent expenditure available through the Treasury.
- **Office of the Prime Minister**; Directorate of Public Service Management assists government departments in personnel and management issues, making recommendations for staff establishments to the Public Service Commission.
- **Ministry of Justice**; facilitating preparation of new and appropriate legislation.

3.1.4 Characteristics of the Situation

Abolishing the politically unacceptable 2nd tier administration resulted in a high degree of centralisation. This happened with many types of services which, by virtue of the interface with the beneficiaries, need to be highly decentralized. Water supply and sanitation is no exception in this regard.

Experience from elsewhere consistently points at the need to decentralize administrative structures and to devolve decision making powers as much as possible to the lower levels. The future water supply and sanitation sector administration should be designed with a view to accomplish a true decentralisation. Reference is also made to sections 7.1.1 and 7.1.2.

The forthcoming creation of regional authorities provides good hope for a development in this direction. In the meantime the present actors should strive to delegate authority to the decentralized structures. At the same time - because changes will soon come - the administrative steps and allocations of responsibilities made at this stage **should be seen a dismantleable.**

3.2 Service User Groups

The broad categories of service user groups applicable to water supply and sanitation have been defined below. This has been done with a view to present the current situation in a systematic and representative fashion. A different and more detailed set of definitions will, however, be adopted for the purpose of allocating specific responsibilities.

A service user is in the context of this chapter a water consumer and, where applicable, a user of a sanitation installation. Where possible a distinction will be made between the different types of facilities or schemes being used. It should be noted that more precise and recommended responsibilities are presented in chapter 6.

The following broad user groups will be applied for the review of services in sections 3.3 - 3.6 below :

- **Urban**; consisting of municipal and peri-urban towns;
- **Communal**; consisting or urban centres, villages and rural areas;
- **Private farms**; consisting of the commercial farms with their resident farm workers and animals.
- **Others**; consisting of mines, tourist centres, and irrigation schemes.

3.3 Urban Water Supply and Sanitation

3.3.1 Municipalities

The municipalities generally have the highest service level and standard among all types of settlements in Namibia.

The following table illustrates the current combined status for 11 municipalities (water consumption according to Department of Water Affairs bulk supply records for 1989/90) :

Estimated Present Population	Bulk Supply million m^3/a		5 Year Increase	Consumed per Capita
	1984/85	1989/90		
255,000	14.1	21.9	55%	235 l/c/d

It needs to be observed that the per capita consumption is overall, also including the water supplied to industries, institutions, etc. In addition, distribution losses are also included in the total annual volume, presumably constituting 10 - 15%. The total bulk supply figure excludes the amount of about 3 million m^3/a supplied from Windhoek City Council's own sources.

The four municipalities being served by their own bulk supply have not been included. They would account for approximately 4 million m3/a, being consumed by a population of about 40,000. Hence, the average per capita consumption for these would be about 275 l/c/d.

The 5 year growth covers a period starting with a suppressed demand due to drought conditions. Nevertheless, it is an annual average growth rate of 9,2% which compounds to 55% over 5 years. This should be seen as a clear warning in a vast arid and semi-arid country where the marginal cost of water naturally is very expensive.

The service is in practice accessible for <u>all</u> municipal residents. The problem of squatters on unserved sites is limited. A rapidly growing population of poor, often unemployed, and who resides under congested conditions, may constitute both a service capacity and an affordability problem.

<u>Sanitation</u>

According to present discharge permits filed by the Department of Water Affairs, the overall service situation for the 15 municipalities is as follows :

<u>Total population</u>	<u>Population Served</u>	<u>% Served</u>
295,000	196,600	67%

As the discharge permits are required to be renewed every 5 years, it appears that the "population served" figure is out-dated. There is nothing to suggest that the service coverage is not close to 100%, except for two reservations :

- squatters may not have access to any sanitation facilities at all;

- Broken toilets, blocked connections, etc. in low income housing areas may prevail for long periods without being fixed.

95% Coverage may seem a reasonable measure of present coverage. The total effluent volume according to discharge permits, 17,8 million m3/a, is about 70% of the volume of water supplied in bulk. Again, the expected effluent volume may not be fully updated but the figure suggest that even after leakages and evaporation losses:

At least 50% of the supplied water would be available for re-use after treatment.

All the municipalities except one have secondary treatment with some form of biological process, e.g. oxidation pond, biofilter, or activated sludge. Hence, provided the treatment works are not overloaded, the effluents can be used for selective irrigation. The high rate plants (activated sludge, biofilters) should have maturation ponds to safeguard safe bacteriological standards.

A high proportion of the effluents, probably around 50% of the total volume, is already used for irrigation. From pollution control point of view this form of disposal together with evapotranspiration/evaporation is desireable.

Two of the smaller municipalities still operate a sanitary bucket system. Under normal circumstances (i.e. suitable soil conditions) pit latrines would be preferable.

3.3.2 Peri-Urban Towns

The standard of service in peri-urban towns is generally lower than in the municipalities. However, for the high income groups there is little difference in practise.

The following table illustrates the current combined status for the 22 peri-urban towns (Department of Water Affairs bulk supply records), excluding 3 without available records.

Estimated Present Population	Bulk Supply million m^3/a		5 Year Increase	Consumed per Capita
	1984/85	1989/90		
30,000	1.46	2.01	27%	180 l/c/d

The same general comments as made for the municipalities apply for peri-urban towns.

The consumption per capita is clearly lower, reflecting a less diversified economy and, above all, a simpler housing standard. It is not known to what extent water shortages have caused a suppressed demand.

The consumption growth is more moderate for the peri-urban towns as a group than for the municipalities. The annual average growth in supply over the last 5 years has been about 5%.

Whereas all municipalities except Karasburg and Otjiwarongo have shown a steady growth, there are greater variations for the peri-urban towns. Notably, some of them (Aranos, Dordabis, Henties Bay, Leonardville, Luderitz) have increased consumption by 50% and more over the last 5 years. In many cases there are substantial variations, both positive and negative, over the 5 year period for the same town.

Although at lower standard and service levels, water supply service is accessible to all residents in peri-urban towns. The problem of squatters on unserved sites is limited.

Sanitation

The discharge permits for peri-urban towns reflect that a smaller proportion of people is served. The available figures reflect the following :

Total population	Population served	% served
24,400	8,900	36%

The population figure is lower than for water supply as records of discharge permits are not available for all towns.

The great majority of peri-urban towns have on-site sanitation systems. Only four have waterborne systems with centralized treatment. The prevailing solutions for high income areas are conservancy tanks (10) and septic tanks (8). For low income houses such solutions as pit latrines (9) and sanitary buckets (4) are prevailing.

As low cost solutions in the low income areas may not have been included, the estimated coverage is assumed to be about 70%. Although volumes and thereby pollutional potentials are limited, the various disposal methods suggest a risk of local problems. Seepage, land application and evaporation from trenches of untreated human wastes call for attention. Safequard against health hazard depends entirely on good management of well selected sites.

3.4 Communal Areas

The reason for presenting all categories of settlements within the communal regions under one heading is to highlight the common problems existing in these previously neglected areas. Moreover, also the information on the water supply and sanitation situation is not documented in the same way as for other parts of the country. The poor documentation is probably exacerbated by the sudden abolishment of the 2nd tier administration.

3.4.1 Communal Towns

Out of the 37 communal towns, only 14 are specified in the Annual Report of Department of Water Affairs (ref ??). Furthermore, it has been difficult to obtain population estimates. Figures have been obtained for 10 towns (Uis, Arandis, Opuwo, Ruacana, Gibeon, Rundu, Oshakati, Ongwediwa, Ondangwa and Rehoboth) form National Planning commission and other sources. In spite of cross checking, these figures need to be treated with caution. Through indirect methods "guestimates" have been made also for some of the additional towns.

Water Supply

The situation for the above 10 towns is as follows :

Estimated Present Population	Bulk Supply million m^3/a		5 Year Increase	Consumed per Capita
	1984/85	1989/90		
178,000	6.38	8.12	27%	125 l/c/d

Among these 10 towns these are substantial disparities :

- Bulk supply to Oshakati has remained constant over the 5 year period, giving a current estimated average specific consumption of 90 l/c/d.
- Supply to Rehoboth has doubled, giving a specific consumption of 135 l/c/d.
- Arandis with a specific consumption of 290 l/c/d is one of very few towns outside the 90-135 l/c/d/ range.

Considering that most towns in communal areas have a considerable community of relatively high paid administrators, the average water consumption of the 80-90% majority is likely to be very low. An estimate would be about 40 - 50 l/c/d.

Using the amount of water supplied and considering population estimates from sources as indicated in section 2.2 above, the total population of towns specified in the Annual Report of Department of Water Affairs would amount to about 210,000 people.

For this population there is general access to water. For an unspecified number of people living as squatters the service level is very low and actual access may be difficult where standpipes have not been provided.

The figures suggest that consumption levels for the poorer groups are at, or below, the minimum level recommended for public health and hygiene reasons.

Sanitation

All the 14 named communal towns (ref ??) have discharge permits, except Uis town in Damara Region where no records have been found.

The discharge permits reflect the following situation.

Total population	Population served	% served
210,000	76,000	36%

This reflects a low service coverage. Reviewing the treatment or waste disposal applied, it appears that 12 of the 13 towns have a secondary treatment system. 11 of these are based on oxidation pond treatment. In addition, pit latrines are mentioned for Rundu which has a substantial back-log of some 32,000 unserved residents.

The rapid growth of many of the towns in communal regions suggest that :

- Facilities are in some cases grossly overloaded;
- Extensive use of on-site facilities are being made;
- There is a need to review the sanitation situation critically with a view to get a more precise picture.

Squatters constitute a problem in many of the communal towns, and attempts to provide communal toilet facilities have not been very successful. Maintenance has proved to be a severe problem.

An informed guess, based on discussions with various officials and review of available material, would be that waste disposal facilities are available to at least 60% of the communal town populations, or approximately 130,000 people.

Presumably a much higher number have some kind of access, if one includes crude and simple installations which may not be sanitary to a satisfactory standard.

Disposal is in most cases by evaporation and seepage from the oxidation ponds. Effluent from overloaded facilities may not be suitable even for restricted irrigation, but it is clear that a substantial amount of water is wasted. Potentially some 5 - 6 million m^3/a could have been made available for irrigation.

3.4.2 Communal Villages

The bulk supply reported on by Department of Water Affairs (ref ??) for "other villages" in the communal regions amounts to a total of 4.29 million m^3/a (1989/90). This figure compares with only 2,65 million m^3/a supplied in 1984/85.

The 60% increase is a clear sign that services have been more widely extended during the last 5 years. Only 25% of this increase was realized in Owambo villages, - quite disproportionate to the share of total communal area population. Obviously the war has affected the situation and caused distorted figures for Owambo in particular.

Assuming that "villages" have a much lower service level than the named towns, and that high income consumers are virtually non-existent, an average consumption of 50 l/c/d can be assumed. If this is a fair assumption, the village water supplies could cater for an estimated total of 235,000 people.

Another assumption may be that livestock watering constitute a substantial element. If each 5th beneficiary also has 2 large livestock units (say 15 per livestock holding family) to be supplied, the corresponding number of LSUs would be about 130,000. They would consume about 2.1 million m^3/a, leaving about 2.2 million m^3/a for human consumption by some 120,000 people.

For the purpose of a broad assessment of water supply coverage the figure of 120,000 people served is therefore adopted. Although institutional consumers are included, this figure may be interpreted as contributing to coverage in terms of rural consumers. Many of these consumers are, however, not farmers relying on agriculture for their livelihood.

Sanitation

The discharge permit records show that a substantial number of villages, expressed in terms of proportion of total communal village population, is being served. In reality, most of these beneficiaries are connected to government institutions which occasioned facilities to be developed in the first place.

According to the available records of discharge permits, the service situation is as follows :

Total population	Population served	% served
120,000	60,000	50%

It should be noted that the 120,000 adopted as total village population is the same figure as assumed to be served by the water facilities. This is merely a rough approximation due to lack of more precise data.

The mode of sanitation and waste disposal employed for villages covers a wide range, including both oxidation ponds and various on-site options such as conservancy tanks, septic tanks, pit latrines and sanitary buckets. The emptying and final disposal of wastes from the on-site installations pose a health hazard unless strict management and control measures are taken.

3.4.3. Water Supply in Rural Areas (Farms)

The majority of formal water supplies in rural communal areas is point water sources based on deep boreholes, or, in areas with shallow groundwater, on wells. Off-takes to rural water supply points are also made from Department of Water Affairs' bulk water supply pipelines where such schemes exist (often regional schemes such as in Owambo and Herero). Also a number of dams have been constructed, mainly for stock drinking purposes.

The overview of installations provided (Department of Agriculture and Rural Development, 1990) is given in Table ?? below.

	No. of Installations				Equipment		
Region	Well	B/Hole	P/Line	Total	H/Pump	W/Mill	Engine
Nama		811		811	10	743	58
Tswana		56		56		17	39
Rehoboth	23	58	3	84		15	39
Herero		695	19	714		45	650
Damara		1456		1456	12	869	575
Bushman		50		50	32	8	10
Caprivi	285	89	96	470	65		89
Kavango		288		288	101		187
Ovambo	?	185	?	185			170
	308	3688	118	4114	220	1697	1781

The information may not be entirely reliable. It should be noted that:

- A number of windmills and engines in Rehoboth (in addition to numbers quoted) are privately owned
- Water Affairs supplied about 1.1 and 4.8 million m3 during 1989/90 for stock drinking in Herero and Owambo respectively, thus indicating a higher number of off-takes from pipelines (see also comment below)
- Data from Owambo is incomplete; e.g. more than 100 excavation dams have been provided
- The number of boreholes in Damaraland appears surprisingly high
- There is also a substantial number of more or less improved privately owned water supply installations

The recent groundwater investigation in (Eastern) Caprivi may give an indication of the variations in terms of services actually provided, hopefully as a worst case scenario:

- Among 230 wells investigated, 81 (35%) were found to be dry
- Among 228 borehole sites visited, 93 had been abandoned and only 69 out of the remaining 135 were operational
- Most water points along pipelines had erratic supply due to excessive consumption at upstream end, causing drop in pressure

There is no reliable information available as to the number of people and livestock actually served by these installations. As current population estimates for communal areas are unreliable, pending the forthcoming census, even crude approximations need to be treated with caution. **The 1991 census will include questionnaire items expected to give essential quantitative information.** The data would warrant a thorough review by the water sector authorities.

The below Table ?? does, however, give indicative estimates of rural populations, excluding the approximate number residing in villages (ref. data in sections 2.2 and 3.4.2), and livestock numbers (equivalent large stock units (LSU), Namibia Stock Census, 1990) with the corresponding number of people/livestock on average per installation.

Region	Population	LSU	No. of Inst.	Pop/LSU per each
Nama	13,000	68,000	811	16/83
Tswana	6,000	18,000	56	107/320
Rehoboth	13,000	82,000	84	154/976
Herero	53,000	333,000	714	74/466
Damara	12,000	70,000	1456	8/48
Bushman	2,000	1,800	50	50/36
Caprivi E	47,000	94,000	470	260/200
Kavango	86,000	109,000	288	299/378
Ovambo	706,000	431,000	(185)	3816/1330
Totals	938,000	1,206,000	4,114	

This is based on the obviously inaccurate assumption that there are no other water supply sources in the region. The stock drinking water supplies to Herero and Owambo would account for about 60,000 and 260,000 LSUs respectively. In addition it should be noted that Owambo has as many as 120,000 donkeys (almost 70% of the national total) which have not been accounted for in the above estimates.

As these supplies are certainly also utilized for human consumption - regardless of water quality and local outlet structure - one may assume that at least some 4,000 people in Herero and some 120,000 in Owambo are served from the livestock supply points. These figures are based on the assumption that the average population/LSU ratio is uniform throughout the two regions.

Assessment of Situation

The number of users per installation is not excessive, considering that the population in Caprivi and Kavango is concentrated along perennial rivers. Owambo remains problematic in the sense that estimates of coverage have to be based on a number of assumptions which in total compounds the inaccuracy.

The problem in terms of service is rather that the scattered settlement pattern requires a much denser provision of installations for the distance between water source and homesteads to be acceptable, at least for domestic convenience.

With low water point density, the cattle will also tend to be concentrated during the dry season. Hence, overgrazing around water points is inevitable in many areas, even where stock levels barely provide subsistence for the owners.

Few of the installations have been provided with a separate, covered tank and standpipe for domestic water collection. In addition, most of the existing standpipe sites have not been constructed with apron and drains required to ensure hygienic surroundings.

Closer analyzes will presumably reveal that **appropriate criteria for water point density should be <u>different</u> for domestic and for livestock supply.** For example, in Botswana a minimum distance between stock supply boreholes is set at 8 km in order to have a reasonably protected zone between watering points even where herd size management is haphazard.

As a most tentative measure of present coverage one may assume that:

- Each water point is serving 5 extended families of 10 members each, or a total of 206,000 people
- The Herero and Owambo stock drinking facilities support a total of 124,000 people in addition to the livestock

Hence, it is estimated that a total of 330,000 people are served by the installations provided by the government. A large number of people are living along perennial and ephemeral (sand) rivers and in areas where perennial wells provide reliable, but unprotected source of water. This may apply to as many as 100,000 rural residents who then do not experience a water crises as such and where the source could be protected at a relatively low cost.

In conclusion it is thus estimated that 430,000 people, or about 45% of the rural population in the communal regions, have a relatively satisfactory water supply situation.

3.4.4. Rural Sanitation

All available reports suggest that rural sanitation in terms of latrines is virtually unknown. Private communication indicates that there may be pockets and a few individuals who have been influenced to provide themselves with facilities.

For policy and planning purposes one may safely assume that sanitation in rural areas has not yet been introduced in Namibia. The privacy aspect which often has a promotional effect during sanitation campaigns - just as much as the public health message - is a weak argument with the scattered settlement pattern prevailing in rural Namibia.

3.5. Private Farms (Commercial)

These farms exist and thrive by virtue of the fact that the water supply situation has been resolved. The inhabited commercial farms, numbering about 5,000 all have reasonable to excellent water supply facilities considered in the rural area context.

As stated in section 2.2 these farms are estimated to have about 235,000 residents of whom the owners have a "high income" consumption (200 l/c/d) and the farmworkers with their families a "rural low income" consumption (30 l/c/d).

It is a fair assumption to assume that 235,000 are adequately served with water. The combined water demand is approximately 4.1 million m^3/a.

The commercial farms have about 60% of the national LSU herd, or 1.92 million LSUs (ref ??). The corresponding water demand amounts to approximately 31.5 million m^3/a.

Sanitation facilities and coverage for the owners are of comparable standard to those enjoyed by urban high income groups. The facilities for farmworkers and their families vary greatly; some labour lines may have individual flush toilet facilities whereas on other farms not even pit latrines are provided. Indeed, in Zimbabwe the national water master plan study identified that the **farmworker communities in many cases lived under the poorest conditions** of all in terms of the environmental health situation.

The issue should be investigated further. As a conservative estimate, it is assumed that 140,000 people, or 60% of those residing on commercial farms, have adequate sanitation facilities.

3.6. Other User Groups

3.6.1. Mines

Besides industrial establishments within municipal or town boundaries and a few with an independent supply, the Department of Water Affairs supply water to five mining enterprises. This amounted to a total of about 7.8 million m3/a in 1989/90. There are about 15,000 people resident at the mining sites.

The information which has been available from discharge permit records cover only the sanitary sewerage and not the wastewater from processing of minerals. All residential establishments except one have secondary treatment in the form of activated sludge and/or oxidation ponds.

3.6.2. Tourist Centres

Water for tourist centres supplied by Department of Water Affairs amounts to about 0.7 million m3/a.

The corresponding discharge permits cover just over 2,000 people making use of a variety of on-site and secondary treatment options.

3.6.3. Irrigation

Department of Water Affairs is the major supplier of water for irrigation purposes except direct abstraction from perennial rivers, small dams and boreholes by private farmers. The major installation is the Hardap Dam supplying a total of about 31.8 million m3 during 1989/90. The total volume supplied by the Department of Water Affairs was 32.5 million m3.

Some 15 million m3 is drawn from the Orange River annually. Schemes under the First National Development Corporation draw some 25 million m^3 annually, mainly from the Okavango River.

The total volume of water used for irrigation, subject to great variations depending on rainfall and reservoir utilisation, is in the range of 100 million m^3/a, providing for over 7,000 ha of irrigated fields.

3.7. Summary of Service Situation

Although a number of reservations have been stated with regard to reliability of information and assumptions made, it is still important to compile a "best possible" broad national picture of current services. This overview can serve as the basis for broad diagnoses of existing problems which need to be addressed by the sector policy and it will direct attention towards the most critical areas to be studied or actioned.

Water Supply

The following service coverage has been estimated above for the respective user (i.e. consumer) groups:

User Group	Total	Population Served	% Served of : Group	% Served of : Nat. pop
Municipalities	295,000	295,000	100	16.4
Peri-Urban Towns	30,000	30,000	100	1.7
Communal Towns	210,000	210,000	100	11.7
Communal Villages	120,000	120,000	100	6.7
Communal (farms)	938,000	430,000	46	23.9
Private Farms	235,000	235,000	100	13.1
	1,800,000	1,300,000		73.5

The population figures have been rounded off.

Hence, it can be seen that approximately 3/4 of Namibia's population has an improved or naturally adequate water supply. As was stated in section 3.4.3 this estimate includes 100,000 rural residents (5.6% of the national population) living in areas where there is not a critical water situation.

The overall situation in urban areas is satisfactory with a 100% service coverage. However, this does not mean that there is no scope for improvement; low income populations and squatters in particular have a low service level in many cases.

The main shortfall is in the rural areas of the communal regions. There the service coverage is a mere 45% in farming areas. When including the villages, where residents include government officials, traders, etc., the coverage rate increases to about 52%.

Hence, there can be no doubt as to the justification for: **Redirecting efforts towards an improvement of the situation for residents of the rural communal areas**. While doing so, it is equally essential to: **Maintain the present coverage levels in urban areas**: The effects of the exceptionally rapid influx to major urban centres suggest that a high proportion of resources available to the sector shall continue to be spent in urban areas.

The above summary does not give any indication as to how critical continued water development is to Namibia's economy. With water being so scarce, there can be no doubt as to the importance. However, with the likely high, not to say exhorbitant, **marginal cost of supplying additional water** to the most commercially active centres in the country, great caution must be exercised.

Sanitation

The following sanitation service coverage has been estimated for the respective user groups:

User Group	Total	Population Served	% Served of : Group	Nat. pop
Municipalities	295,000	280,000	95	15.6
Peri-Urban Towns	30,000	21,000	70	1.2
Communal Towns	210,000	130 000	62	7.2
Communal Villages	120,000	60,000	50	3.3
Communal (farms)	938,000	0	0	0.00
Private Farms	235,000	140,000	60	7.8
	1,800,000	627,000		35.1

Population figures have been rounded off.

Although a few households in the communal rural areas may have latrine facilities, the number is believed to be insignificant. This fact, also combined with low coverage in communal towns and villages, points at a serious **contributing factor to poor health status** among residents of the communal regions.

Rural sanitation cannot be provided; it has to be implemented by the dwellers themselves. One can foresee a long process of introducing, promoting and supporting a latrine "culture" in rural areas before much progress can be expected. Considering income levels, there is a need to develop and promote **no-cost solutions** for this target group.

The urban situation is markedly better. The non-coverage is believed to be in the urban fringe areas, among people with extremely low income and in squatter areas. However, the **magnitude of the backlog** is such that it deserves serious attention; the dense settlement pattern is conducive to transmission of infectious diseases.

With the unserved urban target group in mind, there should be efforts at implementing **low cost solutions** along with updating of existing capacities.

4. SELECTED SECTOR POLICY DETERMINANTS

The future water supply and sanitation sector policy needs to take cognisance of the current resource base as the inevitable point of departure. This base spans much further than the general macro-level situation, existing administrative framework and present services as presented in chapters 2 and 3 above. Selected elements of this resource base and other relevant policy determinants are presented below.

4.1 Water Resources

The general climatic, geological and topographical conditions of Namibia have made water one of the scarcest resources of the country. A brief overview of the water resource situation, mainly based on ref ???? is given in the following.

4.1.1. Perennial Water Sources

The only perennial surface water sources are the border rivers of Cunene, Okavango, Kwando - Linyanti - Chobe and Zambezi to the north and the Orange River to the south. Whereas these sources are of critical importance to Namibia's development, they cannot be exploited without bilateral or multilateral agreements.

