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# WATER SUPPLY IN BANTU HOMELANDS

by

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BY  
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## ABSTRACT

The water supply situation in a typical Bantu area in the drier parts of the Northern Transvaal is investigated in terms of

1. the different types of water sources and
2. the suitability of these sources to supply water to the people and livestock at present and with reference to the reclamation plan now being implemented.

Recommendations regarding boreholes and reservoirs, sub-surface water in dry river channels and privately owned water tanks are made.

## INTRODUCTION

While doing a geographic survey with third year geography students as part of their practical training, the water problems experienced by the inhabitants of the Mamabolo Location (Fig. 1) in the Pietersburg magisterial district forcibly came to the writer's attention. This article is a direct result of observations made during the survey, of a special one-day survey (7th September 1970) at five of the water supply points and at the homes of some owners of water tanks and is designed to analyse aspects of water supply in a Bantu area which is typical of such areas in the drier parts of the Northern Transvaal.

## BACKGROUND

### Rainfall

The Mamabolo Location lies in an area where the rainfall rapidly increases from west to east, that is, from the Pietersburg Plain to the Transvaal Drakensberg. The rainfall average (Table 1), illustrates this.



FIG. 1 : MAMABOLO LOCATION AND ENVIRONS.

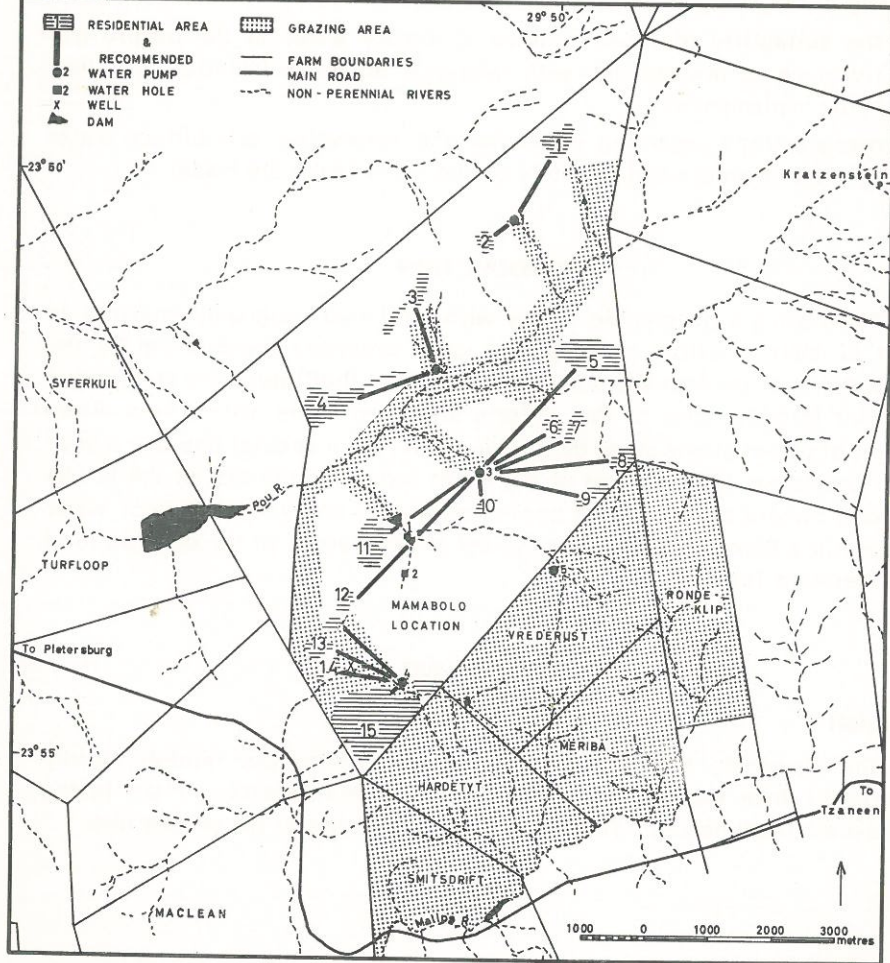


Table 1: Rainfall at Syferkuil and Kratzenstein (Weather Bureau, 1965)

