CHAPTER 9 EXISTING WATER SUPPLY SYSTEM AND SEWERAGE SYSTEM

9.1 Existing Water Supply System

9.1.1 Outline of the Water Supplying System

Water supplying system in the Study Area is divided into a) "bulk water supply", b) rural water supply and c) commercial farms. Namwater is responsible for so called "bulk water supply", while DRWS (Directorate of Rural Water Supply) is responsible for rural water supply for the communities in the communal land.

Local Authorities is responsible for water supply in the village areas which are supplied water through Namwater and for collecting water fee from beneficiaries to maintain water supply facilities**.** Fig 9.1-1 shows the functional demarcation between Namwater and Local Authorities.

Commercial farm owners drill boreholes on their investment for domestic water use or irrigation purposes but it needs to be approved by DWA.

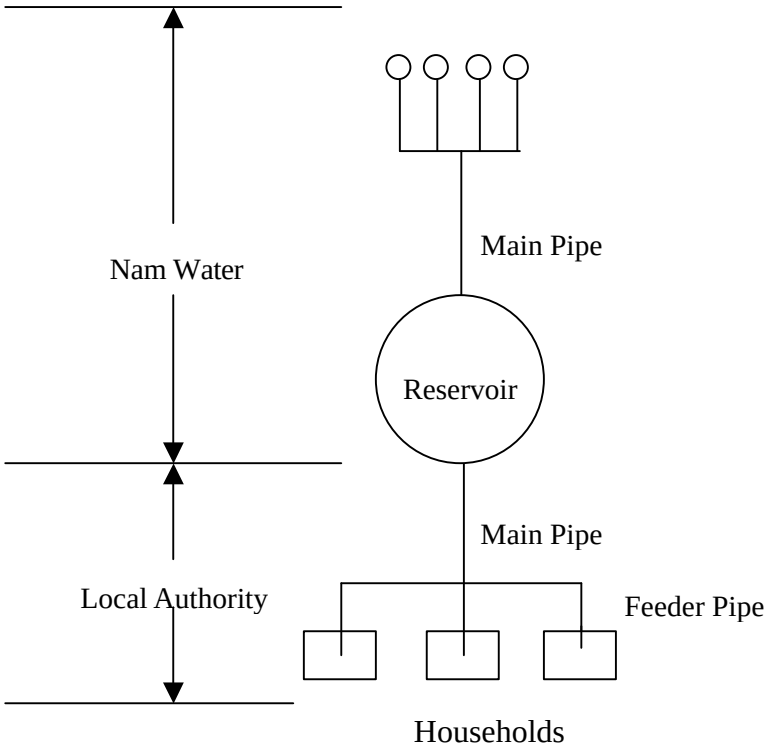

Fig. 9.1-1 Demarcation of Bulk Water Supply System

9.1.2 Population and Areas Served

Beneficiaries of groundwater in the Study Area are composed of village centers, commercial farms, communal land, irrigation, livestock and tourism. Current (1999) population in the Study Area was estimated on the 1981 and 1991 population census.

	1991	1999
Village centers	4,662	6,186
Commercial farms	13,349	16,780
Communal land	10,174	12,130
Total	28,185	35,096

Note. Estimated as of March 2000

According to the hydro-census data 567 ha are irrigated in the Study Area. There are eight hotels and 11 lodges supplied groundwater from boreholes. Livestock is also the major water consumer. Number of livestock is estimated on livestock census of DVS (Directorate of Veterinary Services) as shown below;

Livestock	Numbers (unit: head)
Cattle	120,941
Sheep	525,979
Goats	110,245
Horses	5,123
Pigs	713
Donkeys	2,823
Ostriches	18,842
Poultry	19,668

9.1.3 Unit Water Requirement

Unit water requirements were collected from DWA, DVS, and DRWS etc. As domestic water consumption per capita in the commercial and communal land were quite different because of their lifestyles, 200 liter/day/capita for commercial farms and 30liter/day/capita for communal land were used.