Presently Namibia has access to an agreed 180 Mm^3/a (5,5 m^3/s) from the Cunene and at least 500 Mm^3/a (15m^3/s) from the Orange River. For the other rivers no formal or informal agreements have as yet been reached. However, plans already exist to draw at least 60Mm^3/a (2m^3/s) from the Okavango River into the eastern national water carrier.

In particular the planned abstraction from the Okavango River may become a sensitive issue. It appears that any intervention that may affect the Okavango Delta will draw international attention due to the unique ecosystem.

For other rivers in the north, abstraction of water may reduce present or future hydropower production. Hence, the competing water needs make it essential to consider also the long term economic implications carefully.

The Namibian water authorities should as a matter of urgency initiate the international negotiations required to clarify what volumes of water may be available for future abstraction.

4.1.2. Ephemeral Surface Water Sources

It is estimated that the safe yield from surface water works on the major ephemeral rivers amounts to at least 200Mm3/a or 40% of the total resources available in the interior of the country. These major rivers include the Swakop,

Omataka, Nossob, Oanob, Huarusib, Hoanib, Ugab, Omaruru, Kuiseb and the Fish.

The major dams have a total capacity of more than 600Mm3, although with a safe yield (95% probability) of only 82Mm³/a (13% of available capacity). Most of the available potential has already been developed. The major reserve can be found on the Fish River where a potential of another 100 Mm3/a may possibly be exploited.

In addition, there are more than 500 small dams with a combined storage capacity exceeding 30Mm³ utilized for drinking water supplies on private farms and in rural areas. The safe yield of these dams is not established.

Whereas the scarcity of water has made the development of ephemeral rivers necessary, the associated environmental effects have not been quantified. Inevitably, the harnessing of such high proportions of ephemeral river flows has caused damage to downstream aquifers, riverine forests, etc.

4.1.3. Groundwater Sources

The significant groundwater sources in Namibia are associated with six major geological formations. These are of alluvial, sediment and consolidated nature. Due to low and erratic rainfall, the surface runoff regime, high evaporation rate and the geology itself, the overall recharge is limited for most formations.

As an aquifer which is not exploited beyond the long term recharge potential is a renewable resource, the efficient management and protection of these groundwater sources are of vital importance.

It is estimated that approximately 32,000 boreholes are utilized for water supply purposes. About 85% of these are private, mainly serving the commercial farms. The safe yield of boreholes in service ranges from 0,5m³/h to as high as 120m³/h.

The total potential safe yield of the groundwater sources is estimated to be at least 300Mm3/a which is 60% of the total water resources available in the interior of the country.

4.1.4. Water Balance

The scarce rainfall in Namibia is in itself a severe constraint. Added to this is the fact that an estimated 83% evaporates shortly after precipitation and another 14% is lost through evapotranspiration. Hence, only 3% remain as possible exploitable resources for water supply, of which 2% can potentially be harnessed by surface water schemes and 1% constitutes the groundwater

recharge. Studies have shown that as much as 20 - 40% of water held in reservoirs will be lost due to evaporation. Creation of and transfers to deep storage reservoirs may pay dividends from water balance point of view, and may also become increasingly economical. There are already deficits in some regions of the country, thus requiring long and costly inter-regional water transfers.

4.1.5. Water Quality

The water in the major dams of Namibia is generally of a good quality which after clarification and disinfection, is rendered suitable for human consumption.

For groundwater there are greater variations with some aquifers of excellent quality and others with concentrations of dissolved solids, nitrates, fluoride, sulphates and/or total hardness restricting or excluding their use for water supply purposes.

Namibia has adopted national water quality guidelines based on the international guidelines of the World Health Organisation (WHO). The national guidelines have, however, been modified compared to the WHO standards within proven safe health margins to suit local conditions.

Water quality is regularly monitored in all formal water supply schemes. The Department of Water Affairs as the responsible agency, is also controlling effluents discharged from more than 160 installations issued with permits in accordance with the Water Act.

4.2. Possible Future Water Demands

The purpose of this Report is not to make projections for the future in physical or financial terms. However, a policy must take into account alternative eventualities.

Water demand - if not constrained by its availability and/or exhorbitant pricing - will depend mainly on population growth and settlement pattern, economic development (in commercial terms) and the socio-economic changes among the majority of Namibians presently living in great poverty.

Based on provisional estimates made by United Nations (ref ??) for the present decade, the following slightly simplified growth rates may be deduced:

- Urban populations : 8%
- Rural populations : 1%

Projecting from the population figures given in section 2.2, possible future population distributions may look as follows, assuming the urban growth reduces to 5% from year 2000 onwards :

	Population (thousands)		
	2000	2010	2020
Urban	1,040	1,670	2,760
Rural	1,170	1,290	1,420
Total Namibia	2,210	2,960	4,180

This pattern, pointing at the magnitude of the costly task of providing urban water supply and sanitation services, would be no different from what has already been observed in post-independent Africa.

The corresponding domestic (human) water demand would amount to :

Year :	2000	2010	2020
Demand :	89 Mm^3/a	136 Mm^3/a	217 Mm^3/a

if specific consumptions of 200 l/c/d and 30 l/c/d are being used for urban and rural respectively. This assumes a decline in average per capita consumption in urban areas, resulting from growing urban low income populations and punitive tariffs levied on high income consumers.

Livestock demand has been indicated by Department of Water Affairs (ref ??) to increase slightly over the next 15 years. This will claim a further 70 - 80 million m^3/a.

The other two major water users - both difficult to make projections for - are the mines and the irrigated agriculture. Department of Water Affairs (ref ??) has estimated the combined demand of those two "consumers" to be about 200 million m^3/a by year 2005.

Combining the above estimates (which do not account for major water consuming industries), the demands may increase to :

- Above 400 million m^3/a by the year 2010
- Nearly 500 million m^3/a by the year 2020

It has then been assumed that demands generated by mines and irrigation schemes remain constant from year 2005 onwards.

Looking closer at current trends (1984/85 to 1989/90), the average demand growth has been as follows for three major "consumers" :

- Windhoek (state bulk supply only) : 12% p.a.
- Other municipalities (excl. Whk.) : 9% p.a.
- Communal regions (towns + villages) : 5,3% p.a.

The start of this period was after recovery from severe droughts during the early 1980'ies had just started. Nevertheless, demand has now (for Windhoek) climbed up to and surpassed the pre - drought trend. The below Table ?? gives indicative potential demand projections with alternative growth rates for the above three "consumers".

CONSUMER	ANNUAL GROWTH	DEMAND PROJECTIONS (Mm^3/a)			
		1990	2000	2010	2020
Windhoek	12%	12	38	117	364
	8%	12	26	57	121
	5%	12	20	32	53
Other Municipalities	9%	9	22	52	122
	5%	9	15	24	40
Communal Regions	5,3%	15	25	42	71
	8%	15	32	70	150

A worst case scenario with 12%, 9% and 8% growth rates respectively compounds to a total demand of about 240 million m^3/a for these three "consumers" alone by year 2010. It is then assumed that supply to the communal regions will increase at 8% rather than at 5,3%.

The true financial cost of urban water supply in Namibia is probably heading for amounts in the range of SAR 5-8 per m^3 (bulk supply + distribution, capital and recurrent cost). Such a cost range matches well with the marginal cost of water supply to for example Gaborone which is also going to depend increasingly on long range water transfers. Hence, at to-days Rand - value the economy of urban centres in Namibia would be burdened at the level of about ZAR 1,5 billion annually.

The above point is made here as a prelude to subsequent discussions on tariff policies; needless to say, the issue needs to be studied in depth.

In a recent report by Department of Water Affairs (ref ??), it is shown how it has been possible to revise downwards water demand projections prepared for Windhoek in the past. According to the highest estimates made in

1976/77, the present water demand should have been past the 40 million M3/a level already. 1980/82 estimates were at 30 million m^3/a and the 1988 medium projection predicted about 20 million m3/a.

The issue - as regards Windhoek in particular with its predicted 42% population increase over just two years - is really what impact the unprecedented urban growth will have on water demand. In the water supply and sanitation policy context the above observations and "speculations" clearly merit a vote of serious caution to the decision-makers.

4.3 Health Situation

Protection against public health hazards is freguently cited as one of the major reasons for investing in improved water supply and sanitation facilities. It is widely recognized that such technical interventions are not in themselves sufficient, although they are necessary preconditions for improved public health.

Namibia provides good examples in this regard. The high income minority has a "western" standard of living, including a generally good health status. The majority, however, has a health status of third world standard. There are substantial disparities in helath status within urban areas where water supply and sanitation services are available also to the low income residents.

4.3.1 Health Statistics

Lack of systematic health statistics information from the communal regions is already identified by the Ministry of Health and Social Services as a planning constraint. The below information should therefore be seen as examples only of the prevailing situation.

As can be seen from the Household Health and Nutrition Study (quoted in ref ??), infant and child mortality rates in Katutura are at the 47/1000 and 64/1000 levels respectively; i.e. clearly higher than average national figures for Botswana.

Data from rural and peri-urban Owambo give evidence of a situation which is even more critical; infant and child mortality rates are at the 70/1000 and 100/1000 levels respectively. These are broadly similar to those prevailing in Zambia and Kenya, countries with average per capita incomes roughly 1/3 that of Namibia.

Prevalence of diarrhoeal diseases is frequently used as an indicator of the environmental health situation. Gastro-intestinal infections are also a frequent cause of death among infants/children. The boxed description (Box ??) gives some specific data on diarrhoeal and other water related diseases based on

recent studies in Namibia (prepared by Dr. Bennett, previously with Ministry of Health and Social Services).

The health status among rural residents in communal areas and urban low income groups leaves no doubts as to the justification for reinforced efforts to improve the provision and appropriate use of water supply and sanitation facilities.

As health status invariably is closely correlated with socio-economic status, reference is also made to section 2.5.

The Pattern of Diarrhoeal Disease as Reflected in Hospital Admissions and in Clinics

Onandjokwe Hospital in Owamboland admits the second largest number of patients per year (after Katutura Hospital) in Namibia and was thus taken as an example.

Gastro-intestinal infections accounted for 12% of admissions, being ranked second after malaria. It caused 9,3% of deaths and ranked fifth as a cause of death. Malnutrition caused most hospital deaths and diarrhoeal disease was probably an important contributory factor.

Of a total of 20,340 stool specimens examined in the hospital/laboratory in 1990, 36% were positive for parasites, the most common being Amoeba (25% positive), Giardia, Ancylostoma and Strongloides.

Between 1 March 1990 and 6 April 1990 a total of 4,727 patients with diarrhoea were seen at hospitals and clinics in Owamboland. In this period 36% of stools examined were positive for one parasite and 9% had mixed infections. The most common sources of water among the cases with diarrhoea were wells, cancel oshanas and excavation dams.

In 1988 7,213 cases of diarrhoea were seen in Owamboland giving an incidence rate of 1311 per 100,000 which ranks it with malaria as a major cause of morbidity.

Prevalence of Schistosomia, Hookworm and Strongyloides in Cuando Area of E. Caprivi

In a survey done recently in this area most cases of S. Mansoni occurred in the age group 6 - 15 years.

Prevalance of S. Mansoni ranged from 85 - 90% in many of the villages along the river. Hookworm and Strongyloides prevalence was 30 - 35%.

Child Health

The UNICEF sponsored Household Health and Nutrition Survey in May 1990 showed that for all regions surveyed (North and Katutura) 33% of children had suffered from diarrhoea in the previous two weeks. This implies about 4 episodes in the period January - June, each with considerable nutritional consequences.

4.3.2 Effects of Water Quality

Inferior water quality is often a cause of waterborne infections in African countries, even with "treated" and piped water as supplied in towns and cities. This is not the case in Namibia; water supplied by Department of Water Affairs to all its consumers for domestic purposes met with the World Health Organisation criteria for bacteriological standard. More than 7,700 samples were analyzed in 1988/89.

Also for chemical parameters the water quality sampling generally confirmed that supplied water met with recognized safe health standards. Only in 1,25% of the chemical analyses carried out on more then 3,700 samples were fluoride contents marginally exceeding the target standard.

These records - in a public health context - prove that safe water quality in itself does not ensure a high health status among the consumers. In the sector policy context this underlines the need to promote behaviourial changes. These can only be brought about through appropriate health education campaigns and better understanding at community level of appropriate water use. Involvement of the communities in responsible capacities has proved to assist in such endeavours, particularly in rural water supply.

In most rural areas where people rely on unimproved sources, poor water quality is a matter of concern. Reference is made to occurrences of gastro-intestinal infections and schistosomiasis. Nevertheless, it is well proven that the primary cause of water related (rather than waterborne only) diseases can be referred to inadequate quantities used for personal and domestic hygiene purposes. Hence, there is a case for pursuing easy access as a higher priority than potable standards.

4.4 Relevant Legislation

Article 100 of Namibia's Constitution emphasises the importance of water as a national resource; water in its natural state belongs to the government unless otherwise decided in accordance with the law. As the present **Water Act (Act 54 of 1956)** does not contain this provision, it is now in the process of being redrafted.

4.4.1 Water Supply

In terms of the Water Act the Department of Water Affairs is responsible for the supply of water in bulk to mines, municipalities, Peri-Urban Development Board and other identified growth points. In terms of the said legislation the department is also responsible for the distribution, quality and control measures with regard to purification and disposal of industrial water and sewage effluents. In terms of regulations R1277 and R1278 of the Water Act the department is further responsible for allocation and regulating of water for irrigation purposes and control measures for the abstraction of groundwater in designated water control areas.

In respect of service charges the Department is only responsible for the determination and collection of tariffs for the supply of water from its own schemes according to the present act.

4.4.2 Sanitation

Local authorities, municipalities and the Peri-Urban Development Board, are responsible for these functions in respect of proclaimed municipal town and peri-urban areas respectively, and the Ministry of Local Government and Housing for the planned towns in communal areas and the Department of Agriculture and Rural Development in respect of villages and settlements in communal areas. In the case of municipal areas the Municipal Ordinance, 1963, (Ordinance 13 of 1963) is applicable, and Government Notice No. 137 of 15 August 1973 with regard to the Peri-Urban Development Board. In fact, there is no regulation appropriately controlling the villages and other small settlements.

Department of Water Affairs is responsible for issuance of discharge permits, effluent control and pollutional aspects in accordance with the Water Act. Ministry of Health and Social Services also have control functions empowered through the Public Health Act.

4.4.3 Tariffs

The municipalities, Peri-Urban Development Board and now also - after abolishing of the 2nd tier administrations - Ministry of Local Government and Housing are empowered to levy tariffs within their areas of jurisdiction. The legal provisions are found in the following ordinances/proclamations :

- Section 40 (1) of Ordinance No 19 of 1970; whites and coloureds;
- Section 32 of Natives (Urban Areas) Proclamation no 56 of 1951;
- Municipal Ordinance, Section 243.

Previously, the Administrator General of the past regime was empowered to approve all tariffs for water supply and sanitation services. This requirement was revoked in February 1990 and the authority to levy tariffs is now vested with the respective service undertakers.

Obviously the above legislation containing references to ethnic groups has to be redrafted.

The autonomy instituted in 1990 - although not providing for direct income to the concerned government departments - is in principle desireable. However, for tariffs to serve as a comprehensive management tool also in relation to overall management of water resources, there needs to be a focal approving body. The interests of the State may often be at variance with that of individual water or sanitation undertakers.

4.4.4 Public Health

The Ministry of Health and Social Services has statutory responsibility for health service matters, including primary health care, in accordance with the Public Health Act (1919). This act is old-fashioned and empowers the ministry to instigate preventive measures when "nuisances" are being created.

Various regulations determining specific requirements and standards are in force.

The ministry's Health Inspectorate is in principle responsible for environmental sanitation, including (vaguely) rural sanitation and the control of water sources from a health point of view. The function remains to become effectively discharged outside municipal areas.

4.4.5 Local Authorities

Local authorities play an important role in the provision of services for urban areas (excluding the communal towns so far). The legal framework is provided by the Municipal Ordinance, 1963 (No 13 of 1963) and the Peri-Urban Development Board Ordinance, 1970 (No 19 of 1970) for municipalities and peri-urban towns respectively. In addition, there are various proclamations, government notices and ordinances regulating the establishment of townships on an ethnic basis.

A new act is presently being drafted; the Local Government and Regional Council Act. Its provisions are not yet known. Obviously it will revoke the ethnically based regulations, and it will also enact the regional authorities. Two issues are of crucial importance for the future administration and performance of the water supply and sanitation sector :

- The financial autonomy and access to credit for municipalities and other town authorities
- The statutory responsibilities and operative functions delegated to the regional authorities

The role of the regional authorities may become crucial for the decentralisation and devolvement of authority process which would favour water supply and sanitation sector performance. Moreover, the new act may also create the statutory responsibility and administrative framework needed to address the below mentioned village planning problem.

Also problems related to the land issue in communal regions may be resolved in the new act. Land allocation is currently made at the discretion of the local traditional leadership (headman). This may have to be brought under at least

a semi-formal authority such as a Land Board or similar. The current situation in some of the communal regions is not conducive to a rational provision of services and environmentally sound land use strategy.

4.4.6 Town Planning

Properly regulated and laid out towns are a prerequisite for cost-effective planning and implementation of infrastructure, water supply and sanitation included. Town planning in this regard entails both the broad zoning to accommodate long term growth up to a defined saturation level and the detailed plans for phased development within allocated zones.

Town planning requirements as specified by the law, currently apply to municipalities, peri-urban towns and the 37 designated communal towns. The legal provisions are found in the Town Planning Ordinance, 1954 (No 18 of 1954) and in the Townships and Division of Land Ordinance, 1963 (No 11 of 1963). Naturally, the planning has to take place within the framework providing for statutory responsibilities to local authorities, etc. as set out above. All land which is subject to such planning, has to be fully surveyed.

The present procedures to be followed for obtaining proclamation of a township entail 18 steps (information obtained from Windhoek City Council), starting with preparation of the layout and ending with notice of proclamation in the Official Gazette. These procedures are rather cumbersome and it usually takes 2 years from a layout is prepared till the gazette notice is published. This has, for example, resulted in a situation whereby some 1000 serviced stands in Windhoek have not yet been officially proclaimed.

There seems to be considerable scope for simplifying and shortening the planning and approval procedures without jeopardizing such important features as public hearing, review by concerned government departments and political decisions.

A problem related to town planning requirements is the absence of statutory responsibility for villages in the communal regions. Many of these grow rapidly, particularly under the influence of large new establishments by the government. With increased attention being paid to provision of schools, clinics and other service facilities in the rural areas, the problem is going to accellerate. **As a minimum, some simple zoning should be made to ensure that reserves for future roads and other services are established for the growing villages.**

4.4.7 Other Legal Aspects

Water supply and sanitation are also infrastructure facilitating other developments. This implies that a vast body of acts, ordinances and

regulations constitutes the overall framework. It is beyond the scope of the present Report to review all these legal aspects.

One aspect is, however, becoming increasingly important; the environmental issue. The Water Act covers water pollution, but there is a need to create an overall legal framework to ensure that the necessary strength is given to environmental considerations. This relates to such issues as land degradation, protection of ecosystems, environmental assessment of projects, management of natural resources, social environmental costs and benefits, etc., etc.

Execution of environmental management should become part of the water supply and sanitation sector management as well as that of other sectors. The legal framework is currently under review and one can expect also this field to undergo substantial revisions in the near future. The need for overall guidelines and appropriate, practical management tools will hopefully be resolved.

4.5 Manpower for the Sector

4.5.1 Present Sector Civil Service

The high performance standards achieved in some areas of the water supply and sanitation sector would not have been attained without highly qualified manpower and good management practices. This competence and capacity, which was predominantly directed towards the minority controlled segments of society, constitute a resource which needs to be built on for future service expansion.

Department of Water Affairs is the leading professional agency within the sector. Even with high vacancy rates (in the range of 50% for professional and technician groups) the organisation is still well able to discharge its duties. The total establishment is in excess of 2,000 posts of which about 600 were vacant by 31 March 1989.

Likewise the municipalities, the Peri-Urban Development Board and the various ministries responsible for water supply and sanitation services have high professional and management standards. Motivation and productivity among the lower cadres are reported to be unsatisfactory, in particular affecting maintenance services. The exact establishments and vacancy rates are not known. As examples, however, it can be mentioned that :

- Ministry of Local Government and Housing (Division of Communal Towns) has about 800 employees serving the 37 towns (a few actually served from the neighbouring town); 20% of these may be directly engaged in water supply and sanitation services

- Directorate of Rural Development has about 650 workers ranging from artisans/qualified factotums to unskilled labourers carrying out maintenance on rural water supplies in the respective communal regions

- Windhoek City Council has 800 employees in its technical department; 25% of these may be directly engaged in water supply and sewerage services.

There has been a high degree of resignations from the civil service, partly by people who have left the country and partly because the private sector has offered better terms. The professionally attractive environment existing within most of the sector agencies should be protected and retained as a means of keeping and recruiting personnel into what appear to be challenging positions.

The Manpower Survey (Department of Economic Affairs 1988) revealed an estimated countrywide shortage in 1988 of 365 architects, engineers and related workers, 429 medical personnel and 103 plumbers, just to mention some categories relevant to the sector. With the departure of many qualified people since that time, the situation may be no better at present.

4.5.2 Implications of Present Constraints

For sector expansion and for affirmative action aimed at securing a broader representation of the majority population group in the civil service, there are other fundamental problems. The educated human resource base is limited, manifested in the approximately 60% illiteracy rate prevailing among the adult population. The base from which students for higher technical and administration or management education can be recruited, is indeed still weak.

Some typical features of the current situation include :

- Former exiles trained abroad have not had the opportunity to go through progressive practical experience

- The number of matriculants eligible for entry into higher education is exceptionally low among the majority population group, in particular in the communal regions

- Opportunities for higher technical education are severely limited in Namibia, and indeed in the region as a whole (except for the Republic of South Africa)

- Training abroad, in particular in Western countries, is expensive and often not appropriate to the requirements of Namibia

In total, this situation points at a slow process of change if professional standards are to be maintained. There is no shortcut to experience. What provides hope in the longer term, is that donors usually view support to education and training at all levels as a prerequisite and complementary input to development programmes.

Attitudes among fresh graduates towards taking up work in the communal regions, often under harsh conditions, are not known. Experience from other African countries suggests that higher education is associated with white collar work in cities and major towns. As the most immediate positive contributions can be made by officials in their own (i.e. communal region) environment, there need to be sufficient incentives to make such postings attractive.

5. OBJECTIVES FOR SECTOR DEVELOPMENT

5.1 National Development Context

The history of Namibia has resulted in unacceptable disparities in terms of income and virtually all other socio-economic indicators among the different population groups. Quite justifiably the new Constitution therefore has **equity** as a fundamental principle; equale access to services and equal economic opportunities for all Namibians.

The above chapters 2 - 4 explained some of the current disparities, both in general terms and with specific reference to the water supply and sanitation sector. Chapter 8 below will also make brief analyses of the present distribution subsidies granted to the sector.

Financial resources are limited at present due to the recession in the Namibian economy. Threre are, however, signs that this situation will improve, and some of the shortfalls may be off-set by donors' grants for sector development.

The announced budget for 1991/92 appears positive in this regard.

Redistribution is a theme in the national economic development strategy. The water supply and sanitation sector will be required to contribute during this process, in particular through :

- Improved provision of facilities for currently under-serviced groups
- Adjustments of the tariff policy to facilitate both redistribution within the sector and cost-sharing between the authorities and the beneficiaries

The pace and extent of redistribution and overall service improvements will depend on the performance of the Namibian economy. The uplifting of a 95% majority cannot be done overnight just by taxing the 5% high income minority. The Minister of Finance therefore in his 1991/92 budget speech in Parliament stated that :

> **"Growth without redistribution is meaningless while at the same time redistribution without growth is unsustainable".**

This statement which reaffirms previous policy statements, presents appropriate overall quidelines for the water supply and sanitation sector policy. Apart from confirming that changes have to be brought about by redirecting parts of available resources, it also implies that the process will take time to

complete to a satisfactory level; economic growth (and one may add : the financial performance of the sector itself) will determine the pace.

In the national development contect, the water supply and sanitation sector should be expected to contribution towards social development and to provide necessary infrastructure for economic development.

5.2 Overall Sector Policy Statement

A **sector policy** is required to set out what the government wants to be achieved and, in broad terms, how the policy can be implemented. Based upon the adopted policy, it is possible to continue by preparing :

- The **sector strategy** which will set out more precisely how the policy can be implemented and identify mainly in quanlitative terms the resources required.