Stations	Rainfall in mm											
	J	F	M	A	M	J	J	A	S	O	N	D
Syferkuil	61.9	77.0	30.9	31.7	4.8	6.5	1.1	0.0	12.2	22.7	86.9	105.7
Kratzenstein	153.1	173.7	41.2	24.6	8.7	7.9	4.6	3.0	15.0	26.6	83.8	138.4
	Syferkuil Total						441.4					
	Kratzenstein Total						680.6					

### RECLAMATION

The Chief Bantu Affairs Commissioner in 1963 appointed an Ad Hoc Committee to plan the area, that is the Mankoeng Tribal Authority Area (13220 ha), of which the Mamabolo Location forms a part. Amongst others the Committee made the following recommendations:

1. Carrying capacity to be 1 large livestock unit to 6ha.
2. Farming type: mixed farming with dry lands.
3. Residential sites to be 0.2ha (1/4 morgen) in area for people with land rights and 0.1 (1/8 morgen) for people without land rights.
4. The existing residential areas, with the exception of only a few scattered hutgroups, were located on land virtually useless for agricultural purposes (rocky outcrops devoid of vegetation of value as grazing) and are to be retained.
5. The surplus population<sup>1</sup> can be settled in the village on the farm Turfloop.

This plan is still being implemented and in 1969 the following situation prevailed.<sup>2</sup>

1. Population : 5613 people

1. A definition of what is regarded as 'surplus population' is not given.
2. Statistical data presented here were obtained from the Supervisor stationed at Syferkuil Trust Farm.



2. Livestock <sup>3</sup> :	Cattle	1 291	(1 291 large livestock units)
	Horses	3	( 3 large livestock units)
	Donkeys	5	( 5 large livestock units)
	Sheep	788	( 131 large livestock units)
	Goats	466	( 78 large livestock units)
	Total	—	(1 508 large livestock units)

Apart from the small number of people employed in tertiary activities (teaching, retail trade, etc.) the people are farmers. The type of farming is mainly subsistence with emphasis on dryland production of maize and kaffir corn, with livestock being of secondary importance.

### PRESENT WATER SUPPLY

#### Boreholes

- Pump 1: Windpump (1500 litres / Hour<sup>4</sup>) with provision for handpump which is not connected at present, and an open cement reservoir, about 2m deep. Provision is made for watering animals. The water level in the reservoir was very low at the time of the survey so that people obtained water by lowering tins tied to a rope into the reservoir.
- Pump 2: Windpump and cement reservoir, about 3m deep, with tap and facilities for watering animals. The reservoir was full when the survey was conducted.
- Pump 3: Wheel type handpump (1365 litres / hour) without facilities for watering animals, although they could drink the waste water.
- Pump 4: Lever type handpump, (8000 litres / hour) with facilities for watering animals. This borehole was dry, and according to reports this situation always arises during the dry season.

#### Ephemeral Streams and Gulleys

- Surface water: The main river system is that of the Pou (also known as Turfloopspruit) and is ephemeral in character, flowing only for

- Only livestock needing grazing area are considered.
- Tested flow of water from borehole.

short spells after heavy showers. Scattered pools do exist throughout the year and are suitable drinking places for livestock.

- Sub-surface drainage: Tins and drums from which the bottoms have been removed are planted in the dry channels to allow the water, that collects in them, to be scooped up. In most cases, however, the tins are small ( $\pm 20$  litres) and barely reach down to the water table making only very small quantities available at a time. To fill such a container takes a fairly long time. In some cases where the ground surface makes it possible holes are dug in the channel or channel sides and the water which collects is scooped up. Animals drink at both types of water points.
- Wells: In one known case, a well (large hole enabling people to walk down to the water) has been dug to a depth of about 4 to 5 meters in sandy soil and the water collecting at the bottom is scooped into containers. The rate of water seepage into the well is slow.

#### Man-made Supplies

Water tanks: A small number of homes with corrugated roofs collect at least part of the seasonal rainfall in tanks and drums of varying sizes.