Table 9.1-1 Unit Water Requirement

Sectors of water requirement	Amount of water	
Commercial farms	0.2	m^3/day/capita
Communal land	0.03	m^3/day/capita
Cattle	0.045	m^3/day/head
Sheep	0.045	m^3/day/head
Goat	0.02	m^3/day/head
Horse	0.045	m^3/day/head
Donkey	0.045	m^3/day/head
Pig	0.045	m^3/day/head
Ostrich	0.012	m^3/day/bird
Poultry	0.002	m^3/day/bird
Tourism	0.15	m^3/day/capita
Irrigation	15,000	m^3/ha/year

9.1.4 Standard for Portable Water

There exists the guidelines for the evaluation of drinking water for human consumption in Namibia and there are four classification of water quality;

Group A: Water with an excellent quality
Group B: Water with good quality
Group C: Water with low health risk
Group D: Water with a higher risk, or water unsuitable for human consumption

The bacteriological quality of drinking water is also divided into four groups, namely;

Group A: Water which is bacteriologically very safe
Group B: Water which is bacteriologically still suitable for human consumption
Group C: Water with a bacteriological risk for human consumption which require immediate action for rectification
Group D: Water which is bacteriologically unsuitable for human consumption

9.1.5 Water Supply facilities

Water supply facilities in bulk water supply system are composed of boreholes, main pipes, reservoirs (water tank), pumps and feeder pipelines. In the communal areas, electrical and solar pump, windmills, and sometimes diesel engines are used to pump up groundwater. In the commercial farms, diesel engine pumps and reservoirs (water tanks) are commonly used.

9.1.6 Organization, Operation and Maintenance

1) Namwater（Namibia Water Corporation）

Namwater works for “Bulk Water Supply” and also “Small Water Supply” for schools and clinics. “Bulk Water Supply” means water supply services for populated towns/villages, industries, irrigation as well as stock watering. Organizational chart of Namwater is shown in Fig. 9.1-2.

In supplying water to towns/villages, Namwater operates and maintains boreholes, reservoirs (water tanks) and main pipes as well as maintaining water quality. Contract (agreement) is exchanged between the local authorities and water fee is charged on monthly basis according to water volume consumed.