- The **sector action plans** which will quantify the strategy in terms of time, costs, manpower, resource, utilization, etc.

Interpreting the achievements and shortcomings of the sector in a national development context, the following overall long term policy should be adopted:

Essential water supply and sanitation services shall be made available to all Namibians, and be accessible at a cost which is affordable to the country as a whole.

Thus equitable improvement of services shall result from the combined efforts of the government and the beneficiaries, based on community involvement, participation and responsibility.

Communities shall be given the right - within resources available - to determine which solutions and service levels are acceptable to them. Beneficiaries shall contribute towards the costs of the services, within their available means, and at gradually increasing rates for standards exceeding what is determined by the basic needs.

In operational terms, it will be necessary to make incremental improvements to extend coverage to under- or unserved population groups and thereafter aim to reach target service levels. In this process, community ownership and management will have to be explored.

Due to the complexity of the water supply and sanitation sector, requiring a multidisciplinary management, it is essential to establish intersectoral collaboration. Such collaboration will serve to resolve policy matters, assign overall priorities, avoid duplication and ensure complementarity of interventions by the respective actors. A guiding principle should be to see the government as a facilitator managing the national resources in an integrated manner.

Water supply and sanitation sector interventions are also seen to form a part of measures required to improve public health. Due to this important interface with primary health care, it is of interest to observe some key elements of the adopted health policy.

In March 1990 the Minister of Health and Social Services, the Honourable Dr. Nickey Iyambo, issued a Policy statement entitled "Towards achieving Health for all Namibians". In this he stated "The ultimate goal is the achievement of health for all Namibians by the year 2000 by way of the primary health care approach which will include nutrition, safe water supply, basic housing and sanitation, maternal and child care, immunization and prevention of epidemic, helath education and curative services".

The summary of the policy statement also states : "All existing services will be incorporated in a new nationalized Ministry of Health and Social Services which will be restructured to function at a central level responsible for policy formulation, strategic planing and coordination; a regional level to provide management and problem solving support to districts, and a district and local level where functional activities will take place on a decentralized autonomous basis. Mission health services in service in Namibia will be strengthened and maximally supported".

In the policy statement there is also stress on community involvement: "The new government places a high premium on involvement of communities in health and social services provided at their level. This implies communication, consultation and interaction between health care workers and communities in respect of attitudes and actions towards the causes of poor health. The objective shall be to make the communities master of sustainable primary health care programmes in their own environments".

5.3 Recommended Sector Objectives

In keeping with the above overall policy statement and observing the shortfalls and constraints identified in previous chapters, a set of overall sector objectives is recommended in the following. The motivation for these objectives and their priority ranking is commented on very briefly only where deemed necessary.

5.3.1 Water Supply

It is recommended to adopt the following objectives for water supply:

Provision of improved water supply should:

i) **Contribute towards improved public health**

ii) **Reduce the burden of collecting water for domestic purposes**

iii) **Promote community based social development**

iv) **Support basic needs for subsistence**

v) **Promote economic development**

The priority ranking should be in the above order, subject to assessment of local conditions. All five objectives apply to the rural (in particular communal) regions. Objectives (i), (iii) and in particular (v) apply also to urban areas.

The operative stategy to achieve these objectives would be to develop reliable, safe sources of water with sufficient capacity, and easily accessible, to serve all homesteads and settlements. In doing so, the priorities would be to :

a) Ensure a basic lifelime supply of 20 l/c/d within 1,000 m of the homestead

b) Ensure that the consumers themselves accept responsibilities in accordance with this policy

c) Discourage non-essential or excessive water use

As reflected above, the highest priority should be to achieve the social (including health and community development) objectives as the attainment of these is a prerequisite for economic growth on a broad scale in the long term.

5.3.2 Sanitation

It is recommended to adopt the following objectives for sanitation:

Provision of improved sanitation should :

i) **Contribute towards improved health**

ii) **Ensure hygienic environment**

iii) **Protect water sources from pollution**

iv) **Promote conservation of water**

v) **Promote economic development**

Sanitation in this regard encompasses all aspects of waste water and human wastes disposal. However, solid waste (i.e. municipal garbage, industrial non-liquid wastes) have not been specifically considered.

In practice, objectives (i), (ii) and (iii) apply to the rural conditions whereas all five are applicable to the urban situation, including industrial sites.

The operative strategy would be two-fold, namely to :

- Encourage and support construction of affordable on-site facilities primarily for excreta disposal in rural areas and urban fringes/low income areas
- Continue to provide waterborne sewerage with adequate treatment and disposal where required and affordable

In doing so, the priorities would be to :

a) Introduce a "Latrine culture" in rural areas and through communication support create a demand at community level for sanitation

b) Ensure maximum conservation of water, including effluent re-use where possible, in areas with waterborne sewerage

As reflected above, the water conservation issue is an essential aspect of sanitation; appropriate solutions (i.e. in-house plumbing, treatment and disposal) may greatly reduce the amount of water lost unproductively. Poor health status in the communal regions, and presumably also among farm workers' families, justifies campaigns aimed at **introducing and expanding latrine coverage** for excrete disposal in rural areas.

5.3.3 Irrigation

Irrigation is primarily a resource input towards more intensive farming. However, as irrigation relates substantively to the water resource issue, and partly also to the health issue, it is covered to some extent in this regard.

The objectives of irrigation should be to :

i) **Promote improved nutrition and surplus production at household levels**

ii) **Improve sustainable national food self-sufficiency and security**

iii) **Support sustainable settlements**

In an arid and semi-arid country the temptation to embark on irrigation projects for extension of arable agriculture may be almost irresistible from a political point of view. The financial performance of First National Development Corporation's irrigation schemes along the Okavango River demonstrates the need to be cautious.

Considering the vast amounts of water involved, typically ranging from 15,000 - 60,000 m^3/ha per year, no irrigation scheme should be embarked upon without conducting a comprehensive feasibility study. The viability of the project, all benefits including those of socio-economic nature, must be demonstrated before implementation is decided upon.

5.4 Comments on Recommended Objectives

The objectives should be interpreted in the context of this policy. A part of this is the priority ranking of allocation of water for competing demands. The present policy, ranking demands in the following order, should be continued:

i) Water for domestic purposes, including livestock for subsistence and economic farming

ii) Water for mining and other industrial activities

iii) Water for irrigation

The long term costs, and presumably also national scarcity of water, border rivers included, should be adopted as an overall guide to water development strategies.

A prerequisite for achieving the stated objectives is to involve the consumers and users in the process of developing water supply and sanitation facilities as responsible participants.

This implies a need for participatory training and education in all aspects related to appropriate use and domestic hygiene, community based management, as well as operation and maintenance skills.

As an antidote to the productive benefits of irrigation schemes, they may also introduce new health hazards such as malaria, schistosomiasis and other water related parasites. Hence, the case for educational measures, protection of farmers, proper designs and well planned operation of the schemes is very strong.

5.5 Targets and Planning Horizons

The description of the current situation (chapter 3) and the knowledge of settlement pattern (chapter 2) and available water resources suitable for exploitation is insufficient for a precise definition of service targets to be achieved at defined times. This applies to the under-serviced areas such as rural areas, parts of villages, peri-urban areas and squatter settlements in the communal regions and also to unserviced squatters in other urban settlements.

For most of the urban areas (municipalities and peri-urban towns), the issue is to maintain present service standards and to be able to cope with rapid population growth.

In summary, targets for water supply and sanitation service provision could be formulated as follows :

Urban : Maintain current service levels, with the addition that squatter and unserved fringes be catered for by the medium term; tariffs to be an important financial instrument to achieve target.

Rural : Impossible to quantify current shortfalls and therefore also targets; make comprehensive review of water supply situation as soon as 1991 census information is available and set out targets based on alternative financial/development cost scenarios, with defined community contributions.

Implement sanitation pilot schemes in the short term; implementation strategies and service targets to be developed based on pilot project experiences (costs, public response, institutional arrangements, etc.); full scale implementation towards full coverage to continue during the medium and long term.

Tentatively implementation of policies and specific activities may be referred to the following time frames or planning horizons :

Short term : 1991 - 1996 over the next 5 years

Medium term : 1991 - 2005 over the next 15 years

Long term : 1991 - --> from present time and beyond year 2006

Time blocs are subject to review; the aim should be to make the basic investigations, decisions and adjustments during the short term, continue implementation to reach the policy scenario during the medium term, and thereafter continue the policy (revised as required) to serve in the long term.

It may not be required to take a 15 year view on the adjustments of urban water supply and sanitation strategies; an adequate tariff policy may go a long way towards redressing the situation, provided full cognisance is taken of the projected rapid urban population growth.

The short, medium and long term horizons have been used in this Report to indicate the time frames only. In most cases short term initiatives are prerequisites for the continued medium term actions and so on.

6. RECOMMENDED ALLOCATION OF RESPONSIBILITIES

6.1. The Administrative Framework

Various aspects of the administrative framework has already been commented upon above. The most important cross references are as follows:

- Section 2.3 comments on the abolishing of the 2nd tier government (ethnically based administration)
- Section 3.1 gives an overview of the water supply and sanitation sector actors
- Section 4.4 outlines the most relevant legislation, pointing out present statutory responsibilities
- Section 4.4.5 makes reference to the possible implications of the forthcoming Regional Councils

The recommendations for specific allocations of responsibilities are made within this framework. Even though changes may soon be made in the overall administrative structure, it is adviseable to arrive at full clarity at the present stage for two reasons:

- Firstly, the necessary sector actions can be initiated and continued immediately by the agency or institution given the functional responsibility
- Secondly, when changes are eventually introduced, it will be easier to identify and to transfer responsibilities which are already clearly defined and vested with a specific agency or institution

This chapter contains the definitions and recommendations that are particularly relevant to specific schemes. Overall functions in relation to policy-making, planning, coordination, etc. will be taken up in chapter 7 as a summarized consequence of the specific responsibilities recommended in this chapter.

6.2. Introduction to Allocation of Responsibilities

The basis for recommendations on responsibilities was laid at the WASP Committee Workshop held in Swakopmund 5 - 7 March 1991. The recommendations of the workshop have been reviewed and discussed in the course of the subsequent work. This Report on sector policy presents the final conclusions and recommendations as far as the WASP Committee has been able to reolve the issues.

The following sections present the outcome of the workshop and subsequent deliberations in terms of :

- fundamental principles to be adopted
- consumer/user group definitions, including land ownership
- identification of the relevant responsible bodies and authorities
- definition of scheme types applicable for water supply, sanitation and irrigation services respectively
- definition of water supply, sanitation and irrigation functions respectively
- allocation of responsibility for each function against the respective scheme types and consumer/user groups

The terms "*consumer*" and "*user*" have been adopted for the beneficiary of a water supply/irrigation and a sanitation scheme respectively.

6.3. Basic Policy Principles

Specific policy principles were adopted by the WASP Workshop as the basis for detailed recommendations. The more detailed justification and implications are discussed elsewhere in this Report. The principles for water supply and sanitation respectively have been summarized in the following.

6.3.1. Water Supply

Water tariffs levied in Namibia have been aimed at recovering from the consumer at least the running cost of bulk water supply for domestic (i.e. human and livestock) needs. With capital costs being met from State funds, the consumer and the State have a common interest in keeping costs of water supply low.

This should be pursued by making the consumer self-supporting as much as possible in his water requirement and by restricting the extent of direct State involvement in water supply. It is therefore recommended that the allocation of water supply responsibilities should be based on two fundamental principles, namely:

Maximum Consumer Involvement

The consumers should be active recipients of the benefits provided by the State, accepting and meeting certain obligations. They must be involved and

participate in the various aspects of planning, implementing, managing and financing of water supply schemes. Through this process the consumers will gain a sense of ownership and values. They can also, as individuals or communities, to some extent achieve their own goals and objectives.

Lowest Level of Delegation

The majority of water supply functions should for practical and financial reasons be carried out at the lowest possible level of delegation. The specialized nature of certain types of functions, as well as the need for State control, may however require particular functions to be retained at a more centralized level.

6.3.2. Sanitation

Conventional waterborne sewerage systems as used in urban areas were originally designed for the convenience of the user rather than for economic or public health reasons. It is therefore widely accepted that the user contributes towards the costs of this benefit.

Sanitation services outside urban areas will require more cost-effective methods with emphasis on prevention of health hazards. Affordability and preferences among users will determine the selection from a number of feasible, mainly on-site, options.

It is in the interest of both the State and the user to keep the costs of sanitation low in order to achieve maximum coverage within the financial constraints. This should be pursued by making the user self-supporting in sanitation requirements and by restricting the extent of direct State involvement in the provision of sanitation services. It is therefore recommended that the allocation of sanitation responsibilities should be based on two fundamental principles similarly to those for water supply, namely:

Maximum User Involvement

The users should be active recipients of the service or assistance provided by the State, accepting and meeting certain obligations. They must be involved and participate in the various aspects of the planning, implementation, management and financing of their sanitary facilities. Through this process they will also gain a sense of ownership and values. The users can, as individuals or as a community, to some extent achieve their own goals and objectives.

Lowest Level of Delegation

The majority of sanitation functions should for financial as well as practical

reasons be **carried out at the lowest possible level** of delegation. The specialized nature of certain types of functions and the need for State control may, however, require particular functions to be retained at a centralized level.

6.4. Basic Definitions

6.4.1. Consumer/User Groups

The definitions of beneficiaries of water supply and sanitation schemes are identical. They are, however, referred to as consumers and users respectively. The definitions as agreed upon by the WASP Committee are as follows:

The **consumer/user** is in this context the assemblage of all potential water/sanitation users in a cohesive geographical unit. Hence, it is not necessarily the individual person, institution or organization that makes use water or sanitation services.

The consumer/user groups (assemblages) to be considered will comprise the following:

- Farm

  An agricultural enterprise run by an individual or a company on an area of land which is not necessarily the property of the individual or company, where water/sanitation facilities may be used for both domestic and agricultural purposes.

- Community

  An assemblage of dwellings where a number of people reside, who individually may make a living from agriculture or from other means, and where no permanent government facilities (e.g. school, clinic, post office, police station) exists.

- Village

  A group of houses and other buildings situated in a rural area where some permanent government facilities (e.g. school, clinic, post office, police station) have been provided for rendering a public service to the population in the village and the surrounding area, and where the majority of the population does not carry out farming operations.

- Government Centre

  A centre which exists for the purpose of carrying out a specific

governmental function only (e.g. a border post), and which is run by the relevant government department.

- Town

  Planned centre of population which may be managed by a local authority, and where provision has been made for the establishment of public facilities according to an approved development concept. This level of community development represents a transition phase from a village to a municipal town. The responsible authority may be a central government authority. A distinction will be made between un-proclaimed and proclaimed town areas.

- Municipal Town

  A planned centre of population which is managed by a municipal authority.

- Water Supply Region

  An arbitrarily defined administrative division of the country as related to a water supply scheme's service area.

6.4.2. Land Ownership

Ownership of the land occupied by the consumer/user can either be private or state/communal, defined as follows:

- Private

  Private land is the land which is not State property, irrespective of whether the consumer/user is the owner of all or of part of the concerned land, or whether the land is hired from a private owner.

- State

  State land refers to all land that is the property of the State, including surveyed and unsurveyed land, irrespective of whether the land is communal land or not. A distinction may be made between communal land and other State land where applicable.

6.4.3. Responsible Bodies and Authorities

The following organisations or authorities may be allocated responsibility for certain water supply and/or sanitation activities:

- Informal Consumer Representatives (CR)

  Informal consumer representatives are defined as individuals, or organisations consisting of private individuals, who represent the consumer and act on his behalf.

- Local Authority (LA)

  A Local Authority may be a municipality or some other officially instituted body of local government.

- Local Government (LG)

  Local Government refers to the Ministry of Local Government and Housing.

- Works (DW)

  Works refers to the Department of Works, of the Ministry of Works, Transport and Communication.

- Agriculture (AG)

  Agriculture refers to the Directorate of Agriculture, of the Ministry of Agriculture, Water and Rural Development.

- Rural Development (RD)

  Rural Development refers to the Directorate of Rural Development, of the Ministry of Agriculture, Water and Rural Development.

- Lands and Resettlement (LR)

  Lands and Resettlement refers to the Ministry of Lands, Resettlement and Rehabilitation.

- Water (WA)

  Water refers to the Department of Water Affairs, of the Ministry of Agriculture, Water and Rural Development.

6.5. Water Supply Sector

6.5.1. Water Supply Functions

The complete water supply function entails a wide range of activities. Some

of these may be performed only once at each water supply scheme, whilst others are of a continuous nature. For clarity, each function is defined as a consistent group of activities in terms of their nature, where they are carried out and the level of knowledge required to perform them.

The identified water supply functions are defined below in the form of a brief description of the activities they entail:

- Need Identification

  Before a new water supply can be created or an existing supply be improved, the need for this service has to be identified. The purpose for which water is to be used, the volume of water required and the location where water is to be supplied should, amongst other things, be addressed.

- Need Assessment

  The identified need has to be evaluated, both in terms of the requirement and the priority of the service to be rendered, relative to other identified local water needs.

- Source Development

  Possible surface water and groundwater resources must be identified, investigated and evaluated. Regional and local hydrological and geohydrological potential assessment, geological and geophysical investigations, the recommendation of borehole sites, and the drilling and test pumping of boreholes are activities which form part of this function. Once a final resource evaluation is completed, sources which can be utilized for the water supply are to be developed. A dam in a river and a production borehole are examples of water sources.

- Scheme Development

  This function refers to all activities related to the establishment of a water supply scheme once water sources have been developed. Activities may entail the carrying out of feasibility studies, which include environmental and financial assessment, appropriation of funds, design of the scheme, construction and project control.

- Scheme Operation and Management

  The function comprises the normal physical operation and management of the water scheme, including maintenance of infrastructure, staffing, management of personnel, financial

management of income and expenditure, and activities relating to the responsibility for water quality control and borehole water level measurements.

- Source Management

  This function entails the monitoring of water source reserves and an advisory service to people responsible for scheme operation and management regarding the utilization of water sources, to be based on source monitoring by the party responsible for scheme operation. The main aims of source management are to prevent damage to water sources by incorrect utilization practices and to ensure that water resources are exploited within their long-term sustainable yields.

- Water Data Logging

  Considering the scarcity and quality problems of water resources in the country, an important function is to continue monitoring of the water sources. This requires that a comprehensive water resource data bank be maintained as a central register for easy retrieval of the collected hydrological, geohydrological and water quality information. Such information includes stream flow and rainfall records, description of the geological formations encountered in boreholes, the depths of water strikes, fluctuations in rest and pump water levels, as well as the biological and chemical quality of the water.

- Tariff Policy Formulation

  A water tariff policy has to be formulated and adapted as required in order that tariffs may be determined, imposed and collected in accordance with agreed objectives.

- Training: Source Management

  Water sources must be utilized within their safe yield capacity to ensure that a reliable water supply can be maintained both in the short and long term. This is particularly relevant to small water schemes which rely on boreholes and surface water as a source. Personnel managing the schemes must be trained in the source monitoring tasks and in the execution of directives relating to source utilization.

- Training: Scheme Operation and Management

  Training has to be given to the people with assigned responsibilities for scheme operation, maintenance, and management. Special

attention should be paid to the training of informal consumer representatives to enable them to perform their water supply tasks in a proficient manner.

- Extension Service

  Basic advice on technical, social and health aspects regarding water supply and water use. Management of the specific water supply schemes must be transferred to the population through discussions facilitated by the extension officials. The consumer responsibilities and the issue of water tariffs will be taken up and explained during such discussions. The extension officials should also ensure that the opinions and requirements of the population are conveyed to the relevant responsible authorities, thereby utilizing the extension service to provide for a two-way communication.

- Training: Extension Service

  Training must be given to the extension officials, enabling them to facilitate communication with and training of the population. In order to give them a clear understanding of the basic aspects and disciplines involved in water supply, various ministries and departments must contribute to the curriculum development and actual training of extension officials. The training will put emphasis on coordination needs, communication skills, basic management procedures and monitoring capability.

This last function which was identified during the WASP Workshop should be assigned to the same authority which is responsible for extension services. The function will therefore not be further elaborated on in terms of responsibility allocation, but will be discussed in the human resources development context later on in the Report (Chapter 10).

6.5.2. Water Supply Scheme Type

The scheme type categorizes the way in which water is supplied to the consumer, but does not define the ownership of the scheme. The following definitions have been adopted:

- Well Scheme

  A well scheme is defined as a scheme where the water resource has been developed by hand excavation, auger drilling or other simple drilling techniques. It may be utilized by means of manual or motorized water lifting. A distinction is made between manual and motorized facilities. A typical example of a manual well scheme is a

shallow well source equipped with a handpump or a windlass and where no water storage facility is provided. The same well may be changed to a motorized scheme if a wind, solar or diesel engine powered pump is fitted.

- Borehole Scheme

  A borehole scheme consists of one or more boreholes equipped with manual or motorized pumps. The distinction between manual and motorized pumping is the same as for well schemes. Motorized borehole schemes may deliver water into a storage facility. Such a scheme is not intended to serve large population concentrations, but may typically supply water for domestic use and stock drinking purposes to a small group of consumers.

- Small Surface Water Scheme

  A small surface water scheme is defined as a water supply providing water to a small community. The scheme utilizes a surface water source like a perennial river, or a small dam or excavation dam based on an ephemeral river, and it may have a simple water purification facility and storage reservoir.

- Bulk Water Scheme

  A bulk water supply scheme is a large water scheme which supplies water to a consumer with a substantial water demand. Such schemes encompass water sources and other infrastructure which may require the full-time services of operation and/or maintenance personnel, and deliver water in bulk to the consumer at appropriate central points. The bulk supply of water is metered at the supply point and is disinfected, usually by chlorination, if it is intended for domestic consumption. Metered off-takes from the mains may be provided to serve small consumers.

- Water Distribution Scheme

  A distribution scheme consists of the reticulation system from the central bulk supply point where water is metered, to points where it is accessible to the individual users. Such a distribution system can include community standpipes and may extend up to individual household connection points which may be metered.

Other schemes which may be relevant are developed rivers and canals, as well as water harvesting schemes. These categories were not defined during the WASP Workshop, but will be discussed in the appropriate technology context later in this Report.

6.5.3. Allocation of Water Supply Responsibilities

The WASP Workshop agreed to assign water supply responsibilities to the respective parties basically as as set out in the attached charts, reference Tables 6.1A and 6.1B. Two issues have, however, been taken up for discussions in the course of continued deliberations:

- Department of Water Affairs accepts the responsibility for source development of boreholes for communities also where manual pumping is involved

- The provision of services for villages is problematic; there is no authority with statutory responsibility for such settlements and they may range in size from a small place where a health post with a few dwellings around it to a sizeable settlement which would merit consideration for town status. Blank spaces are left in Table 6.1B where the responsibility issue has not been resolved.

The underlying problems concerning villages was commented upon in section 4.4.6. Recommendations for temporary arrangements are made in section 6.8.3 and partly also in section 7.5.

The exercise was completed without attempting to speculate into future administrative structures such as regional authorities and possible unified district level structures.

In summary, the depicted allocation of responsibilities show that the **Directorate of Rural Development** is assigned a crucial and critical role in water supply to the farming population in the communal areas. The tasks of the directorate span the entire range from Need Assessment to Operation and Management, in particular for the small installations in sparsely populated areas. This is the result of applying the user involvement and delegation principles, as interpreted by the Workshop. Hence, the **Informal User Representatives** should become key actors in community water supply.

Moreover, the proposed allocation of responsibilities is based on the assumption that the **Ministry of Health and Social Services** will develop its primary health care function in all areas of the country, providing for the health and hygiene education required to realize the health benefits of improved water supply. This input is considered complementary to the work of extension officials promoting water supply development.

The **Department of Water Affairs** will according to the recommendations become the custodian of the country's water resources on behalf of the State. This implies responsibility for assuming the lead role in issues pertaining to water policy, legislation and resource investigations and management which

will be further commented upon in chapter 7. In addition, the Department has specific technical responsibilities for source development for boreholes, surface water schemes and for bulk water supplies.

The role of the **Directorate of Agriculture** is proposed to be limited in terms of responsibility for water supply functions. However, with the envisaged role of the informal consumer representatives - in most cases peasant farmers - the sustainability of water supply facilities in rural areas will depend on a socio-economic development which can be triggered mainly by improved agricultural performance. Hence, the extension services and inputs provided by the directorate has an essential indirect support function.