#### How water is obtained

- Women and children carry water in containers from the water supply points. These containers usually vary in size from less than 4.5 litres (1 gallon) to 22.8 litres (5 gallons). This method may be followed several times a day by a household. The distances from the homes to the water supply points may be as much as 2400 m.
- The second method of obtaining water is by filling one or more drums, usually 200 litres (44 gallons) in capacity, and transporting these on animal drawn vehicles or motor vehicles to the homes. In some cases the person to whom the vehicle belongs obtains water in this manner for himself, but in most cases the water is merely transported to inhabitants who purchase it for between 30c to 50c per drum. One such drum may provide water for 1 to 4 days.

## SURVEY RESULTS

To obtain a clear picture of the water situation in the Mamabolo Location assistants were stationed at the three boreholes at present providing water and at two water holes. The latter consist of

1. two holes partly dug into the bank of a gully below a dam wall allowing sub surface water to collect in them, and
2. a number of tins and drums planted in a gully bed.

Although the seepage into these tins is slow the conditions are more hygienic than at the holes. To test the suitability of the latter method a 200 litre drum was planted into the bed several days before the survey. Because of its greater size and the fact that a large part of it lies below the water table, local inhabitants preferred it to those already in existence. Fig.2 illustrates the details of this technique of providing water and the conditions in the gully.

In Table 2 the number of cases or carrying parties and the number of people obtaining water at the various supply points is given.

Regarding this table and observations made during the survey day the following remarks may be made:

1. Average size of carrying party 1. 1 person.
2. With the exception of a few males (2.3% of people) filling drums at Pumps 2 and 3 the carrying parties were women (55.5%) and children (42.2%). According to custom men are barred from carrying water, except when there is a social function.
3. Taking the total number of people visiting the five water supply points, it appears that there is a steady increase in number of carrying parties upto about 9.00 a.m., after which there is a decline with the lowest number of cases coming at about 3.00 p.m. Thereafter there is again an increase approaching the number which came during the first part of the morning. The ratios/hour (i.e. 6.15 a.m. to 4.15 p.m.) are approximately: 2 4: 2 7: 3 0: 2 6: 1 9: 1 4: 1 6: 1 2: 1 0: 2 2.

As the length of the day increases in summer more people will come earlier in the morning and later in the afternoon to avoid the midday heat. It was noticed, however, that children tend to come during the midday.

FIG. 2 : UTILIZATION OF SUB-SURFACE WATER.