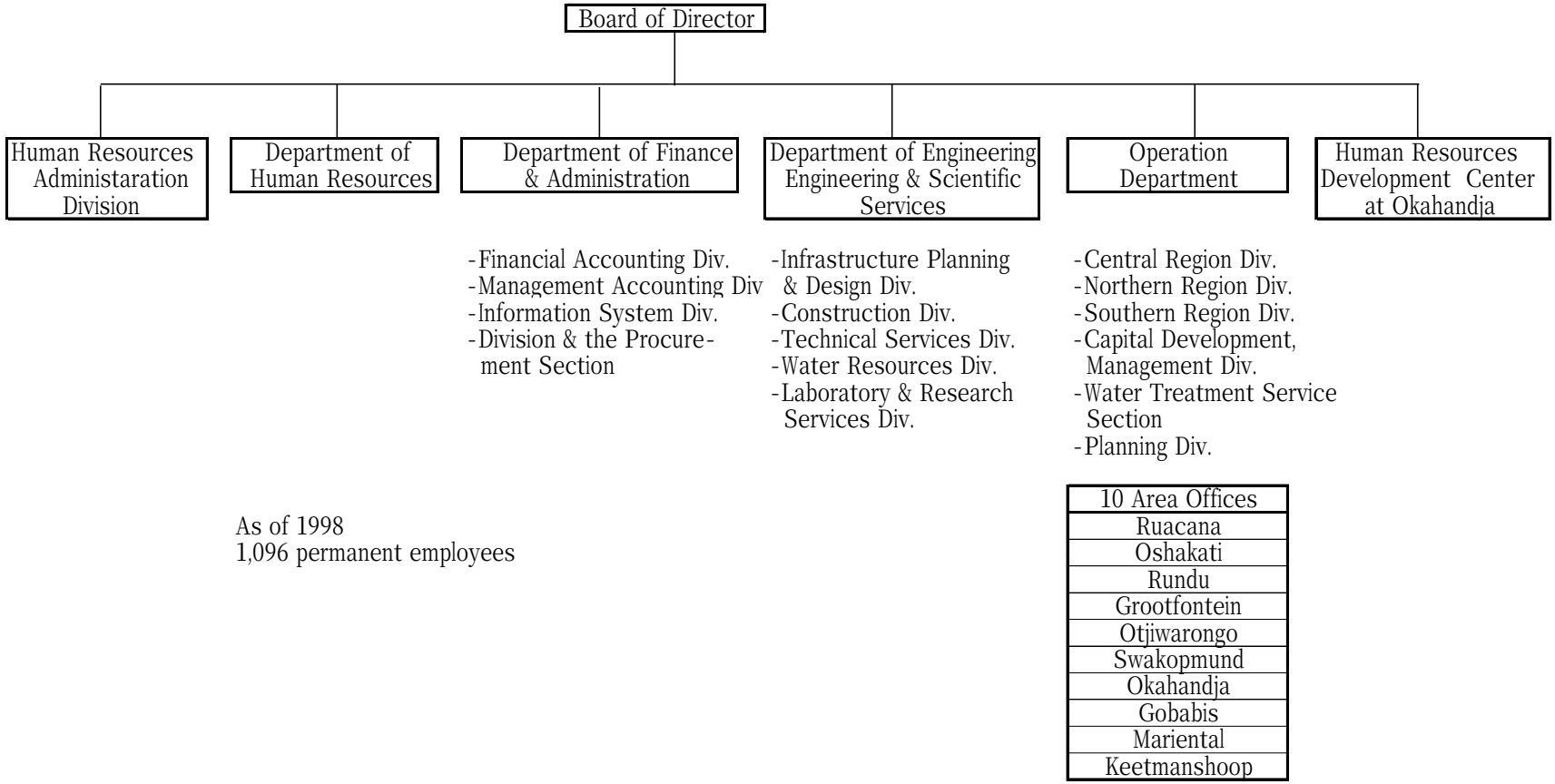

Fig. 9.1-2 Organization Chart of NAMWATER

2) Directorate of Rural Water Supply (DRWS), MAWRD

DRWS is one of the directorates under the DWA and responsible for supplying water for rural areas, particularly for communal land. In the past, DRWS has worked not only for constructing water points but also for operation and repairing in communal land, and communities, therefore, have not been required any contributions to water supply. However, based on the policies of WASP (Water and Sanitation Policy, setting up of WPC (Water Point Committee)) and turn-over of operation and maintenance of the water supply facilities had been proposed, so called, CBM (Community Based Management).

DRWS has 10 regional offices and a 5-year skill-training plan has been carried out for beneficiaries in order to turn over operation and maintenance of the facilities to WPCs. The government aims at playing roles as “facilitator” shifting from “provider” in rural water supply. Fig.9.1-3 shows the organization structure of DRWS.