The **Department of Works** has a wide area of operation as a result of the location of State institutions. As a matter of rationalizing the operational responsibilities in the remote areas, it is recommended that other agencies with a presence in a particular area should take over operative responsibilities previously held by Department of Works. However, this issue is part of the unresolved village water supply problem.

The **Local Authorities** and the **Ministry of Local Government and Housing** will according to the recommendation continue to discharge mainly the same services as at present, i.e. for the proclaimed towns/municipalities and for the urbanized centres in the communal regions. For the smaller local authorities the services are managed by the Peri-Urban Development Board.

Although the **Ministry of Health** has not been allocated a specific water supply function however, the ministry has a role to play through its Health Inspectorate; with reference to the Health Act the Health Inspector may instruct the water undertaker to take appropriate action if public health is threatened.

6.6. Sanitation Sector

6.6.1. Sanitation Functions

The functions related to sanitary waste disposal start with the planning of a sanitation system and go right through to the use and maintenance of the facilities. As for water supply, a function is a group of similar and related activities which can be performed by one responsible body possessing the appropriate level of required knowledge.

A brief explanation of each sanitary disposal function is given below:

- Need Identification

  Wherever people are living, the need for sanitation arises and it has to be identified.

- Need Assessment

  The identified need has to be evaluated, taking sociological attitudes and beliefs into consideration. The need will be assessed in terms of volume and location of human wastes produced, possibilities for disposal, water availability, possible future development of the location, which sanitary system alternatives are suitable and acceptable to the community, availability of funds and local building material. The priority of sanitation services must be determined, taking into account the epidemiological and water pollution risks.

- Geohydrological Investigation

  Improper human waste disposal may pollute surface and ground-water, rendering it unfit for human consumption. A geohydrological investigation including soil permeability tests, geological structures and depth to water table is essential in order to eliminate alternatives where the geohydrology proves unsuitable.

- Scheme Development

  This function, carried out in conjunction with the involved communities, comprises all the activities included in a feasibility study (including public health considerations), design within the financial constraints, construction and commissioning as well as project control and ownership.

- Scheme Operation and Management

  This function is the normal physical operation and management of the sanitation scheme, including maintenance of infrastructure, staffing, management of personnel, financial management of income and expenditure, and activities relating to the responsibility for health inspection, water quality monitoring, etc. The requirements vary substantially with the type of scheme.

- Training: Scheme Operation and Maintenance

  Training has to be given to the people with assigned responsibilities for scheme operation, maintenance, and management. This function covers only the scheme types to be managed by a public authority.

Training and motivation of this personnel are essential for them to perform their tasks in a proficient manner.

- Health and Environmental Control

  If a sanitation scheme or other forms of waste disposal causes a nuisance or a hazard to health, measures of enforcement may be applied in accordance with the regulations. The controls can be executed on site by the staff or by a government authority. Follow-up of long-term effects and evaluation of the effectiveness of schemes are important aspects of this function.

- Tariff Policy Formulation

  A sanitation tariff policy has to be formulated and adopted, where applicable, in order for tariffs to be determined, imposed and collected. Where waterborne sewerage is provided the tariffs have to be seen in conjunction with water tariffs.

- Extension Services

  The extension services comprise of two main activities, namely technical support services and user education. The extension officials must ensure that the users are involved in all stages of the sanitation scheme. A support service, based for example at district centres, can be made available for technical advice and assistance during the construction, commissioning, and operation stages, and when breakdowns occur. Special attention should be paid to the training of informal user representatives to enable them to maintain their individual sanitation schemes. Health education is important for promotion of scheme implementation and for its proper use. A distinction is made between technical support services and user education, the latter referring mainly to health aspects, when considering responsibility allocation.

6.6.2. Sanitation Scheme Type

Among the numerous alternatives available, the below types have been found to be of particular relevance. Each scheme may have two or more modifications falling under the same definition. With the scarcity of water prevailing in Namibia, the selection of technology should take into account its associated water requirements.

- Conservancy tank

  The wastes are flushed into a holding tank from where it is emptied

by a vacuum tank truck for transportation to a treatment and disposal site. It can be characterized as: Wet system with road conveyance to central treatment.

- Pit latrine

The wastes are disposed of in a pit dug beneath the toilet where decomposing will take place. The pit latrine is not a suitable receptacle for large volumes of liquid wastes. It can be characterized as: Dry system without conveyance, based on treatment on site.

- Aqua Privy

The wastes are disposed of through a chute extending well below the water level in the aqua privy tank beneath the toilet. The tank has to be water proof and kept full at all times. Moderate amounts of liquid wastes may be discharged into the tank. It may be characterized as: Wet system without conveyance, based on treatment on site (except disposal of emptied solids).

- Septic Tank

The septic tank is a local "treatment plant" which can receive domestic wastewater. The solids will decompose after settling out whilst the effluent must be continuously disposed of, usually by soakage into ground. It may be characterized as: Wet system based on water conveyance, with treatment on site (except disposal of emptied solids).

- Waterborne Sewerage

The domestic wastewater is discharged from the premises into a sewerage system where treatment is provided at a central site. Such systems are often referred to as "conventional" sewerage. It may be characterized as: Wet system based on water conveyance, with central treatment.

6.6.3. Allocation of Sanitation Responsibilities

The WASP Workshop agreed to assign sanitation responsibilities to the respective parties as set out in attached chart, reference Table 6.2.

The village issue is not as complicated in the sanitation context as it is in terms of water supply. Villagers are generally expected to rely on individual on-site sanitation arrangements. A more sophisticated system serving the Government installation will usually be an independent system. In terms of

future growth of the larger villages the planning issue is, however, important also for provision of sanitation.

As for the water sector, the exercise was completed without attempting to speculate into future administrative structures such as regional authorities and possible unified district level structures.

Applying the same fundamental principles, the recommended allocations follow a pattern similar to that for water supply. There is, however, one notable difference; the **Ministry of Health and Social Services** is going to be a key actor through its country-wide role in User Education and Health and Environmental Control. Through its statutory responsibility for primary health care the ministry will also assume an important role in the Need Assessment for smaller communities, also where people reside on private land.

Informal User Representatives, the communities themselves, are going to assume a high degree of responsibility for their own sanitation schemes, in particular in the rural areas. With few exceptions these will be individual, on-site installations. This brings the **Directorate of Rural Development** into a key position also in the sanitation sector. The directorate will be responsible for Need Assessment in the communal areas (jointly with Ministry of Health and Social Services) and for the technical support services to individual households, assisting with implementation of their schemes.

The **Department of Works** should continue to assist the State institutions. As the sanitation facilities are relatively simple, the user ministries will normally require limited assistance with maintenance and repairs. There will be few cases where the government scheme is also serving the adjoining local community.

The **Local Authorities** and the **Ministry of Local Government and Housing** will according to the recommendation continue to discharge mainly the same services as at present, i.e. for the proclaimed towns/municipalities and for the urban centres in the communal regions.

The **Department of Water Affairs** is assigned a limited role in sanitation. The responsibility for geohydrological investigations is linked to the department's competence in water resource issues. Moreover, the delegated authority pertaining to issuance of discharge permits will remain as at present. No specific function has been assigned to the **Directorate of Agriculture**, although issues pertaining to wastewater irrigation, sludge disposal, etc. may have to be referred to the department.

The recommended allocation of sanitation responsibilities is lacking in clarity as to what agency should take the lead role in the sector (i.e. in respect of policy and legislation). This issue which was identified during the WASP

Workshop, will be discussed in the context of overall sector management and coordination in chapter 7.

6.7. Irrigation Sector

Water for irrigation is a tertiary need according to the national priorities. As all allocations of abstraction rights take place within the national legal framework, the Water Board will play the same role as for water to be supplied to meet primary and secondary needs.

6.7.1. Basic Definitions

The WASP Workshop agreed to adopt the following definitions after a specially appointed working group had made proposals:

- "*Consumers*" of irrigation water may be:
  - Farms on private and state land
  - Government centres, such as agricultural training, research, and development centres
  - Regional State schemes
- The functions will in principle be the same as for water, although with a slightly different content, reflecting requirements of irrigation practices and technologies, particularly for:
  - Scheme Development
  - Operation and Management
  - Training: Scheme
  - Extension Service
- Schemes will comprise the following:
  - For Farms: Well, Borehole, Pumping Station, Farm Dam, State Bulk Scheme Distribution, and Drainage
  - For Government Centre: The same as for Farms, except that wells are not applicable
  - For Region: State Bulk Scheme (incl. dams, etc.) only.

For the bulk schemes the primary/secondary distribution of the irrigation water should be considered part of the scheme.

6.7.2. Allocation of Irrigation Responsibilities

The recommendations are as presented in the attached chart, reference Table 6.3.

As irrigation relates to more advanced development of farming, the **Directorate of Agriculture** has been assigned a key role as the government's competent agent. **Department of Water Affairs** will come in on questions relating to water resources and as the prime actor in provision of bulk water supply in response to needs as identified by the directorate.

In relation to this recommendation it must be observed that the **Ministry of Health and Social Services** should be consulted with regard to risks and preventive measures related to schistosomiasis. The ministry would need to have an input into the extension service function, both for the extension worker training and during their contacts with the farming communities. Likewise, if drainage water as refered to below constitutes a public health hazard to downstream populations, the ministry has an inspectorate function to discharge.

It has been agreed that **drainange** should be given particular attention at the respective stages of scheme planning, development and operation. To the extent that a water quality problem may arise from discharge of drainage water into other water bodies, for example resulting from residues of pesticides, fertilizers or excessive content of organic matter, the Water Act applies and the **Department of Water Affairs** shall have to discharge its regulating and control function.

6.8. Summary of Responsibility Allocation

In order to further clarify and summarise the recommended responsibility allocation, the main features relating to each of the settlement (i.e. consumer/user) categories have been set out below. In addition, there are specific functions relating to ministries' and departments' statutory responsibilities which are therefore applying generally to virtually all consumers/users for all scheme types. These include:

- Water data logging to build up the information required to control and advice on optimum water resource utilisation (**Department of Water Affairs**)
- Bulk water supply being used as the water source (**Department of Water Affairs**)

- Geohydrological investigation for safe sanitation in terms of protection against water pollution (**Department of Water Affairs**)

- Health and environmental considerations (excluding general water pollution) as well as user education campaigns in connection with sanitation schemes (**Ministry of Health and Social Services**, with the **municipal authorities** taking part in/discharging these functions in their areas)

- Extension services needed for appropriate planning, development and operation of irrigation schemes (**Directorate of Agriculture**)

6.8.1. Farmers and Other Communities On Private Land

This group, mainly consisting of all the commercial farms with their workers and dependants, shall mainly continue to take full responsibility for their own situation. The authorities come in as result of control, inspection or monitoring functions. Extension services for advice and possibly access to government credit facilities, etc. may continue.

It is only where water supply is drawn from a State bulk supply that the government will adopt an implementing role. However, in this case it will be a strictly "commercial" relationship between the Department of Water Affairs and the consumer.

6.8.2. Farmers On State Land

This group consists of individually located farms and groups of farms in the communal areas primarily. Being farmers, they should be supported as such, but it is recognized that in general they do not have the financial and technical abilities to cater fully for themselves.

It is nevertheless proposed that they shall in principle be responsible on individual or communal basis for their facilities. They should as farming consumers own and operate the installations. The Government should be prepared to assist communities (i.e. group of farms) in certain areas such as:

- Need assessment (**Directorate of Rural Development**)

- Development of sources requiring sophisticated skills (i.e. boreholes and dams servicing a group of farms; (**Department of Water Affairs**)

- Formulation of a tariff policy setting out the conditions for support, pricing of government services and criteria for selective support where individual assessments are required (**Directorate of Rural Development**)

- Extension services for communication with the local communities and technical support in terms of training and repair services (presumably at a cost) will be made available **(Directorate of Rural Development)**

- Where the water source is a state bulk supply, **Department of Water Affairs** will be responsible. In addition, the department has its general water resource monitoring role and will also give quidelines with regard to suitability of sanitation options.

- For irrigation, the functions are divided between the directorates of **Rural Development** and **Agriculture**; the former primarily communicating with the communities and the latter being technically responsible.

6.8.3 Villages

In villages the government has placed itself in a key role through the establishment of institutions which require infrastructure. Apart from a few traders, bar owners and other businessmen, the great majority of dwellers will be farmers. Those should in principle be eligible to the same conditions and support as set out in the previous section.

There is a **need to resolve the issue of who should be responsible** for scheme development, maintenance and asscíated functions. The uncertainty also revolves around the fact that villages may vary greatly in size and complexity, and they are not planned. The WASP Committee felt that Directorate of Rural Development and the Ministry of Local Government and Housing should jointly review what could be done to initiate a simple physical planning function for the villages.

For other functions, the roles are in principle the same as for the farms on State Land as far as the local community is concerned. However, for sanitation the requirements of specific government institution(s) must be taken into account.

- **Department of Works** will be required to take part (and primarily be the key actor) in Need Identification, Need Assessment, Scheme Development, Scheme Management, Operation and Maintenance

- According to the division of tasks, the **User Ministry** will in most cases be able to discharge the operation and maintenance services

6.8.4 Government Centre

Apart from the specific technical advisory and controlling functions assigned to Department of Water Affairs and Ministry of Health and Social Services, the entire responsibility rests with the **Department of Works**, or to the extent that they are capable, with the **User Ministry** for water supply and sanitation functions.

Where the government centre is on experimental farm, an agricultural training college or similar where irrigation is developed, the **Directorate of Agriculture** has responsibilities for all functions from Need Identification, through to Training and Extension Service. **Department of Water Affairs** is also involved, in their particular technical capacity, in relation to such functions as Need Assessment, Source Development, and certain technical training activities.

6.8.5 Unproclaimed Towns

These towns - many are fast growing - in communal areas fall under the responsibility of Ministry of Local Government and Housing. Hence, this ministry is involved in all functions except where **Department of Water Affairs** and **Ministry of Health and Social Services** have specific roles.

The recommendation also points out the responsibility of the individual users where they have on-site sanitation facilities; Need Identification, Scheme Development, Scheme Management, Operation and Maintenance.

6.8.6 Proclaimed Towns

In these towns the **Local Authority** has the full range of responsibilities on behalf of the town residents. The exceptions are constituted by the general responsibilities held by **Department of Water Affairs** and **Ministry of Health and Social Services**.

It should be observed that individual, on-site sanitation facilities exist in virtually all these towns, thus leaving specific tasks - under the auspices of the Local Authority - to the **users**.

In practice, these Local Authorities are managed by the Peri-urban **Development Board.**

6.8.7 Municipal Towns

These have a well developed administration which has statutory responsibility for most of the water supply and sanitation functions. Hence, the **Municipal Councils** are the key actors within their respective areas.

Department of Water Affairs and the **Ministry of Health** have to render their general functions also in the municipal areas.

As there are still - and in future they may become more - residents relying on on-site sanitation facilities, the **users** continue to have specific responsibilities for their own installations.

7. OVERALL SECTOR MANAGEMENT STRUCTURE

7.1. General Guidelines

7.1.1. Complexity of Sector

Six different central government authorities have been allocated specific responsibilities according to the recommendations made in chapter 6. In addition, numerous individual local authorities (presently 15 municipalities and 25 peri-urban towns) have substantive responsibilities within their areas of jurisdiction. Finally, the consumers/users who will be in charge of their own facilities to a large extent, represent a big and non-homogenous group accounting for about 70% of the national population.

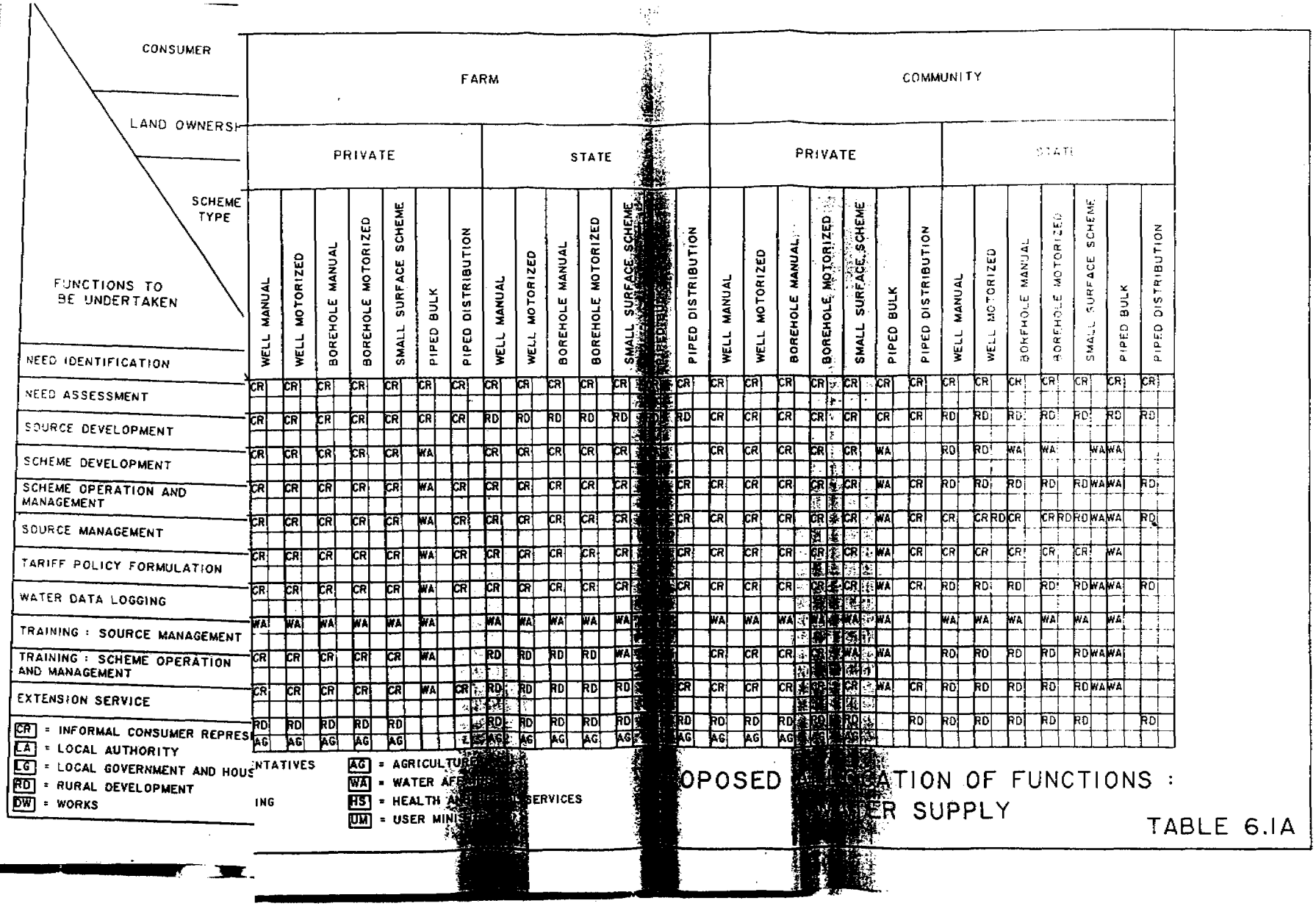
The designated sector agencies have to interact with a variety of users such as other ministries, private enterprises, national and local non-government institutions, groups of private people and with private individuals. As the available resources and the technology suitable for exploiting them for a specific purpose may also vary within a wide range, it can be safely concluded that **the water supply and sanitation sector is indeed complex.**

There may be a need to find **more rational solutions** in specific cases than what follows from the recommended delineation of responsibilities. However, such deviations from the specified schedule of responsibilities should be based on negotiations between the concerned parties from case to case. The responsible agency is thereby required to solicit the services of the agency possessing the relevant capability. This approach has several advantages:

* Formal responsibility remains according to the "blueprint"
* Duplication of identical services will be avoided
* Rationalisation of logistics can be achieved in sparsely populated areas
* Thorough discussions of tasks and their implications are encouraged between the agencies

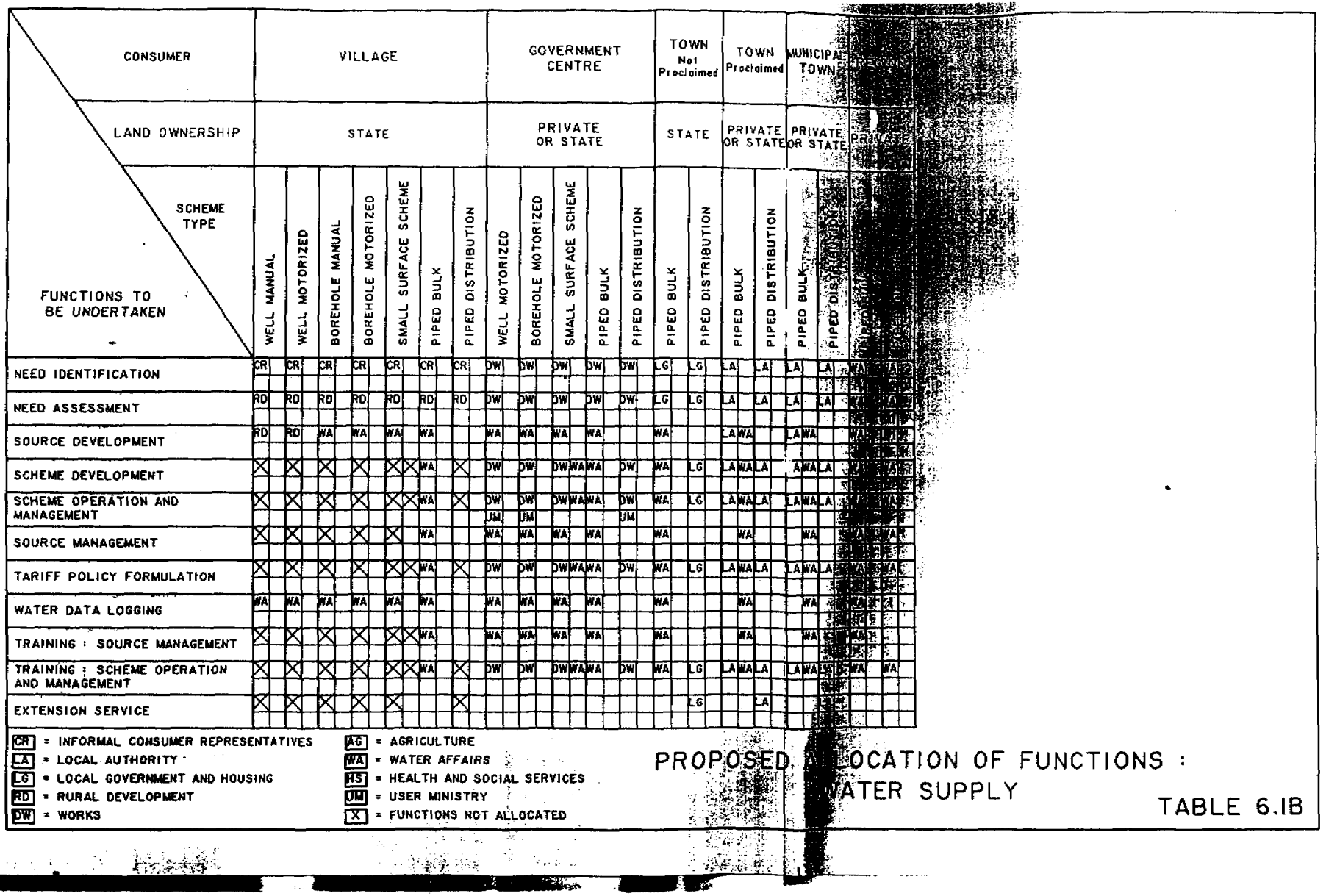
For example, there is no rational reason why the Department of Works should execute the water supply operation and maintenance tasks for a school establishment in an area where Department of Water Affairs or Directorate of Rural Development already have a strong presence for their own operational reasons.