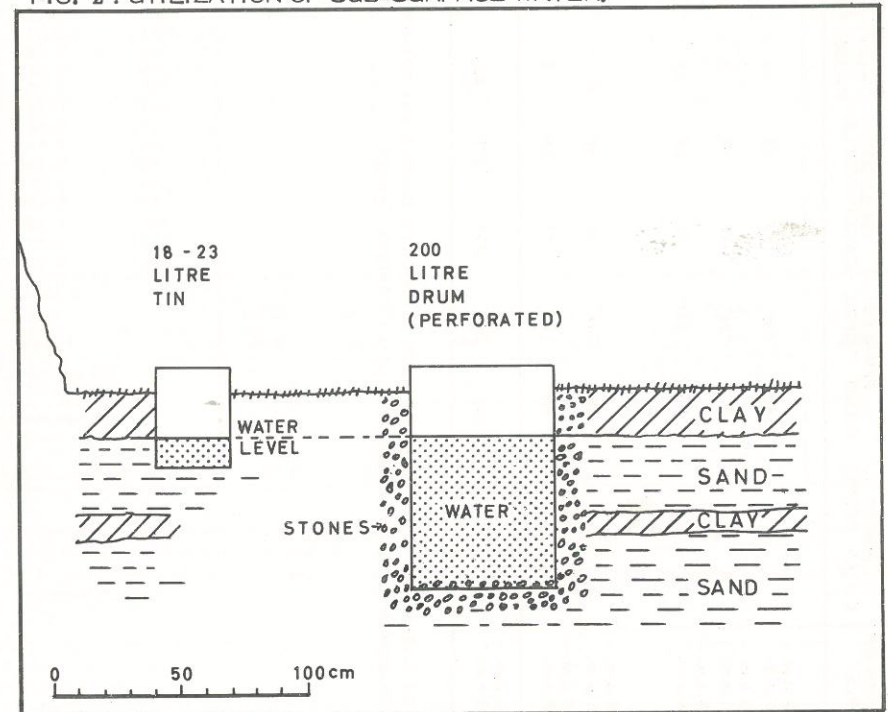




TABLE 2: NUMBER OF CASES AND PEOPLE OBTAINING WATER AT THE WATER SUPPLY POINTS

WATER SOURCE	DURATION OF SURVEY	MALES CASES PEOPLE	FEMALES CASES PEOPLE	CHILDREN CHILDREN ASSIS- TING ADULTS CASES PEOPLE	TOTAL CASES PEOPLE
PUMPS	1*				
	2	6	152	54	10
	3	5	67	37	9
		8	55**	72	11
		—	86	49	—
		—	53	27	3
WATERHOLES	1	—	—	—	—
	2	—	—	—	—
		11	408	231	32
			416	275	42
					135
					83
					682
					750

\* DOES NOT INCLUDE CASES AND PEOPLE COMING MORE THAN ONCE DURING THE SURVEY PERIOD.  
 \*\* INCLUDES 2 CASES (WOMEN 2) FORMING PART OF A MALE CARRYING PARTY.

TABLE 3: QUANTITY OF WATER PER SIZE OF CONTAINER

SIZE OF CONTAINER LITRES (GALLONS)	NO. OF CASES AT WATER SUPPLY POINTS					TOTAL
	PUMP 1	PUMP 2	PUMP 3	WATERHOLE 1	WATERHOLE 2	
2.3 (1/2)	9					
3.4 (3/4)		2				
4.5 (1)	11	3	6		5	
9.1 (2)	9	1	2	7	3	
13.7 (3)	6	21	3		1	
18.2 (4)	163	61	74	111	58	
22.8 (5)	6	1	14	1		
25.0 (5 1/2)		2				
27.3 (6)		3	9	4	4	
31.9 (7)		1	2			
36.4 (8)		4	10	6	3	
50.0 (9)		1	1			
54.6 (12)		1			3	
163.8 (36)	1		1			
200.2 (44)		2	1			
245.7 (54)		1				
382.2 (84)		1				
400.4 (88)		1				
600.6 (132)		1				
800.8 (176)		3				
TOTALS						
Litres	3473.9	5839.9	3212.3	1524.3	1519.7	15570.1
Cases*	205	109	124	129	77	644
Average (X): Litres/case	16.9	53.6	25.9	18.9	19.7	24.2**
Average (X): Litres/case (95% confidence limit)	15.8 to 17.6	25.1 to 82.1	21.9 to 29.9	18.1 to 19.7	17.9 to 21.5	

\* Differences between these totals and those of Table 2 result from failure on the part of assistants to register the quantity of water obtained in some cases.  
 \*\* If the number of cases making use of drums is omitted, then the average drops to 17.1 litres/case.

Table 3 analyses the situation as regards the size of container and the quantity of water used during the course of the survey day, which is believed to be similar to any other day, barring that the number of people visiting the water supply points may differ.<sup>1</sup> It would then appear that on the average a carrying party collects about 24 litres per visit to a water point. It was also found that cases called at the respective water points 2.69 times per day, that is, in many instances, once in the early morning, once in the late morning and once in the afternoon. From the table it is evident that Pump 2 which has a good supply of water and where water, by making use of flexible pipes, can be drawn into drums with ease, is preferred by those people who sell the water to others, and to make it worth while they make use of large containers. Because of the quantity which is collected by every case or party, the water is used mainly for drinking, cooking and other household purposes. There is little water to spare for gardens or fruit trees; so water is often re-used for these purposes and for watering poultry and pigs. Water is often used for preparing cow dung to surface the floors of huts and the courtyard or lapa, for making mud bricks and for plastering the walls. Although the traditional houses or huts are still common, the use of modern building materials (e.g. cement) is rapidly increasing, but this too requires water. It is also a habit to store water in containers at home since the daily water supply from the sources is unreliable. At Pumps 2 and 3, where water is readily available, local inhabitants often do their washing on the spot.