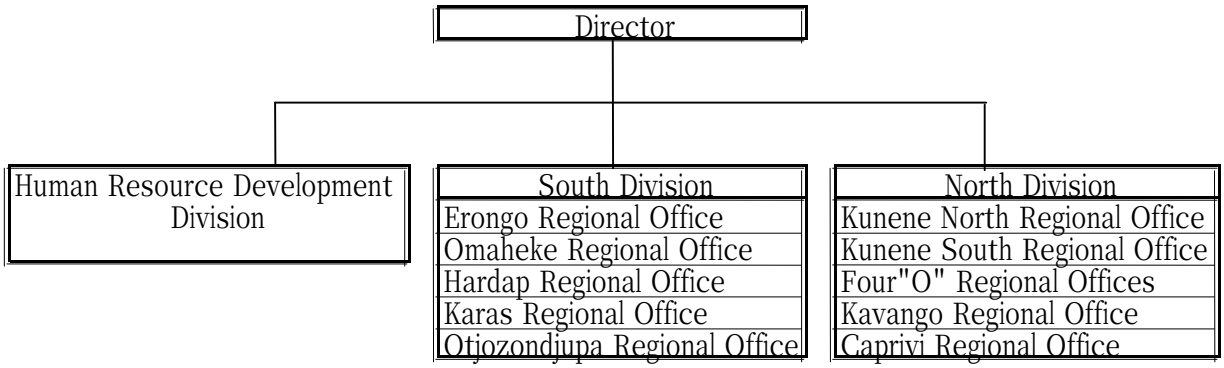

Fig. 9.1-3 Organization Chart of Directorate of Rural Water Supply

3) Local Authorities

The local councils operate and maintain pipe networks to supply water to households in the village centers as well as water fee collection based on contract (agreement) with Namwater.

4) Commercial Farms

Commercial farmers invest in drilling boreholes for domestic use, irrigation and stock watering. Irrigation water permit which is valid for five years is necessary to be approved by the DWA. However, groundwater individually developed is not charged at present and operation and facilities are managed individually.

9.1.7 Current Bulk Water Supply Tariffs

The water supply tariffs currently applied by Namwater are composed of operation cost and capital cost but tariffs applying now are lower than actual unit cost.

9.2 Existing Sewerage System

9.2.1 Service Area and Population

Population and housing census of 1991 shows all toilet facilities in Hardap region as shown below. It is notable that 32.7% of the total household are still use bush as toilet.

Table 9.2-1 Type of Toilet in Hardap Region

Water Closet by Households	Water Closet Shared by Others	Cess Pit	Bucket, Pail	Bush	Others & not Stated	Total Households
5,641	971	704	1,671	4,367	4	13,358
42.2	7.3	5.3	12.5	32.7	0.02	100 (%)

9.2.2 Waste Water Facilities

Conservancy tanks or septic tanks combined with French drains are usually used in households in the village centers as shown in Table 9.2-2. Local Authorities manage oxidation ponds on the outskirts of villages to dump sewerage water. On the individual commercial farms, septic tanks with French drains are usually used, by which sewerage water is disposed by seepage into the ground as shown in Fig. 9.2-1.

Table 9.2-2 Treatment Systems in Village Centers.

Village Centers	Treatment System
Leonardville	Septic tank
Aranos	Septic tank
Stampriet	Oxidation pond
Gochas	Oxidation pond
Kalkrand	Oxidation pond
Aminuis	Oxidation pond
Onderombapa	Oxidation pond

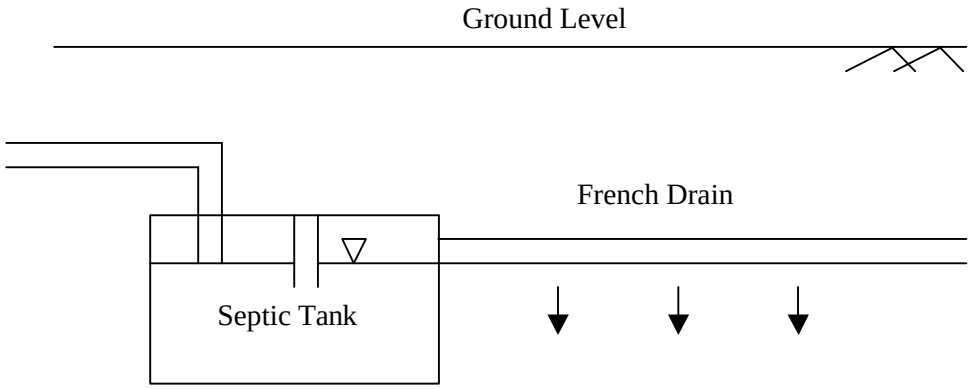

Fig.9.2-1 The Structure of Septic Tank Combined with French Drain