The sector is also greatly affected by issues outside its own administrative control, such as for example:



OPOSED ATION OF FUNCTIONS : ER SUPPLY

TABLE 6.1A



CONSUMER	VILLAGE							GOVERNMENT CENTRE					TOWN Not Proclaimed		TOWN Proclaimed		MUNICIPAL TOWN		REGION
LAND OWNERSHIP	STATE							PRIVATE OR STATE					STATE		PRIVATE OR STATE		PRIVATE OR STATE		PRIVATE
SCHEME TYPE / FUNCTIONS TO BE UNDERTAKEN	WELL MANUAL	WELL MOTORIZED	BOREHOLE MANUAL	BOREHOLE MOTORIZED	SMALL SURFACE SCHEME	PIPED BULK	PIPED DISTRIBUTION	WELL MOTORIZED	BOREHOLE MOTORIZED	SMALL SURFACE SCHEME	PIPED BULK	PIPED DISTRIBUTION	PIPED BULK	PIPED DISTRIBUTION	PIPED BULK	PIPED DISTRIBUTION	PIPED BULK	PIPED DISTRIBUTION	
NEED IDENTIFICATION	CR	CR	CR	CR	CR	CR	CR	DW	DW	DW	DW	DW	LG	LG	LA	LA	LA	LA	WA
NEED ASSESSMENT	RD	RD	RD	RD	RD	RD	RD	DW	DW	DW	DW	DW	LG	LG	LA	LA	LA	LA	WA
SOURCE DEVELOPMENT	RD	RD	WA	WA	WA	WA		WA	WA	WA	WA		WA		LA	WA	LA	WA	WA
SCHEME DEVELOPMENT	X	X	X	X	X	WA	X	DW	DW	DW	WA	WA	DW	WA	LG	LA	WA	LA	WA
SCHEME OPERATION AND MANAGEMENT	X	X	X	X	X	WA	X	DW UM	DW UM	DW	WA	WA	DW UM	WA	LG	LA	WA	LA	WA
SOURCE MANAGEMENT	X	X	X	X	X	WA		WA	WA	WA	WA		WA			WA		WA	WA
TARIFF POLICY FORMULATION	X	X	X	X	X	WA	X	DW	DW	DW	WA	WA	DW	WA	LG	LA	WA	LA	WA
WATER DATA LOGGING	WA	WA	WA	WA	WA	WA		WA	WA	WA	WA			WA			WA		WA
TRAINING : SOURCE MANAGEMENT	X	X	X	X	X	WA		WA	WA	WA	WA			WA			WA		WA
TRAINING : SCHEME OPERATION AND MANAGEMENT	X	X	X	X	X	WA	X	DW	DW	DW	WA	WA	DW	WA	LG	LA	WA	LA	WA
EXTENSION SERVICE	X	X	X	X	X		X								LG	LA			

CR = INFORMAL CONSUMER REPRESENTATIVES
LA = LOCAL AUTHORITY
LG = LOCAL GOVERNMENT AND HOUSING
RD = RURAL DEVELOPMENT
DW = WORKS
AG = AGRICULTURE
WA = WATER AFFAIRS
HS = HEALTH AND SOCIAL SERVICES
UM = USER MINISTRY
X = FUNCTIONS NOT ALLOCATED

PROPOSED ALLOCATION OF FUNCTIONS : WATER SUPPLY

TABLE 6.1B

USER	FARM						COMMUNITY						VILLAGE						GOVERNMENT CENTRE						TOWN (Not Proclaimed)						TOWN (Proclaimed)						MUNICIPAL TOWN					
LAND OWNERSHIP	PRIVATE			STATE			PRIVATE			STATE			STATE						PRIVATE OR STATE						STATE						PRIVATE OR STATE						PRIVATE OR STATE					
SANITATION SCHEME / FUNCTIONS TO BE UNDERTAKEN	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	CONSERVANCY TANK	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	WATER-BORNE	CONSERVANCY TANK	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	WATER-BORNE	CONSERVANCY TANK	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	WATER-BORNE	CONSERVANCY TANK	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	WATER-BORNE	CONSERVANCY TANK	PIT LATRINE	AQUA PRIVY	SEPTIC TANK	WATER-BORNE
NEED IDENTIFICATION	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR DW	CR DW	CR DW	CR DW	CR DW	DW	DW	DW	DW	DW	CR LG	CR LG	CR LG	CR LG	CR LG	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA
NEED ASSESSMENT	CR HS	CR HS	CR HS	RD	RD	RD	CR HS	CR HS	CR HS	RD	RD	RD	RD DW	RD DW	RD DW	RD DW	RD DW	DW	DW	DW	DW	DW	LG	LG	LG	LG	LG	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA
GEOHYDROLOGICAL INVESTIGATION							WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
SCHEME DEVELOPMENT	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR DW	CR DW	CR DW	CR DW	DW	DW	DW	DW	DW	DW	CR LG	CR LG	CR LG	CR LG	LG	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA
SCHEME MANAGEMENT OPERATION AND MAINTENANCE	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR DW UM	CR DW UM	CR DW UM	CR DW UM	DW UM	DW UM	DW UM	DW UM	DW UM	DW UM	CR LG	CR LG	CR LG	CR LG	LG	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA
HEALTH AND ENVIRONMENTAL	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS WA	HS	HS	HS	HS	HS WA	HS	HS	HS	HS	HS WA	HS	HS	HS	HS	HS WA	HS LA	HS LA	HS LA	HS LA	HS LA WA
TARIFF POLICY FORMULATION	CR	CR	CR	RD	RD	RD	CR	CR	CR	RD	RD	RD	RD	RD	RD	RD	RD DW	DW	DW	DW	DW	DW	LG	LG	LG	LG	LG	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA
TRAINING : OPERATION AND MANAGEMENT																	DW					DW					LG					LA					LA
USER EDUCATION	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	LA	LA	LA	LA	LA
TECHNICAL SUPPORT	CR	CR	CR	RD	RD	RD	CR	CR	CR	RD	RD	RD	RD	RD	RD	RD	RD DW	DW	DW	DW	DW	DW	LG	LG	LG	LG	LG	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA

CR = INFORMAL USER REPRESENTATIVES
LA = LOCAL AUTHORITY
LG = LOCAL GOVERNMENT AND HOUSING
RD = RURAL DEVELOPMENT
DW = WORKS
WA = WATER
HS = HEALTH AND SOCIAL SERVICES
UM = USER MINISTRY

PROPOSED ALLOCATION OF FUNCTIONS : SANITATION

TABLE 6.2

CONSUMER	FARM																GOVERNMENT CENTRE					REGION
OWNER	PRIVATE						STATE										STATE					STATE
IRRIGATION SCHEME TYPE / FUNCTIONS TO BE UNDERTAKEN	WELL	BOREHOLE	PUMP STATION	FARM DAM	STATE BULK SCHEME	DISTRIBUTION	WELL	BOREHOLE	PUMP STATION	FARM DAM	STATE BULK SCHEME	DISTRIBUTION	BOREHOLE	PUMP STATION	FARM DAM	STATE BULK SCHEME	DISTRIBUTION	STATE BULK SCHEME
NEED IDENTIFICATION	CR	CR	CR	CR	CR	CR	CR RD	CR RD	CR RD	CR RD	AG RD	CR RD	AG	AG	AG	AG	AG	AG
NEED ASSESSMENT	CR	CR	CR	CR	AG WA	CR	AG RD	AG	AG	AG	AG	AG	AG WA	AG WA	AG WA	WA	AG	WA
SOURCE DEVELOPMENT	CR	CR		CR	WA	CR	CR RD	WA		AG	WA	AG	WA		AG	WA	AG	WA
SCHEME DEVELOPMENT	CR	CR	CR	CR	WA	CR	CR RD	AG	AG	AG	WA	AG	AG	AG	AG	WA	AG	WA
SCHEME OPERATION AND MANAGEMENT	CR	CR	CR	CR	WA	CR	CR RD	CR	AG	AG	WA	AG	AG	AG	AG	WA	AG	WA
SOURCE MANAGEMENT	CR	CR	CR	CR	WA		AG RD	AG	AG	AG	WA		AG	AG	AG	WA		WA
TARIFF POLICY FORMULATION	CR	CR	CR	CR	WA		AG RD	AG	AG	AG	WA	AG	AG	AG	AG	WA	AG	WA
WATER DATA LOGGING	CR	CR	CR	CR	WA		AG RD	WA	AG	AG	WA	AG	WA	AG	AG	WA	AG	WA
TRAINING : SOURCE	CR	CR	CR	CR	WA		AG RD	WA	AG	AG	WA	AG	WA		AG	WA	AG	WA
TRAINING : SCHEME	CR	CR	CR	CR	WA		AG RD	AG	AG	AG	WA	AG	AG	AG	AG	WA	AG	WA
EXTENSION SERVICE	AG	AG	AG	AG		AG	AG	AG	AG	AG		AG	AG	AG	AG		AG	

CR = INFORMAL CONSUMER REPRESENTATIVES
AG = AGRICULTURE
WA = WATER
RD = RURAL DEVELOPMENT

PROPOSED ALLOCATION OF FUNCTIONS : IRRIGATION

TABLE 6.3

- Physical planning/town planning
- Land allocation and utilisation
- Non-governmental organisations' relationship to government strategies/programmes
- Financial resources allocated through State budgets
- Administrative autonomy in revenue collection and expenditure granted to local and government sector authorities
- Environmental protection and control, as it relates to land use and economic activities in general and to water use in particular

This complexity calls for communication skills, positive attitudes towards cooperation and willingness to be flexible among the sector agency staff. Moreover, the complexity also implies a strong need for:

- **Decentralisation**, in order that the administration be able to deal with the complexities at a level where they are manageable and transparent
- **Sector coordination**, institutionalized in such a way that sector policy issues, practical cooperation, priority conflicts and appropriate deployment of resources can be resolved

7.1.2. Decentralization

The present sector administration (except the functioning local authorities) is highly centralized as a result of abolishing the relatively autonomous 2nd tier at Independence. It is now only the municipalities holding truly devolved powers to execute and regulate services.

The respective ministries and their departments have to a varying degree established offices at regional or at arbitrarily selected local levels in accordance with their own operative requirements.

Among the sector actors reviewed in section 3.1, it is presumably the Ministry of Health and Social Services that has the clearest decentralisation strategy. The roles in terms of policy making, management support and functional activities have been delegated and broadly delineated in accordance with administrative levels as explained in section 5.2.

Practical Delegation Issues

The lack of delegation - although decentralized offices exist - results in cumbersome administrative procedures. Two examples may be given to illustrate the point:

- A regional office of the Department of Water Affairs is generally not authorized to procure spareparts directly; the offices keep requisition forms which may only be used in emergencies, otherwise requirements have to be forwarded to the HQs for approval and action

- The regionally based maintenance teams servicing rural water supplies in communal areas have to request permission from Directorate of Rural Development HQs for replenishment and emergency procurement of spareparts; the procedure involves several steps between region/supplier/HQs before an order can be effected

Such practical issues should be attended to as they create bottlenecks and provide for just an imaginary control function. In the case of Department of Water Affairs, the accountability and cost control is still vested with the local office, yet they cannot act independently. As a matter of management principle and sound motivation of the organisation, decisions need to be taken at the informed level rather than at levels determined for the convenience of accountants.

Another practical administrative issue is the inter-ministerial cooperation in terms of funds allocation. It appears to be financially problematic for one agency to execute services of some substance for another agency. In order to achieve rational operations, it should be made easy for one government agency to authorize its agent counterpart to incur expenditure and facilitate payments within the authorized limit. This is for example a problem when Department of Water Affairs receives trainees from other agencies at its Von Bach Training Centre; direct additional expenditures by the centre has to be met from a Department of Water Affairs vote.

Unified Administrative Structure

The lack of a unified national administrative structure was mentioned above. The agencies dealing directly with consumers/users on a permanent basis are required to have a presence allowing regular communication. The water and sanitation sector actors should be established at identical decentralized levels (although all do not need to be present at the same low level as the extension service).
Shortage of qualified staff is a often cited as a constraint to extensive decentralization. However, experience shows that delegation of responsibility

foster motivation and commitment. It is therefore recommended that the decentralization objective should take precedence over the performance objective in order to avoid the self-conserving "competent centre" syndrome. A risk of some failures has to be accepted in the short term.

> From a Water Sector Policy point of view, it is justified to make a **strong recommendation** to the government **that a unified administrative structure be implemented** with presence of all community oriented functions at identical regional and sub-regional levels.

This would enable planning, coordinated implementation and maintenance support at levels where overview, accurate information and community contact can be merged.

7.1.3. *The Practical Role of Government*

The recommended allocation of specific responsibilities not withstanding, the mode of operation may be designed within a wide range of options. The respective agencies have a choice between executing the tasks down to the smallest detail, or, at the other extreme, managing externally acquired resources such that the tasks are accomplished.

For urban situations and generally where a large number of independent consumers are to be served, a service agency with comprehensive responsibilities is the only rational solution. This agency, whose services have to be paid for, should preferably be controlled (in full or partially) by the consumers, e.g. through elected councils, consumer associations, board representatives, etc. The agency still has the option to make wide use of private sector resources.

Two options for publicly controlled provision of service exists, namely to continue with public service agencies (e.g. Department of Water Affairs, municipal councils) or to introduce a parastatal corporation with financial autonomy similar to SWAWEC.

For rural situations experience from other countries shows that the best results have been achieved where consumers take a direct responsibility in accordance with their own priorities and resources.

The principle for responsibility distribution, in particular for rural development efforts, should thus be:

* **Government** should promote, educate and facilitate (incl. technical, managerial and financial support)

* **Communities** should plan, implement, operate and maintain facilities in accordance with their needs; they should be the owners

For both urban and rural situations the role of the private sector should be recognized. In the major towns a reasonable private sector capacity already exists. The sector agencies, in particular Directorate of Rural Development, should see as its role to promote entrepreneurship at the local level in the rural areas.

For such capacities to be established it is necessary that a certain amount of work be assured, for example through service contracts. Whereas government needs to manage and control the external inputs such that the communities gain access to affordable services, the private sector could be contracted to capacitate both the Government and the communities. This has particular relevance to non-continuous and specialized tasks.

Some areas where higher degree of privatisation could be applied, include:

- Contract suppliers or mechanical workshops to carry out preventive maintenance and service on plant and equipment

- Make use of consultants for long term involvement in project implementation, including community mobilisation, training at local and district level, materials supply and supervision

- Make use of contractors to carry out new constructions, rehabilitation and maintenance (e.g. borehole drilling and cleaning)

- Support non-governmental organisations and channel government resources through them for specific, long term project activities in defined areas

- Encourage the creation and use of multi-disciplinary groups, for example joint ventures between consultants and research organisations, to carry out studies, experimental projects, pilot activities, etc.

7.1.4. Integration of Sector Interventions

Integration may be defined as the combination of interventions which is aimed at and required to achieve the defined objectives. More importantly, for the consumer or user integration would entail the creation of an ability to make appropriate use of the entire set of services and facilities.

Hence, integration has an element of making physical installations available and also an element of motivation as well as education aimed at behaviourial changes. This is a particular issue among rural communities and to some extent among urban low income groups where knowledge and awareness are limited.

The government/community interface makes it necessary:

- For government **to learn** more about the needs, priorities and perceptions of the respective rural and low income communities; socio-economic studies and well monitored pilot projects are required
- For the communities **to understand** government policies; both possibilities and limitations of available assistance
- For the government **to apply** the defined conditions for support once government policy has been explained; the acceptability of new policies has to be evaluated
- For communities and government extension service (i.e. Directorate of Rural Development in particular) **to develop** acceptable procedures, including the mutual commitments, for:
    * Handing over of existing facilities (they may have to be rehabilitated to good working condition)
    * Implementation of new community managed installations, whether point source or stand pipes
- For government, in consultation with communities, **to establish** how improved rural sanitation should be actively promoted for early implementation

7.2. Institutionalized Sector Coordination

7.2.1. The Need and Scope for Coordination

The need for sector coordination was identified in section 7.1.1 above on the grounds of the complexity of the sector. In addition, the responsibility allocations recommended in chapter 6 describe a sequential involvement of different agencies for the development of a particular scheme, depending on both the type of scheme and type of settlement.

The need for coordination is obvious. **A forum for sector coordination** needs to be created. Such a forum should have a two-fold objective, namely to:

- Recommend solutions to sector policy issues, and
- Resolve through consensus the practical sector issues

Hence, the sector coordination forum would serve to ensure that:

- Sector resources be used in an optimum way, in particular avoiding duplication
- Sector agencies and work forces develop a joint identity and a commitment towards the common cause
- Consultations take place on a regular, scheduled basis

It is required that one body be appointed responsible for convening the coordination forum, providing chairmanship and secretariat functions.

Among the practical issues to be addressed by the coordination forum are:

- Planning and budgeting for various interventions, in particular where interdependencies exist
- Determination, introduction and enforcement of tariffs based on the relevant legal provisions, including harmonization and approval
- Coordination of external support agencies such as multi- and bilateral donors as well as contributions by NGOs, ensuring compliance with government policies and national standards
- Inter-agency services on complementary basis or on "sub-contracting" basis for cost-efficiency, capacity or competence reasons.
- Standardization in terms of design parameters, technical specifications, implementation procedures, etc.
- Training for related tasks and utilisation of staff/facilities across departmental "borders"
- Coordination of extension services, both in terms of specialized technical services, basic technical support and public education/training
- Review of socio-economic data of relevance for the sector; propose issues and subjects to be investigated

- Exchange of experience, review of monitoring data and evaluation of performance; proposals for remedial measures when required

7.2.2 Recommended Coordination Structure

Coordination is required at the national, regional/sub-regional and "project" level. The uncertainty as to the future decentralized administrative structure poses a particular problem in this regard. It is essential to have the respective actors represented and aligned at all levels relevant to the particular role they are going to play.

It is recommended that:

> A **National Coordination Committee** (NCC) should be institutionalized; a transformation of the WASP committee, possibly with a few additional members (e.g. Finance, Education), appears to be the logic step to take.

NCC may have to be comprised of two levels centrally;

> An **NCC Sector Council** should be created, composed of the respective permanent secretaries, and meeting (say) quarterly with the task to address overall priority allocations, policy issues and crucial conflicts which may occur. Key Cabinet ministers may be invited to attend meetings.

> An **Executive Committee** which can meet more frequently should also be created. This would constitute the working body addressing the current issues, preferably by agreeing on firm plans which give clear mandates and tasks to the respective participants in sector programmes/projects.

> Permanent or ad hoc **NCC Sub-Committees** may be established as and when required to address specific subjects. The membership should not be restricted to central government officials; NGO and donor representatives, local authority representatives, researchers, consultants, etc. would be useful and necessary resource persons to have on these sub-committees.

The National Coordination Committee would need a small secretariat constituting an interdisciplinary group. Three professionals, being of the technical, economy and social science professions, should be recruited for the secretariat. They will need a secretary for office support, but may otherwise make use of existing resources.

The permanent sub-committees should be seen as standing forums analysing specialized sector information and preparing draft recommendations to be deliberated on by the Executive Committee.

The need can be seen at least for the following permanent sub-committees:

- **Administration and Finance**; covering also programme coordination, tariff issues, budget review, donor coordination, international rivers, legislation
- **Water Resources Management**; covering hydrology, hydrogeology, environmental issues, systems operation, overall resource inventory
- **Technology**; covering design and material standards, appropriate technology, treatment and water quality (both water and sanitation)
- **Training and Personnel**; covering identification of training needs, coordination of training, manpower development, performance assessment, incentive schemes
- **Rural Water Supply and Sanitation**; covering the technical and socio-economic issues which are unique to rural/communal areas

7.2.3. Focal Agencies

Focal agencies need to be identified for the respective sub-sectors. It would be advantageous if just one agency could serve as the one focal agency for the entire sector, in particular as it would make the work of the National Coordination Committee easier to organise.

For the water supply sub-sector it seems that the **Department of Water Affairs** is well placed to carry out this role. It already has the responsibility of being the government's advisor in water related issues. Some competence in socio-economic subjects would, however, have to be introduced into the organisation.

The department's role in sanitation is limited, although an important link exists with regard to water requirements and potential pollution associated with waterborne sewerage (urban). Ministry of Health and Social Services, in cooperation with the Directorate of Rural Development are particularly important for rural sanitation whilst Ministry of Local Government/Local Authorities are important for urban areas.

In order <u>not</u> to split the coordinating function into two -which could easily result in a compartmented approach - it is recommended that **Department of Water Affairs** be appointed the focal agency for the entire sector.

The chairmanship of the National Coordination Committee would follow this appointment. The associated responsibility would include documentation and information dissemination services and a general responsibility for taking initiatives of importance to the sector.

It may be considered to establish a separate **sub-committee** for sanitation policy/strategy issues in order to strengthen this aspect of the sector.

The proposed secretariat should be placed in the Department of Water Affairs as a staff function to the chief executive. This would also help solving the above mentioned need for socio-economic expertise in the department as one secretariat member should be of such professional background.

7.3. General Sector Functions

The proposed responsibility allocation is related specifically to the planning, implementation and running of particular schemes. In addition, there is a need to identify the general sector functions where the scheme specific functions are brought together. For example, the regions may prepare requests for new installations which in total exceed the financial or technical capability of the sector. There must then be a central planning function which ensures appropriate decisions on priorities, preferably based partly on the Needs Assessment done in the scheme context.

General functions, related only in part to the specific scheme types, should therefore be defined. Examples of such functions are:

* Overall sector development planning, to which the respective water supply and sanitation agencies have to respond and comply
* Policy and strategy development for the water supply and sanitation sub-sectors respectively
* Preparation of legislation, standards and legal guidelines for the sector
* Water resource allocation, incl. allocation of water for competing purposes, maintaining inventories of identified water resources, prioritizing between segments of sector, etc.
* Financing; development and recurrent expenditure, of particular importance if alternative means of financing are introduced (revolving funds, donor grants, loans directly to a sector utility, etc)

Broadly the above issues can be accommodated under the following general functions:

- Sector Policy Planning
- Water Resource Planning
- Financial Planning and Programming
- Administration and Manpower Development

These disciplines represent in many ways an aggregation of the scheme specific functions, translating them into policies, legislation, strategies, priorities, programmes, and budgets which will enable the government to make resources available to the sector.

These overall functions - to be rendered by all sector agencies within their own sphere of responsibility - will be required to deal with a number of issues in the immediate future. These include:

- There will be a shift in service provision emphasis from urban to rural, with corresponding change in ranking of priorities
- Financial resource allocations for water/sanitation will in the future compete increasingly with other needs of equally high priority
- The sector will need to demonstrate a higher degree of self-sufficiency in terms of finance and localized management in order to remain competitive
- Growing willingness by communities to participate must be created within the short to medium term
- A strategy for creating a felt need for improved rural sanitation should be developed and implemented in the short to medium term

Finally, the sector management will in the above endeavour be required to design proposals which are also politically acceptable. The pressure for rapid changes is already levied by politicians, and the best contribution the sector management can make is to identify options which are both professionally and politically acceptable.

Creation of acceptable options can only be achieved in an environment where the managers accept and understand that substantial changes compared with past policies and standards have to be made.

7.4. Commercialized Operations

The bulk supply function of Department of Water Affairs is well suited to operations on commercial terms similar to e.g. SWAWEC. Consideration should be given to setting up a corporation which will operate on a full cost recovery basis and be able to compete with the private sector for qualified staff resources.

In cases where the State finds it necessary to subsidize a water supply undertaken by such a corporation, it could be made through specific grants to cover deficits incurred by the particular scheme.

Repair services could more easily be extended to private, community, public and commercial customers by a corporation which would have to charge the actual cost (and retain the income). The State would have to decide to what extent, if at all, any of these customers should receive a subsidy in order to afford the service. There should be no monopoly for the corporation on such services; the private sector should be allowed to compete.

In some cases it could be a rational solution if no distinction was made between the bulk supply and the distribution with regard to operation and maintenance. A corporation could offer to undertake distribution on agent basis at cost.

If a corporation were to be created, the units of specific, direct relevance to water production would have to be transferred from Department of Water Affairs to the new corporation, together with the productive assets. What should, at least, remain with the Department of Water Affairs are the units required for fullfilling the statutory and advisory responsibilities to the government, being the prime water resource agency in terms of policy-making, water resource management and a general lead role within the sector relevant functional units need to be retained.

The issue has not been deliberated on by the WASP Committee in any detail, but the Consultant is recommending that:

> **The issue of creating a parastatal corporation responsible for water production, bulk supply and in specific cases distribution of water for whole- or retail sale should be investigated. Department of Water Affairs should appoint a committee to study the matter in detail and present its recommendation to the Cabinet, through the proposed National Coordination Committee (if established).**

7.5. Transition to Proposed Responsibility Allocation

The major immediate changes relate to water supply for the rural communal areas. The recommendations place a heavy burden on the Directorate of Rural Development, not only in day-to-day maintenance operations, but in particular as regards extension services related to community responsibility, ownership and management.