Inhabitants have two main complaints:

1. Readily obtainable and assured supplies of water are far apart and people often have to walk far. This aspect will be discussed below.
2. Water at the waterholes is often dirty because animals also drink there. This is especially true of places similar to Waterhole 1.

Mention has already been made of the time involved in getting water. It was found that a case spent on the average 7.8, 3.6, 7.5, 5.4 and 7.3 minutes at pumps 1 to 3 and waterholes 1 and 2 respectively. To a certain extent the suitability of the various points to supply water is reflected by

1. On the survey day, for example there was a religious ceremony in a nearby area which according to reports attracted many people from Mamabolo Location.

these times. The exception here is Pump 3, where although water is readily available, it takes time to fill a container especially when there is crowding at any one time because of the type of pump installed there. This crowding often takes place at the other points as well and people may have to wait some time for their turn. With the tap at Pump 2 this problem does not arise. At the well<sup>1</sup> referred to previously the waiting time may run into several hours because of the slow rate at which water collects in the hollows. At this point too the water is rationed to two tins per family per day, so that many of the people in the nearby residential areas obtain their supply from Waterhole 2. One should, however, not only take into account the time taken to fill the number of containers per case, but also the travelling time from home to water supply point and back. This aspect will be discussed further when dealing with the reclamation plan.

#### Animals

Table 4: Watering of animals

	Pump 1	Pump 2	Pump 3	Waterhole 1	Waterhole 2
Cattle	47	85	41	86	5
Donkeys	10	19	2	8	17
Goats	38	57	52	1	—
Sheep	58	—	40	45	7

Table 4 shows the pattern of watering animals. The situation at the various points does not vary greatly, except at Waterhole 2 where the water in the tins and drums is at a level which is difficult for animals to reach.

#### Tanks

21 homes, where tanks are installed, were included in the survey to collect information regarding the contribution such tanks can make to water provision. A summary of the results are:

1. Average catchment area:  $43.38\text{m}^2$  ( $\bar{X} = 33.84$  to  $52.92\text{m}^2$  at 95% confidence limit).
1. This well has gained importance because Pump 4 is dry during winter.



- |                              |              |           |          |
|------------------------------|--------------|-----------|----------|
| 2. Size and number of tanks: | 4 500 litres | (1 tank ) | 13 cases |
|                              | 4 500 litres | (2 tanks) | 2 cases  |
|                              | 2 250 litres | (2 tanks) | 1 case   |
|                              | 2 250 litres | (1 tank ) | 5 cases  |
3. Average period which tank has been in use: 4.6 years.
- |                       |                                      |          |
|-----------------------|--------------------------------------|----------|
| 4. Usage of water for | (a) household only                   | 11 cases |
|                       | (b) household & washing              | 9 cases  |
|                       | (c) household & washing & irrigation | 2 cases  |
5. Average amount of water used/day: 40 litres ( $\bar{X} = 22.7-57.3$  litres at 95% confidence limit.)
- |                               |                                    |         |
|-------------------------------|------------------------------------|---------|
| 6. Occupation of family head: | Teacher                            | 5 cases |
|                               | Businessman                        | 2 cases |
|                               | Workers in Johannesburg & Pretoria | 8 cases |
|                               | Others                             | 6 cases |
7. Present situation of water in tanks:
- |  |                |                           |
|--|----------------|---------------------------|
|  | Empty          | 14 cases                  |
|  | Some (average) | 470 litres/tank per case. |
8. Average duration of water in tank: 7 months/case
9. Average amount by which water in tank is augmented: 46 litres/day/case ( $\bar{X} = 33.6$  to 58.4 litres at 95% confidence limit.)
10. Extent to which installation of more tanks is considered:
- |  |                   |           |
|--|-------------------|-----------|
|  | Yes - 2 tanks     | - 2 cases |
|  | Yes - 1 tank      | - 4 cases |
|  | Undecided         | - 8 cases |
|  | No                | - 3 cases |
|  | Decisions unknown | - 4 cases |

Although a detailed count of tanks was not done in the Mamabolo Location, it is strongly doubted whether the total number will exceed twice that included in the survey. Since this type of water storage is strongly recommended for this area, the following calculation may be interesting.