The operational situation in rural areas has deteriorated after abolishing the 2nd tier administration; the redistribution of resources and responsibilities has failed to meet the requirements so far (ref. chapter 9). The current trend should be broken immediately and steps should be taken to rehabilitate, subject to specific conditions being met by the communities, the installations which at modest cost can be put back into service.

These urgent measures cannot be undertaken within the proposed responsibility framework unless extensive agent operations are employed until the Directorate of Rural Development is better capacitated. Hence, transitional arrangements are inevitable, in particular as regards the physical execution of the tasks.

The immediate priority tasks for Directorate of Rural Development should, in terms of rural water supply and sanitation, be directed towards preparing itself to assume the reponsibility fully. This would entail, inter alia, to:

- Provide communication support for initiation of community acceptance of responsibility and eventual take-over
- Prepare, test and finalize sequential procedures for development of community based installations
- Receive water supply staff transferred from Directorate of Agriculture and establish its operation and maintenance support organisation
- Prepare a detailed organisational and logistics plan, including manpower development requirements, in respect of its assigned responsibilities
- Draw up a plan for gradual take-over of operational responsibilities, with performance indicators determining the timing of individual steps
- Ensure immediate budget provisions to cater for its own and its agent(s) operations in respect of water supply and sanitation

In the meantime, support should be solicited from other agencies on an agent basis. In practice, this would be limited to the Department of Water Affairs,

possibly with some "software" inputs by the Ministry of Health and Social Services into preparations for the training and community mobilisation tasks.

The following actions are seen as prerequisites for a smooth transition regarding rural water supply and sanitation responsibilities in the communal regions:

- The transfer of responsibility with its implications at field level should be made known and clearly explained to the staff concerned; a series of short regional seminars could be conducted

- Staff should be redeployed within the Department of Agriculture and Rural Development, from Agriculture to Rural Development, to ensure adequate backstopping and supervision of the services to be rendered in the field

- An officer-in-charge of rural water supply, reporting to the Directorate of Rural Development HQs, should be posted to each communal region

- As it has been agreed that the Department of Water Affairs should be responsible for all borehole drilling on behalf of the government, the drilling crews and the equipment should be transferred from Department of Agriculture and Rural Development

- The allocated role of Directorate of Rural Development in rural sanitation needs to be clarified and planned; contacts should be established with the Ministry of Health and Social Services in order to prepare the strategy for promotion, possibly with Health being the key actor through its education campaigns initially

- Directorate of Rural Development and Department of Works may agree on which party should develop the capacity for daily operation and maintenance (ref. villages and also government centres) in specific areas

- Directorate of Rural Development may agree on division of responsibility for public education, local organisation and mobilisation with the other extension cadres, e.g. Ministry of Health and Social Services and Directorate of Agriculture, in a specific area

- Rural Extension Officers may be trained by the Department of Water Affairs to undertake simple geohydrological assessments for latrine siting and simple logging of water sources

8. FINANCE AND TARIFF POLICY

8.1 Introduction

The financial policy as adopted in Namibia prior to independence was dictated by a number of factors :

- The Republic of South Africa was able to provide substantial budget support to "Namibia".
- Investments traditionally favoured the minority high income group.
- During the 1980'ies resources were for a period directed substantially towards communal areas, presumably with a view to reduce discontent.
- Municipalities have had a high degree of autonomy, supported financially by soft loans from the central government.

Overall, Namibia was at the time of Independence left with a substantial stock of infrastructure assets, the water supply (in particular) and sanitation sector being no exception. In many respects this situation has provided for a "breathing space" during which continued maintenance is an essential priority.

In addition, past financial priorities had of course also created the disparities described earlier in this Report. Hence, a second priority would be to mobilize resources for expansion and upgrading of services to previously neglected areas of the economy. The review in chapter 3 clearly points out such areas in the water supply and sanitation context: **The commununal regions.**

8.2 Current Level of Investments

8.2.1 Department of Water Affairs

The Department is the custodian of assets representing accumulated investments of close to ZAR 0.5 billion measured in actual expanditure. The total replacement value expressed in todays Rand-value would amount to more than ZAR 2 billion.

Investments in State water works have for the last 13 years remained at a more or less constant level of : **ZAR 30 - 35 million per annum.**

Due to inflation this has implied an equally constant rate of reduction in real terms of well over 10% p.a.

The capital budget of Department of Water Affairs for 1991/92 is proposed at: **ZAR 30.9 million.** Hence, the budget remains constant in actual figures, but continues to decline in real terms.

However, this decline is off-set by contributions made by donors (see section 8.4). Although the total projected disbursements for 1991/92 are not precisely defined, the additional funds from donors would add another **ZAR 10 - 15 million.**

8.2.2 Municipalities/Local Authorities

The budget vote for soft loans from the central government to municipalities is currently being curtailed. As a result, many municipalities have no funds for their capital budgets for 1991/92. The Ministry of Local Government and Housing has only about ZAR 4 million available, against requests amounting to ZAR 30 million.

Municipalities which have been able to build up funds from surplus revenue in the past, can still continue to make investment. This is the case with Windhoek City Council in particular . The City Council is working according to the following capital works schedule for the period 1990/91 - 1993/94 (water infrastructure) :

YEAR	1990/91	1991/92	1992/93 - 1994
Capital Budget	6,2	4,6	19,6

Figures are in million Rand, and the last figure covers a two year period.

Hence, if seems that Windhoek City Council is able to mobilize resources to cope, at least to some extent, with the rapid influx of people to the City. Two issues are, however, serious threats in this regard :

- The funds built up in the past are about to be exhausted.
- Rumours have it that the central government intends to bring the council budget under its control.

Other municipalities are in a more difficult position, e.g.:

MUNICIPALITY	YEAR	
	1990/91	1991/92
Tsumeb	0,5	nil
Otjiwarongo	0,6	0,4
Keetmanshoop	2,0	nil
Swakopmund	0,8	0,8

Figures are in million Rand, rounded off.

If this trend continues, the urban growth could soon represent a major service problem in Namibia. Notably and invariably, a shortfall in service capacity always affects the poorest initially, and later spreads upwards through the social hierarcy.

Specific information for the peri-urban towns (and for the communal region towns) has not been reviewed. However, for communal towns the capital budget for 1991/92 will be reduces to ZAR 5 mill compared to ZAR 18 million past year.

8.2.3 Rural Water Supply (Communal Regions)

Department of Water Affairs has within its budget continued to provide waterpoints with cattle troughs along the bulk supply pipelines. However, the major provisions are found in the budgets of Department of Agriculture and Rural Development.

The 1991/92 budget was particularly problematic as provisions originally proposed by the 2nd tier administration had to be transferred to a new department's vote. Furthermore, the Directorate of Rural Development also had to be established and organised.

The following figures have been obtained for capital works, i.e. for expansion of services.

YEAR	1990/91	1991/92
Amount	3,2	7,5

The amounts are in million Rand. In fact also additional allocations were made available during 1990/91. Additional resources are about to be made available from donors, notably from FINNIDA and UNICEF.

8.3 Recurrent Expenditure

The issue of recurrent expenditure will be reverted to under the section on current tariffs below. In brief summary the situation is as follows :

8.3.1 Department of Water Affairs

The immediate target is to recover all running costs of the State schemes including related infrastructure and overhead costs. However, as the department is not allowed to retain the accruing revenue, its entire recurrent budget has to be voted by government.

The general administrative functions, training, national level investigations and operation and maintenance of the State Water Works amounted to a total of approximately ZAR 37 million during the fiscal year 1988/89. The total revenue during the same period amounted to about ZAR 31,5 million, or 85% of the recurrent expenditure (as defined above).

The accruing revenue is remitted to the Treasury in accordance with standard government regulations.

8.3.2 Local Authorities

The local authorities are required by law to be financially autonomous and to balance their accounts for services rendered. Thus, the revenue is banked and kept by the councils.

The Windhoek City Council has been able to make a surplus in its water and sewerage accounts in the past years. The water account currently balances at about ZAR 15 million, of which about ZAR 7 million is paid to Department of Water Affairs for water supplied in bulk.

The revenue collection performance has generally been good in all municipalities. However, the water accounts have been affected by past political decisions to the effect that the water undertaker is not allowed to disconnect the supply to any consumer. The justification for this decision was to protect those who could not afford. Apparently many more consumers have taken advantage and simply ignored the bills.

As a result, Windhoek City Council has total arrears of about ZAR 8 million on their service accounts for Katutura, a large part being unpaid water bills. The same applies to other municipalities, e.g. Keetmanshoop has 20% arrears on their water accounts (52% in the low income "township"), Otjiwarongo has 5-10% in arrears (about 30% in the low income "township") and in Tsumeb some ZAR 175,000 is outstanding (all referring to low income areas). For Swakopmund, however, the situation is much better; arrears stand of about 4%.

Similar experiences and levels of arrears as prevailing among the municipalities are reported by the Peri-Urban Development Board.

8.3.3 Communal Towns

The division within Ministry of Local Government and Housing in charge of services for the communal towns has a recurrent budget of about ZAR 34 million for 1991/92. The total bulk water supply charge, paid to Department of Water Affairs, was about ZAR 6,5 million for 1990/91. Only about ZAR 3 million was collected as water revenue. Again, the above mentioned reason applies; people ignored payment because the service may not be disrupted.

8.3.4 Rural Communal Areas

There is not a consistent policy in the country as regards expenses (in cash or kind) to be met by rural beneficiaries. In some regions the pump operators are on government payroll, in others the local communities even provide fuel. Generally, the maintenance and repair service is free throughout the country.

In order to render this service, the Directorate of Rural Development has an annual recurrent budget of approximately ZAR 10 million (1990/91), ref. also chapter 9 where the maintenance situation is commented upon.

8.4 Donor Funds

The following information has been obtained on donor funds pledged or being considered for the water sector, reference Table ??.

Country/Donor	Description	Amount (R)
EEC	Groundwater investigations (5 areas)	5.0 m
Germany/GTZ	Central Area Water Master Plan	5.7 m
Germany/GTZ	same, to be discussed after Ph 1	5.7 m
Germany/BGR	Groundwater investigations	6.5 m
Germany/KFW	Ogongo - Oshakati, canal/ treatment	60.0 m
France	Oshakati - Omafu pipeline	6.8 m
	same, remains to be financed	(27.9 m)
Netherlands	Possible support being discussed	
	Ogongo treatment plant	(3.2 m)

	Rural water supply, Ovambo	(4.6 m)
	Upgrading Calueque p/stat'n (Ph 1)	R1.4 m
	Upgrading Calueque p/stat'n (Ph 2)	(3 . 5 m)
	Ogongo - Okalongo regional scheme	(9.0 m)
India	Groundwater schemes, Ovambo	(2.0 m)
Japan	Provision of 2 drill rigs	(10.0 m)
Finland	Integrated area water and sanitation programme, Ovambo, being discussed	?
UNICEF	Area based programme, Ovambo, with water component	?

Figures in ( ) denotes amounts presented to donors for consideration in cases where discussions are at an early stage.

Discussions have been held with the following countries, and donor agencies so far without any specific project proposals being considered:

- Italy
- Rumania
- China (Peoples Republic)
- Cuba
- African Development Bank

The contributions by donors may well become very significant for the water and sanitation sector. This constitutes a priority area shared between donors and the government. In particular the aspects related to rural community based programmes, services for the urban poor and all aspects of manpower development (including training at agency and community levels) can be expected to receive increased attention.

The sector would benefit from preparation of programme "packages" based on the Sector Policy to be prepared and presented for consideration by donors. In this process the government should insist on support which is fully in accordance with Namibia's own policy and preferences. This has a bearing on several elements of what may be termed the "donor game":

- Maximum use of resident (and eventually genuinely Namibian) expertise

- All expenditures, as well as services, materials and equipment received, should be accounted for by the relevant government department

- Quality and selection of equipment should be in accordance with adopted Namibian standards and practices

- Where applicable, the donor support to area specific projects should include support elements of national significance (e.g. training, standard specifications, documentation and dissemination of experience, etc)

- Where Namibian industries have the potential and local manufacture is deemed viable, donors should support development of the local water industry

Examples of failure in other countries are numerous; this experience should be drawn from the donors themselves and from other countries in the region with a view to identify what should not be done and what usually works. What has proved essential to convince donors not to insist unduly on supplying their own commodities, is for the recipient country to be able to present a realistic, well updated sector policy.

The Box ?? describes briefly two experiences, based on Tanzania and Botswana.

Tanzania

The Tanzanian government decided to divide the country's twenty regions between the interested donors, primarily for the purpose of having comprehensive Regional Water Master Plans prepared. These plans contributed greatly to enhanced knowledge of water resources across the country.

Most of the donors continued implementing the master plans, and it happened during a period of dramatically deteriorating economic conditions for Tanzania (and most other developing countries). Often contrary to the opinion of Tanzania's water ministry, the donors unilaterally decided to go for simple, low cost technology; the handpumps came in vogue!

With at least 8 - eight - different donors implementing programmes without an accepted technical guidance from the Tanzanian authorities, the country ended up with a multitude of different handpumps. The design concepts and manufacturing standard literally ranged from space age to village technology level. And the total number of pumps installed on shallow and deep wells amounted to tens of thousands.

Eventually, two donors (the Netherlands and Finland) took an interest in supporting local manufacture of what is supposed to become the "national handpump". A local company was created and through a joint venture the Finnish pump manufacturer came to support the enterprise. If successful, this will greatly ease the availability of spareparts for the handpumps in particular. Being manufactured and available from within the country, one would expect them to be easily available for local currency.

Botswana

Rural water supply in Botswana has been supported for two decades by the Swedish government through SIDA. Although one may say that the sector was possibly too much influenced by Swedes on technical assistance contracts, SIDA does not insist on preference for Swedish commodities.

Standardisation of pumps and engines was a problem; partly due to tendering procedures the water authority could never be sure of what equipment would "win" from time to time. SIDA was willing to support a standardisation process and waivers from tendering procedures were obtained. All new and all installations Report for 1988/89. due for replacement were fitted with pumps and engines of the same type and make. The range of engines was also narrowed down as much as technically possible.

This strategy has certainly paid dividends in terms of spareparts stocking, training of repair crews, quick replacement of broken equipment, etc. The reliability and maintenance standards have benefitted significantly.

8.5. Current Water Tariff Practises

8.5.1. Basis for Water Tariffs

The State has in principle considered and treated water tariffs as a general source of revenue. According to the Water Act (No 56 of 1956) it was the Administrator General who was authorized to grant approval of bulk supply tariffs. Government departments are not authorized to retain and spend the revenues accruing from provision of services. Hence, they serve only as revenue billing and/or collection agents for the central Treasury.

All funds for capital development of State bulk supply infrastructure have been made available directly from central government budgets. The calculation of recommended tariffs has not taken this capital cost element into account although precise records of investments are available. The basis for tariff calculations has been limited to the running costs, including elements of engineering and administrative overheads.

The local authorities (municipalities in particular) have followed a different system as the Municipal Ordinance and other legal provisions allow them to operate as separate financial entities. Investments have been financed by soft loans from government in addition to funds built up as a result of operational profits.

In rural areas the commercial farmers have been subsidised by the State for their capital investments into water facilities, but all operation and maintenance expenses are their own individual responsibilities. Farmers in the communal areas have been supported by free services to a few, selected on rather arbitrary basis. The great majority therefore "pay" a tariff in terms of the social cost of being underserviced. They have not had the access to government credits and grants in the same way as the commercial farmers.

8.5.2. General Tariff Policies

Representations made by the Department of Water Affairs to the Cabinet (e.g. on 11 July 1985) indicate that the past government had adopted a general long term policy of full cost recovery. However, it has not been deemed possible by the State to pursue this objective as yet.

Department of Water Affairs has related the level of tariffs only to actual operation and maintenance costs in their regular presentations to the Administrator General in the past. For bulk supply differentiated tariffs have been adopted, meaning that tariffs are related to the running costs of the particular scheme providing water supply at a specific point, but not reflecting the investment cost at all.

The present operative objective is for the State to recover the full recurrent costs, including general overheads. Water Affairs as well as other state water supply agencies are dependent on Treasury budget allocations for their operations. In this sense there is no direct relationship between water supply income and expenditure.

The local authorities have been required to service both capital and recurrent costs of the entire distribution system with reservoirs, booster pumps, etc. downstream of the bulk supply point(s). Their water tariffs are set to reflect all three cost bearing elements, namely bulk supply price, local capital costs as well as operation and maintenance costs.

Hence, the municipalities and, at least in principle, the peri-urban towns, have had a clear financial objective for the management and pricing of the services.

Water supplied by the State to industrial/mining consumers is an exception; they are charged the full economic tariff by Water Affairs, in some cases subsidised from other government sources.

The water tariff structure has not generally been designed as a management tool for controlling consumption levels, wastage and timing of augmentation. Neither has there been a conscious policy upto now to provide for cross subsidies between the different consumer groups.

8.5.3. Current Tariff Levels

Department of Water Affairs

The Water Affairs bulk supply tariffs are approaching the level required for break even between running/overhead expenditure and water revenue. In setting the tariffs a certain amount of discretion is used to ensure that:

- Increases are not made too abruptly from one year to the next
- Water sold from nearby schemes is not priced too differently
- Water sold from high cost schemes is priced at "acceptable" level

The ensuing harmonized tariffs resulted in the following financial performance for 1988/89:

- Potable water sold: 50,173,081 m^3
- Running costs: ZAR 33,355,558
- Unit cost: ZAR 0.66 per m^3
- Income from sales: ZAR 27,344,634
- Unit income: ZAR 0.54 per m^3

This resulted in an overall deficit of ZAR 6,010,924, or ZAR 0.12 per m^3, equivalent to 18% of the running costs. This deficit was the highest during the five year period reported on in Water Affairs' Annual Report for 1988/89. Prospects for 1989/90 were better due increased rates and water sales. Figures released indicate a loss of less than ZAR 1 million, or about 2.6%. As a result of proposals for tariff increases recommended for 1991/92 it is estimated that a slight profit of about ZAR 80,000 will be made.

Considering the range of running costs for the various bulk supplies, figures from 1989/90 show that water supplied to the central region through the Von Bach system has the lowest costs; ZAR 0.222 per m3. The most costly operations are in the Ovambo region where water supply running costs are ZAR 0.620 per m^3.

For other supply regions the costs range between ZAR 0.35 to ZAR 0.57. All these figures exclude the engineering and national overheads of about ZAR 0.07 per m^3 for all water produced.

The actual running costs for individual schemes vary within a wide range. For example, in the Waterberg supply region the average cost is ZAR 0.809 per m^3 whilst the low and high cost schemes range from ZAR 0.093 to ZAR 3.76 per m^3. For Ovambo region the variations are less pronounced (although average cost is high); the average cost per m^3 is about ZAR 1.00, with low and high cost schemes ranging from ZAR 0.73 to ZAR 1.24.

For irrigation water released from dams and supplied untreated, the tariff structure favours low application rates on a given area of land. Tariffs valid for 1989/90 were as follows:

	CONSUMPTION (m3/ha/year)		
	< 20,000	20 - 25,000	> 25,000
Tariff (ZAR/m3)	0.0075	0.0100	0.0630

With proposed tariff increases there will be a slight profit also for supply of irrigation water. Without treatment and usually with no or minimal pumping, operation of irrigation schemes is far lower than for potable water supplies. However, with the large quantities of water involved, the capital cost element would significantly affect the tariffs if accounted for.

When reviewing current tariffs, it is important to note that capital costs are not accounted for. With a total accumulated investment in bulk supplies nearing ZAR 500 million (present replacement value about ZAR 2,000 million), the capital cost element would add significantly to water prices if a break-even were to be reached. Conservatively estimated, full recovery of the capital cost element would increase the tariffs by some ZAR 2.00 on average. The marginal costs of supplying additional water from new works would in most cases be far much higher.

As an additional comment, it may be mentioned that the Department of Water Affairs considers the long term aim is to move towards a country-wide, uniform tariff. This should only be done on condition that the possibility to regulate water consumption by use of tariffs as a management tool is retained and applied as needed.

Department of Water Affairs has adopted a cost documentation system which lend itself to calculation of the true price of water produced. This will prove valuable both in connection with decisions on future pricing of water and if a

decision is taken to make parts of the Department a parastatal water utility. This issue was recommended on in chapter 7.

Municipalities

The water tariffs adopted by Windhoek City Council (effective as of 31 May 1990) are shown below as an example of charges levied by municipal authorities.

Basic levy, depending on size of water pipe connection (examples within range 15 - 150 mm):

15 mm connection pipe:	ZAR 7.25 per month
25 mm connection pipe:	ZAR 14.50 per month
50 mm connection pipe:	ZAR 40.85 per month
100 mm connection pipe:	ZAR 61.70 per month

Unit prices, chargeable according to meter reading:

All private, public, institutional and commercial consumer categories except sports clubs:	ZAR 1.12 per m^3
Sports clubs:	ZAR 0.22 per m^3

In the case of Windhoek the bulk supply price paid to the Department of Water Affairs is ZAR 0.58 per m^3. Thus, on the metered consumption the City Council is adding a surcharge of ZAR 0.54 per m^3 to cover its own expenses.

The average domestic consumption is currently estimated at 240 l/c/d, with about 530 and 70 l/c/d representing the high and low income consumption levels respectively. The specific consumption for low income housing areas has been observed to decline over the last couple of years, probably due to higher dwelling occupancy rates; the number of housing units has in no way been able to keep up with the influx of people, in particular during 1990.

Except for the modest differentiation caused by the basic levy (partly reflecting the cost of larger meters), all consumption is charged at the same rate. This does not reflect the true cost of providing services and also exclude the possibility of cross subsidizing between consumer groups.

The City Council is presently designing proposals for an alternative tariff structure with progressive charges for increasing water consumption and with differentiated charges for non-domestic consumers. An illustration of the implications is shown in Box ??.

Alternative Tariffs

The level and structure of tariffs have a significant impact on water expenditures to be met by a household. The typical monthly account for a Windhoek household with present tariffs range between:

Low income housing:	15 mm connection at	ZAR 7.25
	80l/c/d, 8 p for 30 d	ZAR 21.50
	Total :	ZAR 28.75
High income housing:	25 mm connection at	ZAR 14.50
	400 l/c/d, 5 p for 30 d	ZAR 67.20
	Total :	ZAR 81.70

The Technical Department of the Council is presently considering to introduce a moderately progressive tariff structure, with rates of possibly ZAR 1.00 and ZAR 1.35 for consumption above 6 m3 respectively. The above two typical households would with the new tariff structure have to pay:

Low income housing:	Plot size charge, at	ZAR 4.00
	80l/c/d, 8 p for 30 d	ZAR 21.20
	Total :	ZAR 25.20
High income housing:	Plot size charge, at	ZAR 20.00
	400 l/c/d, 5 p for 30 d	ZAR 78.90
	Total :	ZAR 98.90

Although not causing dramatic changes, the nature of a progressive structure is well illustrated. The plot size fixed charge is not exactly as is being considered by the Council. It is also considered to introduce a third block price for excessively high consumption rates.

Peri-Urban Towns

The Peri-Urban Development Board has applied a water tariff system similar to that of the municipalities. The levied charges consist of a basic levy per consumer and a metered charge according to actual consumption.

The tariffs vary substantially as indicated below:

Kalkfeld; basic monthly levy ZAR 2.85, metered ZAR 0.66 /m3

Grunau; basic monthly levy ZAR 9.65, metered ZAR 1.10 /m3

Between these extremes the typical charges are in the range of ZAR 5 - 8 for the basic levy and ZAR 0.70 - 0.95 for the metered charge.

Compared to the bulk supply rates charged by Water Affairs, the surcharge

on metered consumption varies from ZAR 0.02 up to ZAR 0.30 per m^3. In addition, the consumers are paying the basic charge. Judging from the ZAR 0.54 surcharge applied per m^3 in Windhoek, most or possibly all peri-urban towns are operating water accounts at a deficit.

*** Info from P-UDB ?? ***

Unproclaimed Towns

Unproclaimed towns in the communal area regions have been managed by the Ministry of Local Government and Housing since the 2nd tier authorities were abolished at Independence.

The ministry sells water at a price just ZAR 0.02 higher than the bulk purchase price. For the 37 communal area towns the total payment Department of for Water Affairs bulk supplies is almost ZAR 7 million per year. The income is from onwards sales to consumers is, however, merely about ZAR 3 million.

The ensuing loss of revenue, exceeding 50% of the purchase price, is contributed to a country-wide boycott of payment. This poor performance seems to be caused partly, or perhaps mainly, by political decisions in the past not to disconnect payment defaulters. Public health reasons have been stated as the justification.

As for other retail water suppliers, the ministry has decided to start disconnecting the electricity supply of those who have defaulted on water payments.

Rural Water Supply

Commercial farmers are fully responsible for water supply to their farms within the limitations determined by the Water Act. They do, however, receive continuing subsidies if connected to a State supply where all costs are not levied, e.g. capital cost recovery.

Water to rural consumers in communal areas is generally provided free of all charges, although with variations as explained above. The justification for providing entirely free services to all communal area farmers is doubtful. Whereas many are subsistence farmers who cannot afford even a minor cash payment, there are also well off farmers who are in a much better position to pay than many of the urban poor. The implications of this statement are spelt out in section 8.7.2 below.

8.6. Principles for Future Tariff Policies

8.6.1. Comments on Financial Management

It is an inherently dangerous situation to de-link expenditure and income related to provision of services. The government regulations imply that all revenues have to be remitted to the central Treasury. At the same time the Treasury has to provide the recurrent funding for running of the same revenue generating facilities.

The municipalities have enjoyed a high degree of autonomy with a financial management system requiring income to match expenditure. They have, supported by State subsidies in the form of soft loans and cheap bulk water supply, been able to operate on a sound financial basis. The administration has a definite incentive to carry out revenue collection efficiently as both operations and investments have been dependent on the generation of income.

The State water undertakers should be allowed to operate separate water accounts and to **retain the water revenue**.

Alternatively, if this is unacceptable within the government system, the **recurrent funds could be voted as "revenue based"** (i.e. available only against a specified amount of revenue collected).

If the proposal to consider creating a parastatal water utility corporation, the issue of surrendering revenue will be much more marginal. It will apply to the Ministry of Local Government and Housing, to Department of Works, and, depending on final decisions on responsibilities and tariffs, to Directorate of Rural Development.

It is unfortunate that there has been political interference in the past with the enforcement of water payments. If there is a case for assisting people who cannot afford to pay the legally levied charges for water services, the required assistance should be paid from a social security vote rather than undermining the water revenue collection system.

> It is recommended that, as a matter of policy, a **higher degree of autonomy in terms of financial management** should be granted to the sector actors. This will allow for a transparent system where the government more easily can identify areas requiring a need-based support.

The presently applied tariff systems do not lend themselves to serve as a tool for demand management. There may be situations when the water undertaker

wants to reduce the demand (drought, capacity shortfalls, etc.) or to increase consumption in order to sell more water.

> It is recommended that under the water scarcity prevailing in Namibia, the tariff structure should be designed to encourage water conservation and reduced wastage through the **application of progressive and differentiated tariffs.**

With differentiated tariffs it will be possible to introduce cross subsidies. It will thus become possible to ensure poor consumers' access to the minimum amount of water required for basic needs and personal hygiene at an affordable cost. Typically some 10 - 20% of consumers consume 70 - 80% of the water in African cities. Although the situation appears to be slightly more equitable in for example Windhoek, the tariff structure should be seen as an available tool to maintain and possibly improve social equity.

Bulk suppy prices charged by the State has not taken into account the capital cost element. This should be gradually charged.

> It is further recommended that
>
> **full cost recovery be introduced in the medium term.** In order to ease the transition, the value of existing works may be written off, thus taking into account only new works.

8.6.2. The Basis for a Future Tariff Policy

The knowledge of water use pattern, development costs and operation/maintenance costs is good enough for deciding on the basic principles of tariffs. However, more knowledge is required for the actual design and decisions on tariff structures for the various categories of water supply.

Generally there appears to be a "missing link" in terms of relevant management information on the water supply and sanitation sector in Namibia; **the relationships between demand and impact on water resources and their development have not been linked to people's socio-economic status and behaviour.**

Under the (semi-)arid conditions of Namibia, conservation and management of the developed sources are just as important as paying attention to undeveloped sources. With particular reference to the cost, tariff and finance issues, the following should be studied as a matter of urgency:

- Typical water consumption by respective consumer categories; overall consumption, use for different purposes, seasonal variations

- Factors affecting water consumption pattern; dwelling size/standard, household size/composition, socio-economic status, price level and tariff structure, local conditions (e.g. climate)

- Costs of supplying water (bulk + distribution), in particular the marginal costs as demands increase

- Affordability, by consumer groups; effects on living standard or economic activities of changes in water tariffs, willingness to pay, prediction of response to tariff changes, scope for demand management based on price elasticity

By applying such knowledge in the design of actual tariff structures, installed supply capacity may be stretched substantially by suppressing a relatively unconstrained demand. Likewise the knowledge of consumer behaviour may be used to deal with drought emergencies by reducing demand through selective tariff measures such that effects on the economy are minimized.

Considering that water is free only in its natural state, the supply from a developed source has to be paid for. A tariff policy needs to be established in order to guide how to determine:

The details of how costs should be split between the consumer and the State/local authorities for the various water supply (and sanitation) categories, service levels and water use purposes.

The cost implications of developing water supplies in Namibia are very substantial. The boxed text, Box ??, sets out a perspective of the cost scenario.

COST PERSPECTIVE

A few indicative figures may illustrate the cost situation and also demonstrate the need for changes in present cost recovery practices. More work is, however, required to prepare a proper description of the cost scenario.

Capital Costs:
The capital costs for small rural water schemes in Botswana often run to ZAR 5,000 per person (borehole, pump, storage, limited distribution). To serve 0.5 million rural residents in Namibia currently having inferior service, capital expenditure may amount to ZAR 2,500 million (same technology/service level).

It is safe to assume that primarily "problem cases" remain to be attended to (low population densities, difficult supply conditions, poor success rates), hence causing high costs.

The estimated replacement value of bulk water supply assets in Namibia (ZAR 2,000 million) serving approximately 0.7 million people, suggests that the investment costs for larger concentrations of people may amount to about ZAR 3,000 per capita.

The marginal costs of additional supply will tend to be high as remote or marginal sources have to be developed. It may therefore cost more than the ZAR 2,000 million to cater for bulk supply meeting a doubled consumption in urban centres during the next one - two decades.

Recurrent Costs:
At current average bulk supply costs, services to 1 million rural residents with two heads of livestock each (assumed to be the "lifeline" quantity of 100 l/c/d), would amount to about ZAR 25 million per year, or about 75% of Water Affair's total running expenditure for the State bulk schemes. An informed "guestimate" indicates that the present requirement for recurrent funds to support existing rural/communal water points already runs to about ZAR 30 million, or more than two times the present allocation.

With a fully government/municipality operated service for the entire population of 1.8 million, the staff establishment could not be less than 5,000. Already now Water Affairs has an establishment of about 2,000 posts and the respective maintenance teams serving rural areas amount to about 700 employees. The staff costs alone would run to more than ZAR 40 million per year as a fixed expenditure.

Depending on adopted assumptions, it may be shown that **unserved rural residents with poor access to water "pay" the highest price** of all (due to collection journey). Added to this "price" is the social cost of diseases resulting from use of contaminated water. Hence, the issue of the consumer's expenditure per unit of water consumed is complex and needs closer analyzes.

8.6.3. Tariff Policy Objectives

There seems to be no option but to **adopt a policy of cost-sharing** between the beneficiaries and the authorities. This joint responsibility should also entail the right of the beneficiaries to influence the standard of service they will receive, although they will have to meet a major proportion of the costs.

The costs may relate to:

- actual investment costs (from budget or loan finance)
- servicing of the capital investment
- replacement/major rehabilitation costs
- repair/maintenance costs
- regular operation costs
- collection/transport costs (by consumer/authority)

Four main considerations are normally applied when setting out the tariff policy:

- With reference to the **social objectives** of equity and health for the entire population, a minimum standard of service may be guaranteed by the State (depending on location); the conditions upon which support towards such a service will be rendered have to be specified, e.g. where the State may not intervene, what minimum counter performance the State would demand from the consumer, what the consumers can afford to pay, etc.

- With reference to **economic objectives** the State may find it viable to stimulate economic activities in certain locations through provision of water supply; ensuing activities may not be of such nature that full cost recovery is feasible. From a socio-economic point of view the intervention may still be favourable, resulting in employment, food security, etc. This should be demonstrated in a comprehensive feasibility study rather than being conceived as a politically opportune undertaking.

- Depending on what the State can afford to spend on capital investment and recurrent costs, **financial objectives** in terms of cost recovery for the water sector as a whole should be established; recovery targets may be staged to avoid abrupt changes and also to prepare for future financial situations

- It is essential that the tariff structure is easily understood and simple to apply, hence there is also an **administrative objective** to be considered; the social and financial objectives need to be built into the structure such that it is administratively feasible

Hence, the principles for designing of tariff structures and setting of tariff levels need to be defined on the basis of a comprehensive knowledge. Factors such as financing of all costs associated with the operations (including loan servicing), cross-subsidies, water conservation, ease of enforcement and simple administration are the key determinants.

When considering financial objectives in general and actual financial performance in particular, it is essential that the sector agencies are given the necessary autonomy and freedom to operate efficiently. Experience shows that this can only be achieved if the agency is insulated from undue political interference. This aspect was also addressed in sections 7.4 and 8.6.1 above where autonomy and privatisation of certain parts of the sector was discussed.

The actual design of tariffs in accordance with the policy is a matter of optimizing a model such that the various objectives are met with a minimum of adverse effects. The design will take into account:

- The defined "lifeline" supply to be made available on affordable terms
- The need to penalize excessive use of water which makes no contribution to the economy
- The possibility of encouraging recycling and reuse by industrial enterprises and other large scale consumers

Due to the present differences in economic opportunities and in available services, there is a need to distinguish between tariffs for urban and rural areas. Rural is in this context defined as individual households or communities which make their livelihood primarily from farming. For both categories there are severe disparities in terms of affordability, and those have to be taken into account.

8.7. Recommended Tariff Policy

The above stated principles and considerations for tariff policies have been applied to make recommendations in respect of urban, rural and irrigation water supply in the following.

8.7.1. Urban Water Tariffs

It is recommended that the future tariff structure should have:

- A fixed, low price for the defined minimum volume of water (below 5 - 15 m3/month per family often applied)
- A block tariff system with progressively increasing rates for increased consumption (modest increase up to 20 - 30 m3/month per family, thereafter sharp increases in two or more steps)
- An assessed consumption figure for non-metered connections - only to be allowed where garden watering, car washing, etc. is not possible - based on number of water consuming fixtures
- Rates for commercial enterprises recovering the full financial costs with possible subsidies made available from an authority other than the water supply agency
- Direct and immediate recovery of plot-related investments (i.e. local distribution)
- Sewerage rates related to the volume of water, but calculated such that cost of conveyance and cost of treatment/disposal are reflected

The tariffs should be **subject to administrative approval by the Permanent Secretary to the Ministry of Agriculture, Water Affairs and Rural Development** (based on recommendation by the Secretary/Department of Water Affairs) in order to ensure harmonization and, where necessary, to ensure that the tariffs serve to conserve or "market" water. The tariff issues will also be deliverated on in the proposed NCC Sub-Committee on Administration and Finance (ref. section 7.2.2).

It is essential that the water resource custodian as well as the bulk supplier have an influence on the actual pricing of water. Selective State (cross-) subsidies may also be warranted and can be worked into the respective tariff structures.

Tariff levels should be reviewed annually with a view to avoid backlogs compared to financial objectives and fluctuations in general cost levels. The financial autonomy presently enjoyed by municipalities should be maintained and extended to as many consumer groups as possible.

8.7.2. Rural Water Tariffs

Water supply for individual farms operating according to commercial principles can be treated either similar to urban water supply (in terms of cost recovery),

or they can be left to care for themselves 100% (possibly assisted by defined subsidies as the State may seem fit).

For the typical subsistence farmer in communal areas the approach has to be more flexible. The "tariff" should be seen more as a framework determining the State's responsibility for supporting a specific community.

Support should only be granted to communities which accept to make a defined counter performance. The size, type and timing of this counter performance will vary with community and water project characteristics. There seems to be no alternative but to **exercise individual assessments** when it comes to determining what contributions should be required from the consumers.

The primary objective of such assessments is to define which consumers deserve a higher and possibly continuing degree of support by the government. For this purpose the **Directorate of Rural Development** should develop operative criteria to base the assessment on. These would take into account such aspects as present affordability, potential for generating income, type of water supply (cost and complexity characteristics), degree of service to be provided, etc.

Where possible, it should be left to **the community itself to decide** on their internal division of responsibilities, also for meeting costs and labour tasks. However, a minimum of control and guidance would need to be exercised; it is not the intention of the government to create opportunities for influential people to exploit poorer members of society.

As a matter of policy principle:

> **The installation should belong to the community (represented by its Water Committee). The State's role should be that of providing necessary support**

The State support should also take the form of insurance against "losses" beyond the control or competence of the local community, e.g. drying up of wells sited/supported by the State, low success rate in borehole drilling, etc.

The government may retain ownership of the borehole or dam itself, but leave all equipment to be owned, operated and maintained by the community.

Implementation, rehabilitation and maintenance assistance should only be provided for <u>after</u> the mutual responsibilities have been agreed upon. Some **basic principles should constitute the recommended tariff policy**:

- Implementation or rehabilitation will only proceed after mutual responsibilities and commitments have been agreed upon

- State support will be terminated if conditions are not adhered to as resources can be better spent elsewhere

- The community should always pay for the daily operation costs, except in cases of excessive pumping where a temporary subsidy towards fuel costs may be granted

- Call-out emergency repairs should always be paid for, but not necessarily at full cost

- The State may decide on a set of subsidies to be administered by an agency responsible for settlement and/or agricultural production

The water supply support services should be fully transparent in terms of expenditure (type, location, amount) and the ensuing conditions and requirements be made fully known to the communities. These should form the basis for dialogue between the authorities and the communities, eventually resulting in a formal agreement setting out mutual responsibilities.

"Payment" and "rates" are not straight forward issues if an equitable situation is to be created. For instance, recovery of investment in windmill or solar installations providing for low future running cost needs to be harmonized vis-a-vis diesel powered or handpump options. A set of rates reflecting operator negligence, predictable wear-and-tear breakdowns, replacement frequencies, etc. should be developed and applied for repair services.

The detailed structure and levels of tariffs shall have to be decided upon after more detailed studies of implications. Service rates, level and type of contributions, options eligible for State support etc. should be specified.

The circumstances may differ widely and two examples are given in the boxed descriptions as an attempt to clarify how tariffs can be applied in different situations. One example (Box ?) refers to a location with different settlement categories within the same supply area. The other (Box ?) explains the implication of technology selection.

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8.7.3. Irrigation Water Tariffs

The Department of Water Affairs is running the supply of irrigation water at approximately break-even in terms of recurrent expenditure viz. revenue. By far the major costs of providing irrigation water, at least from dams in the interior, will be the capital cost element.

It would be more appropriate if Department of Water Affairs could charge the full costs in the future (as done for other commercial undertakings) and that the subsidy element be injected through the budget appropriate for supporting food production (or settlements).

Hence it is recommended that irrigation water is charged by the water authority at the financial tariff rate, which may be off-set by a subsidy towards the produce value or in other forms to be established by the government.

The need for proper feasibility studies of irrigation projects have been pointed out elsewhere. The financial performance of some of First National Development Corporation's schemes on the Okavango should not be copied.

9. WATER SUPPLY FOR COMMUNAL RURAL AREAS

9.1. Crisis Identification

The service situation in communal rural areas is critical. This has been documented in chapters 2 and 3 of this Report in terms of:

- Low incomes and general poverty
- Lack of community organisation and initiatives
- Poor health status
- Marginal opportunities for improved agriculture in most areas
- Limited service coverage (water supply, sanitation, health)

Communities have in the past neither assumed nor been given any significant responsibility for provision of improved water supplies in the communal areas. The local headman may have been involved in the location and prioritizing of installations, but generally the participation in decision-making has been limited. With fuel supply and maintenance being free services, the starting point for a new policy is indeed not favourable.

As has already been stated, there is no doubt about the justification for increased support to the most needy of the communal regions. Furthermore, this policy has recommended that improvements can only be made through the involvement of the communities. Following from the above, this may be difficult to implement, and one should expect the redirection of support to take time to be accepted.

This chapter will analyse the situation further and make some broad recommendations that can be used to develop the eventual strategy. In doing so, one should apply the recommended policy, but it has to be adapted carefully to local conditions in terms of, inter alia:

- Water resource situation
- Socio-economic characteristics
- Organisational abilities of local community
- Willingness to participate in projects
- Potential for improved agriculture and generally for sustainability of the settlement

9.2. Maintenance of Rural Water Supplies

The below Table ?? gives a breakdown of resources employed by government for operation and maintenance of the rural water supplies in communal areas (ref. description in section 3.4.3). Budget figures (in ZAR thousands) are from the 1990/91 financial year. The table shows that an **average of ZAR 2,325 is spent annually per water point installation.**

Region	Rec. budg.	Depots	Teams	Workers	Vehicles
Nama	ZAR 390	5 nos	9 nos	97 nos	13 nos
Tswana	ZAR 369	1 no	3 nos	36 nos	10 nos
Rehoboth		1 no	1 no	4 nos	1 no
Herero	ZAR 2,486	10 nos	35 nos	223 nos	51 nos
Damara	ZAR 2,477	10 nos	92 nos	18 nos	
Bushman	ZAR 63	2 nos	2 nos	16 nos	2 nos
Caprivi E	ZAR 538	1 no	3 nos	42 nos	8 nos
Kavango	ZAR 1,653	5 nos	97 nos	13 nos	
Owambo	ZAR 1,596	2 nos	5 nos	58 nos	____
Totals:	ZAR 9,572	73 nos	665 nos	116 nos	

A notable difference between the respective regions, not reflected in the table, is that in some (Herero and Tswana) the local pump operators are on the government payroll, paid about ZAR 480 per year.

It should again be noted that the information is not fully consistent and information from the significant Ovambo region is particularly uncertain. Some inaccuracies may have resulted from the way reports have been requested and collected from different regions (Department of Agriculture and Rural Development, late 1990; ref. ??).

The Rural Development HQs has now requested that weekly reports of repair and construction progress be prepared and forwarded. These reports generally reflect an ad hoc maintenance activity based on emergency repair and replacement of faulty equipment.

Looking at the strength of the manpower, depot facilities and vehicles, there is **a good basis established** for developing the technical maintenance services required in the future. This resource should be developed further to comply with the implications of the new policy, including the role of Directorate of Rural Development.

The teams do undertake some new construction as well. These activities are, however, modest with a few new boreholes, reservoirs, cattle troughs, etc. being added each year. The manpower and equipment available to the teams could provide for more extensive technical support to communities constructing their own facilities. The procedures for new developments will be commented on further in section 9.4.

The boxed case description from Nama (Box ??) gives a more detailed description of how the maintenance is organised within that region. The set-up in other regions is similar although of various strength and quality.

Nama Water Supply Maintenance

Namaland is about 2.5 million ha and has about 1,500 farms. Maintenance is organised from 5 sub-regional depots where Chief Factotums are in charge of a total of 9 maintenance teams. Each team of 8 workers is headed by a Senior Factotum.

Maintenance requests are recorded in a "complaints" protocol at the depot office. Weekly programmes are worked out based on the reported breakdowns. Teams spend 4.5 days in the field each week and normally return to the depot on Friday. They then receive instructions, load the truck and depart early on the following Monday.

Farmers try to attend to minor problems themselves. The teams had, however, noted that there was a limited willingness among farmers to help each other in difficult situations; they look upon themselves as individual farmers rather than as a community.

Fast moving spares are kept in stock at the respective depots. If not in stock, a cumbersome procedure involving at least 5 steps from quotation via HQs approval to delivery is required. Each depot is also responsible for issuing free fuel to the diesel powered pumps. The rule is that farmers should collect the fuel themselves. When convenient, the maintenance teams may bring the fuel drum and supply it on site.

The Chief Factotum tries to visit his field teams at least once each week. In this way there is a good contact between the depot administration and the field problems. Information on the respective installations is lacking at the depot office. A filing card system is needed to keep a precise record of water point installations and the repair history of each unit. Instructions to collect such information had just been issued by the supervising officer in Keetmanshoop.

The complaints book at Gibeon showed that about 150 breakdown reports had been received between 1 January and 23 April, pointing at an annual rate of about 500 cases. That implies about 0.6 repairs per installation per year. 50% of the reports gave a specific reason for the breakdown. Problems were normally attended to within a week after protocol entry. In exceptional cases it took 2 - 3 weeks.

The supervisors felt a need to be linked to a competent technical organisation which could provide backstopping, training support and better promotional possibilities within the organisation.

9.2.1. Requirements for Sustainability

Well researched experiences from other developing countries in Africa have demonstrated the inadequacy of fully government run water supplies in rural areas. Not only the costs and logistics support have proved beyond the capacity of governments to handle; the services provided have often not

addressed the felt needs and expectations of beneficiaries who have had a limited influence on how, when, where and by whom services have been provided.

Sustainability of services is not a question of recurrent funds alone. The following list of **complementary elements contributing towards sustainability** - specifically relevant for community based services - has been established:

- Strong community organisations
- Appropriate skills (community and agency)
- Coverage of operational phase inputs
- Supportive attitudes (local priorities)
- Accepted service levels
- Appropriate technology
- O & M related support systems and services
- Extension services
- Decision on responsibilities
- Execution of responsibilities

Considering the relative strengths of Namibia's economy and administration, as well as implications of its colonial history, the following characteristics can be stated as a basis for policy decisions and operative strategies:

- There is limited experience with self-development and organisation for community based development, including communal ownership of resources such as water supply installations
- Decisions must be taken with regard to cost recovery and criteria for financial support to communities
- The low level of technical skills at community level and among the population in general is a constraint to rapid expansion (although returning migrant labourers may bring home relevant skills)
- With water being a critical factor for most rural activities, one can expect improvements to be assigned high priority by communities with

few priority conflicts; expectations as regards service level may have to be reconciled

- A good institutional basis exists within the sector agencies, for managing and financing expanding sector development
- A basic maintenance infrastructure is in place, but needs upgrading and relevant backstopping support, partly depending on adoption of the recommended policy vis-a-vis the communities' responsibilities
- Extension services required to implement the policy decisions on community responsibility need to be established, including the practical communication procedures
- More investigations and experiments are required with a view to identify feasible low-cost or easy-to-maintain technologies

The reason why maintenance is discussed before development of new water points is simple:

> **Unless the substantial long term burden of daily operation and maintenance is resolved, particularly in sparsely populated Namibia, a strategy for new developments may become meaningless.**

9.2.2. Recommended Maintenance Organisation

The allocation of responsibility for the respective water supply functions, including Scheme Operation and Management was set out in chapter 6. As an entirely new principle has been proposed in terms of community participation, the issue has been discussed in more detail below. The intention is to provide a better understanding of the recommendation made at the Swakopmund Workshop.

Future allocation of responsibilities should be based on the concept that:

> **The communities in the communal rural areas consist of farmers. They should therefore be supported and be developed to become better farmers. The water supply interventions should be seen as an opportunity to achieve this objective.**

Hence, there is a need to arrange for the transfer of ownership from the State to the communities of water supply installations. This change in formal ownership should be introduced as a result of negotiations with the beneficiaries of existing schemes and as a condition for support to new schemes.

The developed water source may continue to be owned by the State, for example the borehole itself, but not the equipment.

The conditions for supporting a community water supply at the investment and maintenance stages respectively have been proposed in the tariff context, ref. Chapter 8. The below recommendations are made on the assumtion that the principles for tariffs be adopted.

Government should accept and be committed to support maintenance of rural water supplies on the condition that:

- The community has a representative body (water committee or similar) representing the consumers on a collective basis
- The consumers have accepted ownership and thereby responsibility for operation and basic maintenance of their water scheme
- The tariffs applicable to the particular scheme and consumer group are accepted and met by the consumers

Hence, it is required that:

> **Communities shall be the owners of their water supply installations on a collective basis where the consumer is more than one family/farm**

The government's responsibility should then comprise the following obligations:

- Advise and train the local community in basic management and operation procedures
- Carry out an annual routine inspection and advise on necessary maintenance tasks
- Respond to requests from communities for repair services, to be rendered against standard charges

The mutual responsibilities should be formalized in a standard agreement between the government and the consumers. Directorate of Rural Development should in this context represent the government.