The average size of catchment i.e. corrugated roof, is  $43.38\text{m}^2$  and the annual rainfall can be taken as 550mm. Thus if only one down pipe is installed 23859 litres of water is really available. This is the equivalent of about  $5\frac{1}{3}$  tanks of 4500 litre capacity or about  $10\frac{1}{2}$  tanks of 2250 litre capacity. Undoubtedly the situation does arise that during the rainy season the tank is filled and the remainder is lost, but simultaneously the water in the tank is used making space for more. To fill one 4500 litre tank thus requires just over 100mm of rainfall and 50mm to fill the smaller tank. Taking the average rainfall data (Table 1), it is found that a large tank will be filled by the October and November rains and that despite the use of water, a tank should remain full during at least December, January and February. If no rain water is added to such a tank after it is once full it should last about 100 days at an average extraction rate of 40 litres per day.

From the above it can be seen that, if it is financially possible, each family should consider installing at least one tank. This is also illustrated by

1. the fact that a third of the tanks included in the survey still contained water a month prior to the advent of the rainy season and that
2. the average period for which water is available from the tanks is about 7 months.

The amount drawn off daily, viz. 40 litres, though less than the 65 litres<sup>2</sup> obtained by the other inhabitants of the location, is augmented by getting water from the existing sources at the rate of 46 litres per day, giving a total of 86 litres per day, about 20 litres more than that obtained by non-tank owners.

1. Although this is the average roof area of homes where tanks are found it is probably larger than the average area of corrugated roofs in the Location, since the tanks are found at the homes of wealthier families. A roof with an area of only  $16\text{m}^2$  will, for example make 8800 litres available per annum, still showing the significant contribution a tank can make.
2.  $24.2 \text{ litres/case} \times 2.69/\text{day} = \pm 65 \text{ litres/day.}$



## WATER PROVISION AND THE RECLAMATION PLAN

### Residential Areas

The reclamation plan makes provision for 15 rural villages of varying sizes under the jurisdiction of 7 headmen and scattered throughout the location in areas where the land is unsuitable for agriculture. All these villages exist at present. The water provision for each is outlined in Fig. 1 and Table 5, and reflects certain aspects of these settlements in relation to the water supply.

Dividing the settlement areas (356 ha) into plots of 0.21 ha (¼ morgen) a total of 1664 plots, each housing a family, is obtained. One should keep in mind that parts of the residential areas are unsuitable for building and that other portions should accommodate non-residential uses, e.g. schools, so that the number of plots may be somewhat less, but a total population of about 10 000 may therefore have to be accommodated in the location although the present population is about 5600, and preliminary figures suggest an increase of about 8% in 1970. A large number of people travelling distances (from home to water supply point and back) of between 700 to 4800m, have therefore to be supplied with water mainly for household purposes.

The question may now be asked whether the present water supply, which is also that envisaged by the committee in their recommendation plan, fulfils and will fulfil the needs of the location's people.

It has been shown that of the three dams which have to serve the location the wall of one is broken and the other two are dry and that one borehole, Pump 4, is dry so that people residing in the south obtain their water supplies from the well reasonably nearby, from Waterhole 2 and from a point near the mainroad on the farm Maclean. The dams would in any case provide water during part of the year only and unless purified the water is not fit for human consumption. The other remaining water sources, wells, holes and tins embedded in dry river beds may be regarded purely as of secondary importance, although they are in many areas of great importance at present. The need for more boreholes to ensure supplies within reasonable distance of population concentrations is evident, but whether windpumps or handpumps should be installed remains