Hence, it is required that:

> **Government establishes and runs a decentralised maintenance support system assisting communities to become self-sufficient according to a mutual agreement**

Discussion of Options

There are three government agencies with mandates of particular relevance to rural water supply (see also chapters 3 and 6):

- **Department of Water Affairs**;

  responsible for water resources management and technical/ financial aspects of resource development and utilisation

- **Directorate of Rural Development**;

  responsible for support to community based development, including local level training and management support

- **Ministry of Health and Social Services**;

  responsible for primary health care, including safe water and health/hygiene education

In simple terms, there is an **administrative distinction** between technical aspects, peoples' organisation and peoples' usage of water in relation to rural water supply services.

With regard to maintenance of community owned installations, the logical choice is to allocate the prime responsibility to Directorate of Rural Development. However, it may be argued that after initial agreement has been reached, the major task will be the technical maintenance support function. Below follows an assessment of advantages/disadvantages of having Directorate of Rural Development and Department of Water Affairs respectively as the responsible agency for maintenance.

Directorate of Rural Development:

Advantage: Strong community orientation, able to communicate with local committees

Facilitates linking with other rural development activities

Clear and unified responsibility for rural water supply functions as observed from the consumers' side

Disadvantage: New agency which will require time to develop base functions in relation to community support

Limited infrastructure and expertise for technical support services

Non-substantive agencies often remain under-resourced for their tasks (experience from other countries)

Department of Water Affairs:

Advantage: Well developed technical and administrative structures

Procedures, facilities and expertise relevant to maintenance already present within the organisation

Organisation with central and decentralized maintenance responsibilities already exists

Disadvantage: Rural water supply may loose in priority compared with other Water Affairs tasks

Tradition within organisation purely technical; communication support would be a new aspect

Fragmented responsibility may cause confusion if Water Affairs and Rural Development have partial responsibilities

Recommendation:

Considering the potential merits of either solution, and also keeping in mind that the creation of Regional Authorities may soon result in new changes, a "least change" option should be adopted from technical point of view. This should, however, take place in a way which safeguard maintenance performance.

The main consideration is, however, that:

> **Assigning the key role to Department of Agriculture and Rural Development will ensure interaction with communities on their premises as farmers. Other Government agencies may extend support upon request from case to case.**

On a balance it is therefor recommended that:

- **Directorate of Rural Development** should have the overall responsibility for rural water supply maintenance, including administration of funding, staff, communication support and State subsidies to operation and maintenance

- **Department of Water Affairs** may be requested by Rural Development to render certain specialized agent services on a case-to-case basis

With this approach a three tier development and maintenance structure will be created, consisting of:

* **The community based caretakers/scheme managers**
* **The regional maintenance organisation**
* **The HQs for policy, planning and funding**

For Rural Development to discharge the assigned responsibilities it will be necessary to strengthen its Water Supply organisation with at least:

- One qualified water engineer at HQs with planning and management responsibility in relation to maintenance support
- One qualified artisan in each of the maintenance regions, to be given special in-service training to ensure planning, management, and communication skills

For Directorate of Rural Development's role in new developments, additional staff will have to be considered as explained in section 9.3 below.

Department of Water Affairs will have permanent responsibilities for borehole, surface water and bulk supply development, for water data logging (monitoring of water resources), and for training related to their permanent development tasks. In addition, it can be foreseen that Water Affairs may be requested by Rural Development, through the Permanent Secretary to carry out specialized tasks such as:

- Training of trainers to serve at the Agricultural Training Colleges and in the field (mobile training)
- Planning tasks such as preparing scheme inventories for rehabilitation and maintenance requirements
- Execution of specific rehabilitation projects
- Preparation of designs for surface water schemes
- Advice related to policy matters, tariff issues, water quality, etc.

In addition to the proposed responsibility for the National Coordination Committee's secretariat, Department of Water Affairs should also have a small permanent unit to advise on technology issues, organise agreed support functions for rural water supply within the department and participate in the planning process (resource allocation, priorities, monitoring and evaluation of experiences, documentation, etc.).

All agent services should be invoiced by the executing agent to the prime responsible agency. Hence, the Water Affairs services will be commercial in nature and would not conflict with a possible decision to create a parastatal corporation (ref Chapter 7.4).

In order to rationalise government's maintenance services in the communal areas, Rural Development should also prepare to assume responsibility for small installations still maintained by Department of Works where practical. This, however, refers to the issue of Villages which the WASP Committee has not been able to resolve.

9.3. Development of New Water Supplies

9.3.1. Procedures

The purpose of community owned water supplies is not primarily to divest the government of obligations and responsibilities, but to create an environment where individual communal area farmers can develop their capacities to manage water supplies and other improvements.

The requirements and procedures explained as conditions for maintenance support would apply to new installations in particular. In order to introduce a new policy successfully, it is essential that the relevant procedures are followed right from the start; there should be no leeway or openings for frustrating the new policy.

There is no need to explain the procedures further; reference is made to section 9.2 above and to chapter 10 on Human Resources Development. However, it is **strongly recommended** that:

- The policy message be given full political support
- The policy be subject to wide public announcement
- Relevant concerned authorities and their officers be given detailed briefings in seminars, etc
- Public relations campaigns be designed and launched, for example including pamphlets, posters, press releases, access to broadcasting, etc.

The complexity, logistics, staff requirements and costs of implementing according to community participation principles should not be underestimated. Although the burden on conventional technical agencies may be reduced, there will have to be intensive promotional and training efforts launched at all levels to give the new policy momentum.

9.3.2. Cost Issues

Estimates made by UNICEF (H. Spruitj, 1990, ref. ??) indicates a somewhat lower coverage in Ovambo than presented in chapter 3 of this Report. However, in spite of this discrepancy, interesting conclusions with regard to additional water supplies were presented.

Applying the UNICEF criteria (20 l/c/d from source within 1,000 m) for a satisfactory solution, it is estimated that the need in Ovambo is in excess of 3,000 additional water points.

Although water supply coverage is relatively better in other regions - considering differences in population, settlement density, etc. - there may be a national need to provide some 1.5 - 2 times this number of water points (i.e. 4,500 - 6,000) totally in communal areas to reach a satisfactory basic service level.

The investment cost per installation may range from ZAR 5,000 (or less) for a shallow well installation to more than ZAR 40,000 for a deep borehole in an area where drilling success rate is low.

For connections to a piped bulk scheme costs will also vary within a wide range; provisions for the marginal costs of increased bulk supply plus piped distribution have to be accounted for. Depending on soil conditions the cost per metre of small diameter piping to serve a single settlement may range from ZAR 15 to 50.

Hence, supply from a bulk supply main would compare favourably on investment costs with a point source installation only upto a distance of 1 - 3 km. Operation and maintenance costs may be cheaper for connection to a bulk supply, possibly doubling this distance range.

The estimated requirement for upto 6,000 new water points - at an assumed average cost of ZAR 30,000 each - could possibly cost a total of ZAR 180 million. Comparing with current capital investment budgets, it could take in the order of 20 - 30 years to reach a satisfactory service level for rural residents in communal areas.

This clearly demonstrates the need to investigate low-cost options which could represent feasible and viable alternatives to conventional solutions. There may

be a need to advocate a more diversified water use strategy, distinguishing between water for human consumption (small quantities) and non-potable water for other uses (large quantities). Reference is made to section 9.3.3 for a continued discussion on this issue.

Consumer responsibility does not off-set a considerable proportion of the costs as long as they cannot afford to pay for the investment. Selective credit schemes offering an opportunity for the better-off communal area farmers to make early improvements should be considered.

However, the central government should take every opportunity to relieve itself of long term recurrent responsibilities. Moreover, by gradually transferring more responsibility to informal consumer groups it can be hoped that these groups will **continue to expand and improve their own water supply services** with a gradually reduced support also during the investment stage.

It is a challenge to government to identify both the most needy and the most development-effective areas for investments and subsequent recurrent support. As resources are limited there is no alternative to a selective system for provision of support. Although individual assessments are problematic, they have to be made.

The government policy is to ensure equitable access to water supply for all consumers in the long run. However, priorities should in the short run be guided by the adopted objectives of social and economic development respectively, with the first providing for virtually free support and the latter for credit support.

9.3.2. Implementation Strategy Issues

For rural areas the technology choice is restricted by water resource constraints, leaving large areas unsettled as water sources have as yet not been identified or developed. As a result of ongoing groundwater studies (ref. EEC supported programme covering four areas so far), supplementary options are likely to be identified. For individual households and small communities **minute local sources** should be given more attention for development on community basis; the exploration work in the past has concentrated on the stronger sources which could serve larger settlements.

In some areas there will also be merits in looking for options entailing differentiated use of available water sources. The relatively small potable water volumes could come from a different source from the larger quantities needed for other domestic and livestock purposes.

Water for human and livestock consumption respectively are both rightly considered a primary demand according to present policy in Namibia.

However, an important issue here is that availability and access should be assessed according to different criteria. Briefly, for human domestic consumption it is desirable to have the water source closest possible to the home.

The same would apply to livestock if herd size and range management were adequate. However, with the inherent risk of overgrazing in communal areas, the provision of spaced-out water sources may be the only practical way of protecting some of the land from degradation, keeping it as a marginal dry season grazing reserve. In Botswana a rule of minimum 8 km between each cattle watering borehole has been enforced in communal areas precisely for the purpose of providing **"instant" range management.**

Alternatively, low yielding sources able to sustain only a limited number of livestock at each watering point could be an alternative. Where gravity is possible from a borehole, small diameter pipes with a limited gradient could serve as a flow restrictor controlling the maximum yield.

Even development of sources which are not perennial, but which may assist in **bridging the dry season gap**, could be of interest as elements of an overall solution. Zimbabwe, for example, planned its rural water supply programme with a widely spaced network of boreholes to serve as drought fall-back for communities having shallow wells as their primary (although not 100% reliable) source.

It is recommended that the Rural Water Supply Unit to be retained within the Department of Water Affairs could aim at **compiling a design manual for rural water supplies**. The preparation should be done in close cooperation with the Directorate of Rural Development in order to reflect the community development and communication support requirements.

Another important aspect would be to ensure a high degree of standardisation, wherever possible based on locally manufactured materials and equipment. The possible conflicts with tender procedures should be assessed, and if necessary waivers sought. This is particularly urgent in view of the prospects of increased donor participation in sector development; if there is a well justified standardisation policy, most of them may agree not to import their own brands.

Pilot Projects

Continued experiments should be included in future programmes. The strategy of utilizing local, regional and national water sources, in this order of priority, could be adapted also at the micro level; on-site sources (including water harvesting) should be exploited before resorting to more distant sources.

A strategy aimed at differentiated use of the various water sources, possibly also changing with season, would require flexibility in terms of standards for water quality, quantities available and service levels. The issue can only be partly resolved by the water authorities; the other important party is the consumer who will be carrying the long term responsibility.

Advantage should be taken of ongoing or forthcoming programmes, including activities undertaken by NGOs, to identify a few pilot projects where experiments could be made in terms of:

- Technology selection and mix
- Promotional procedures
- Training of community members for a range of tasks
- Alternative levels of community and government contributions
- Alternative divisions of responsibility for maintenance, with reference to affordability and different degrees of training

In order to gain specific experience these selected pilot projects need to be particularly well monitored, evaluated and documented. It is **recommended** that:

> **Department of Water Affairs take an immediate initiative to establish at least five pilot projects in representative or otherwise interesting parts of the country. The responsibility for the pilot projects should be handed over to Directorate of Rural Development within two years, subject to established planning capacity.**

With the varying conditions (including both water resources and settlement pattern across the country), it is not likely that a single strategy would be applicable throughout Namibia. The purpose of the pilot projects would be to identify criteria and determinants for adaptation of strategies to the local environment. Preferably, the variations should be modifications of a basic strategy, and always based on the same principles concerning responsibilities, decentralization and community involvement.

9.4. Statement on Priorities

The current situation in rural communal areas - based on observations and conclusions presented in this Report - dictates that **the following general priorities be adopted** for water supply interventions in the short term:

i) Develop the maintenance support structure

ii) Introduce the concept of community responsibility and start the mobilisation/training for this task

iii) Carry out rehabilitation of existing installations, bringing all viable water points into operation

iv) Attend to crisis situations where new installations should be provided as a matter of urgency

v) Upgrade existing installations to acceptable service and hygienic standard, utilizing community labour and promoting hand-over

vi) Initiate a general development programme compatible with available institutional capacity

The above listing is in order of priority. As can be seen the priority assigned to the construction of new water points has been rated low. There are two specific reasons for this recommendation.

- Firstly, the institutional capacity, methodologies and detailed framework for implementation on a large scale has to **be created before escalating** the activities; they will presumably be growing slowly while other priority and prerequisite activities are going on

- Secondly, there is a need to **safeguard past investments** and in that process create the maintenance structures and methodologies which will be applied for the future growing stock of water installations

The emphasis on maintenance has already been stated by government. However, in practice such intentions are easily compromised under the pressure for extended coverage. Again, high intensity donor programmes could contribute to a difficult situation; new installations may be developed faster than the maintenance capacity can be put on-line.

In order to meet the above priorities, it will be necessary also to strengthen the technical competence within Directorate of Rural Development for new developments. The minimum need is initially to one qualified engineer assisted by 1 - 2 technicians at HQs. As activities pick up, each region where projects are in progress, will need 1 - 2 technicians with subordinate technical staff for construction work/supervision.

10. HUMAN RESOURCES DEVELOPMENT

10.1. General Needs

Parts of the water supply and sanitation sector in Namibia are well developed; it compares with that of a developed country. The constrained water situation has made this development of the sector - including its human resources - a necessity for the level of economic activities already achieved. This situation, combined with the identified shortfalls, points out two obvious priorities for human resources development:

It is equally important that:

- **Present professional qualities and capacities be retained and developed**
- **New priority areas be addressed at the same level of dedication and professionalism**

Responsibility for human resources development will follow the pattern of responsibility allocation as set out for the respective water supply and sanitation functions. Although training is identified as specific functions, the overall needs of the sector have to be viewed in a wider context.

The urban areas enjoy generally adequate services. The key issue is to consolidate the current situation and to be able to keep abreast with the rapidly growing requirements resulting from urban influx. With adequate pricing of the services this part of the sector should be in a good position to continue its good performance.

The main challenges are connected to the development and implementation of new strategies for services to rural areas. Three dimensions are particularly important in terms of human resources development :

- Services to rural areas will be given higher priority
- Schemes will be developed as community based rather than as a government delivery
- Minute water resources suitable for low-yielding point sources may play an important role

These three dimensions imply that:

- **More manpower** has to be allocated for the rural part of the sector; they have to be recruited, trained and deployed with adequate professional and logistics support

- **Change in attitudes** among the government officers, honouring the priorities and needs of communities; better knowledge of socio-economic conditions and local development potentials is required

- **Investigations and experiments** have to be initiated with a view to expand the knowledge of resources and their utilisation under community management

For manpower development the above has implications both in terms of size and quality of the manpower resource. These are additional requirements as all previous tasks and functions have to be continued. The obvious strategy would be to retain and gradually expanded the sector capability while reorienting priorities and attention. Redeployment in order to achieve new goals cannot be avoided. Clearly, a trade-off between the conflicting objectives and sector priorities - made under political influence - are inevitable.

10.2. Sector Management

Human resources development for the sector management mainly refers to the training and reorientation required to address the new agenda. Main issues include:

- Improved knowledge of the socio-economic framework for development in rural areas

- Management of a decentralized administrative structure, requiring adequate support, follow-up and control mechanisms

- Introduction of management procedures for development of community based programmes

- Management of an expanding network of extension staff and technical support services

- Information management, aimed at monitoring status and progress, providing planning input and refining the policies and strategies

- Administrative and financial management adapted to community based schemes where cash and/or kind contributions may apply (ref. the tariff policy)

- Planning, designing and conducting of training for the respective staff groups (both traditional and new fields)

The above issues, and others as may be identified in the course of further strategy development, will have to be carried out by the different actors

according to their assigned overall and specific responsibilities. However, considering the interdependencies already described, also training has to be coordinated and rationalized. It was therefore recommended to establish a separate NCC Sub-Committee on Training and Personnel.

One element of management development will be to **ensure wide exposure to and understanding of** the specific problems associated with services in rural areas as well as in low income urban areas. This process will take time not only at the central and top management level, but also for the decentralized organisation where executing capacity has to be established.

10.3. Extension Services

The recommended policy based on the adopted fundamental principles and, hence, allocation of responsibilities, is not feasible for the communal rural areas without a well established system of extension services. In the context of rural development, such services still need to be firmly defined and established. In support of sustainable community based water supply and sanitation at least the following categories of extension services need to be available:

- **Rural Development**; assisting communities with identification of water supply and sanitation needs, local management and organisation, specialized consumer/user training, implementation, and maintenance; assisting with introduction of income generating activities

- **Health**; creating demand and motivation for improved services on a community managed basis through health education and demonstration of adequate practices; general health education for optimum health benefits from the facilities

- **Water Technology**; identifying viable alternatives from which communities may select and thereafter be assisted to implement (including provision of external inputs, training/supervision of local manpower, etc.)

- **Sanitation Technology**; as for water technology, but less complex (low cost, local materials, typical designs)

- Agriculture; assisting communities with development of improved agricultural activities, enabling efficient use, and thereby promoting sustainable management, of the water installations

After the respective organisations have been planned in terms of manpower requirements, location, and management structure, the various disciplines of extension services have to be analyzed with a view to determine the training delivery. Elements of these analyses include, i.a.:

- Task analyses; what knowledge and skills each category of staff has to possess in order to carry out the required tasks

- Selection of trainees; identify the trainees, their background qualifications and what abilities need to be developed through training

- Type of training; determine the objectives, format and content of the training, with due regard given to exposure to practical aspects of future assignments

- Practical organisation of training; identify required trainee output, trainers (who may also have to be trained), suitable venues, and timing of actual training

- Cost of training; calculate all cost elements of the training, including both one-off and the variable costs

- Training and development plan; prepare the detailed plan for training activities required to meet the manpower demands

The ensuing training plan may consist of pre-service, in-service and refresher courses, as well as elements of on-the-job training. Considering that skills required for water and sanitation development will be just a part of the overall skills to be trained, the need for careful coordination between agencies and training efforts is essential. A realistic approach to what is the "need-to-know" rather than the "nice-to-know" course contents must be adopted when curricula and job descriptions are prepared.

Four sets of key institutions will play an important role in establishing the required extension service manpower resources:

- **Von Bach Training Centre**; this institution belonging under Department of Water Affairs has concentrated on conventional water supply technologies in the past and should continue to do so; the centre should provide an input within this capability to Agricultural Training Colleges and to Rural Development Centres; the role should be to assist with the training of trainers for these institutions and to continue training as in the past

- **Agricultural Training Colleges**; these institutions under the Directorate of Training in Department of Agriculture and Rural Development should assume the key role in training of regional maintenance teams, rural extension workers (technical skills), community level trainers (technical skills) and construction workers required to assist local communities

- **Rural Development Centres**; these should support the rural extension workers, assist with demonstration projects and applied, appropriate technology; training of community water committee members in basic management and administration (in cooperation with extension workers)

- **Ministry of Health and Social Services**; both the network currently being set up through training-of-trainers programmes, health inspector training and the ministry's general extension service machinery (nurses, community health workers, clinic/health post staff, etc.) will contribute; basic knowledge of health and hygiene education element essential for all sector workers

Directorate of Rural Development is vested with the main responsibility for initiating the training planning process related to extension services. The needs have to be identified and the specific roles of the various institutions be spelt out within an integrated sector context. Only then can the various training resources be mobilised for a joint effort.

10.4. Community Management

Community management of water supply and sanitation projects should be seen from two perspectives:

- Dependency on external (i.e. government) assistance should be minimized through development of self-reliant rural communities

- Local management will relieve the government of recurrent commitments and logistics intensive operations in often remote areas

Training of community representatives should be based on objectives reflecting these two perspectives. Specific community based tasks and skills to be addressed include:

- Local organisation and leadership for mobilisation of resources during the construction and operation phases

- Simple management and administration procedures such as task allocation, procurement, cash/kind collection, accounting, reporting, etc.

- Technical skills related to construction, operation and maintenance

- Communication skills and awareness for continuing hygiene education at community level

The execution of the required training tasks, to be coordinated with the general implementation, rehabilitation and maintenance plans, will be one of the prime responsibilities of the extension workers. There is, however, a need to gain experience over a period of time before firm development plans for community based projects can be established.

During the initial stages government should be cautious not to undermine the potential for community participation further; reference expectations and past service delivery approach. A minimum of communication support and information to communities, through the local leadership and through the recommended information campaign (ref. section 9.3.1), about expected future commitments and contributions should therefore accompany any government intervention in the sector.

The basis for future human resources development at community level has to be laid through information explaining the responsibilities and tasks to be undertaken by communities. The actual training for development of necessary skills will be made in due course by extension workers. Such training has an added value beyond the strict needs related to water supply and sanitation; perhaps the main justification for investing in human resources development among rural community members is the expected spin-offs when the taught skills are being applied in other priority activities.

A capacity problem, and thereby a serious time-lag, can be foreseen in this regard. Attempts should be made to involve NGOs in the process and along the lines explained in the recommended policy. There are already examples of NGOs executing the role of the Ministry of Health and Social Services in respect of health education, local health posts, etc. The same strategy could be applied for community managed water supplies.

10.5. Structure of Training Programmes

Some of the analyses required to precede training programmes have been identified above. Most of the immediate measures appear to be well suited for sector agency based training delivery. However, for the long term development - also in view of the relatively small size of the national economy and the sector itself - the national education system should become an actor in the training efforts. This relates to basic education, vocational training, and to adult education programmes.

Although the broad elements of training for the sector can be identified, the **magnitude and details depend on a number of factors** such as land and settlement policy, rural development policy, resources available to water and sanitation sector, future decentralised administrative structure, tariff policy, etc. The need to learn and develop detailed strategies on the basis of well monitored projects should also be recognized.

Hence, there is no way it is possible at this stage to quantify the training efforts ranging from senior management level down to individual community members. All which can be said is that the task is vast and complex, but that it is a prerequisite for progress in overall development. A major point is to allow time for a sensible development rather than succumbing to pressure for "quick fixes".

10.5.1. Reorientation

As results of socio-economic studies and experimental implementation projects become available, improved knowledge should be disseminated to the sector management. The role of social sciences in this process should be recognized as the sector is going to explore fields and approaches which have been given little attention in the past. This new set of information should be accommodated in the sector's information management system.

For professionals and sub-professionals already working in the sector and new recruitees with conventional training, it is believed that most of the reorientation can be achieved through informal processes. Documentation of experiences, problem-solving workshops and other immediately productive actions will go a long way towards achieving the reorientation objective.

Efficient dissemination of information could be a key element in this process, preferably supported by discussion seminars of inter-disciplinary nature. Again coordination and integration stand out as important requirements. The respective agencies may in addition develop their own specialized in-service training in the form of short courses and exposure programmes.

10.5.2. New Staff Groups

For new staff groups (e.g. construction supervisors/instructors at community level) or for groups where the tasks will be substantially changed (regional maintenance teams), formal training courses will be required. The development of curricula and job descriptions for such staff groups require cooperation between the sector agencies.

As the main emphasis will be on staff of relatively low grades and to be deployed at decentralized levels, also the training should be decentralized. The central administrations are required to plan, budget for and organise training-of-trainers courses in order to make instructors available.

These trainers could preferably be drawn from the regular establishment and serve as trainers for parts of their time, thus providing efficient link between practical experience and training.

10.5.3. Dual Focus Approach

Sector performance is not merely a question of skills. Motivation, work place facilities, incentives, career opportunities, supervision, and adequate management are some of the factors which in combination with individual skills ensure good performance.

The sector can only perform well if the agencies are able to develop and retain their work forces. As the skills may be marketable, it is rather the other performance factors which may persuade the staff to stay on. With alarming attrition rates already reported, the career and qualification aspects should be looked into. Qualifications and progressive experience requirements should be specified for the respective posts as one of the measures to ensure a stable manpower situation.

The particular objective of admitting more representatives of the majority ethnic groups, disfavoured in the past, into the civil service should be addressed in the human resources development context. It may be opportune to **create special promotional programmes** for such officers in order to give them progressive experience and gradual promotion based on assessment.

Affirmative action is provided for in the Constitution and the sector should prepare for it as a necessary and positive contribution to the sector's performance. In the long run, however, appointments based on political, ethnic or other forms of favouritism, can only serve to undermine the performance of the service; experiences of both industrialized and developing countries are massive in this regard.

It is therefore **recommended** to approach the issue with foresight and in a planned manner; with the weak educational base among the majority group it should be no surprise that **affirmative action in a complex and, in some areas, highly specialized field as the water sector will take time.**