TABLE 5: RESIDENTIAL AREAS AND RECOMMENDED WATER SUPPLY

SETTLEMENT NO.	SETTLEMENT SIZE (ha)	NO. OF SETTLEMENT UNITS* OF 0.21 ha		DISTANCE FROM PUMP (m)	RECOMMENDED SUPPLY POINT
		UNITS	PERSONS		
[ 1	18.9	88	572	1200	PUMP 1 (WIND)
[ 2	14.6	68	442	600	
[ 3	17.1	156	1014	900	PUMP 2 (WIND)
[ 4	48.0	80	520	950	
		224	1456	1150	
[ 5	14.7	304	1976	1050	PUMP 3 (HAND)
[ 6	6.9	68	442	2200	
[ 7	12.0	32	208	900	PUMP 4 (HAND, DRY)
[ 8	9.4	56	364	1250	
[ 9	9.4	44	286	1400	
		44	286	1700	
[ 10	6.9	32	208	350	2 DAMS (ONE BROKEN ONE DRY)
[ 11	24.0	112	728	1650	
[ 12	5.1	24	156	2400	1 DAM (DRY)
		412	2678	1481	
[ 13	2.4	100	650	1100/1150	PUMP 4 (HAND, DRY)
[ 14	9.4	44	286	800	
[ 15	138.8	648	4212	700	
		792	5148	937	
<b>TOTALS</b>					
				1664	10816

\* 1 unit is occupied by 1 family. The number of persons per family in the Mankoenong Tribal Area is given as 5 by the Ad Hoc Committee, but more recent studies suggest a larger number, e.g. Diomu (1966) estimates it at 6.5 persons in the Mamabolo Location and Smit (1965) gives the number as 7.3 and 5.6 persons per family in Sibasa and Sekhukhune respectively. An inspection of unpublished statistics available at the office of the Supervisor stationed at Syferkuil also gives the number as 6.5. This number, because it agrees with Diomu's findings is accepted in this study, though there is a possibility that it is still too low.



debatable. In the first case the wind is of vital significance and without a tap it is difficult to obtain the water when the water level in the reservoir is low (e.g. Pump 1), but it has the advantage that little water is wasted. The rather lengthy time periods spent here is also experienced at the handpumps despite the ready supply of water obtainable with only a little manual effort (e.g. Pump 3). The problems arising when the level in the reservoir is low may partly be overcome by constructing inside a reservoir, a chamber, say 1 metre in diameter, into which the water is first pumped before overflowing into the larger reservoir. Although the embedded drums should play a secondary role, this technique may be greatly improved by embedding more drums, according to the method outlined above, in localities which remain relatively distant from the boreholes. The use of water tanks at the homes with corrugated roofs<sup>1</sup> is also advocated in the light of the distinct advantages such tanks have.

#### Grazing Areas

Since the people in the location are accustomed to graze their stock on the adjacent Trust farms and do not kraal them at night, there is no need to provide water for the stock within the non-grazing areas. Further, any large scale movement of animals on a daily basis between the grazing areas and the residential areas would obviously only lead to the destruction of the natural vegetation and to soil erosion, as is already evident near existing water supply points.

The committee assessed the carrying capacity of the grazing areas as 1 cattle or large livestock unit to 6 ha (7 morgen) and recommended a stocking rate of 1 cattle : 1 sheep : 1 goat. On the areas scheduled for grazing in the location and on the trust farms viz. 3343 ha, a total of 558 cattle units or 186 cattle, 1116 sheep and 1116 goats can therefore be grazed. The present number of livestock (1508 cattle units) still exceeds this total by far.

The number of animals to be watered at present and in the future is not

1. It may be noted here that corrugated roofs, if no ceilings are provided, have a distinct disadvantage as regards temperature, since the temperature range and conditions inside the home are not as favourable as when the traditional thatched roofs are constructed.

exceptionally high, but the present provision, (which is also that envisaged by the committee) is inadequate on the grounds of the distances to be travelled by the animals and the present state of the water supply points. These provisions are:

Grazing Camps	Watering Points
Camp 1. Mamabolo Location	[ Pou River Pumps 1,2,3 (no watering facilities) and 4 (dry)
Camp 2. Smitsdrift (Portion) Hardetyt	[ Dam (Dry) Malips (Malepo) River (ephemeral) and Dam
Camp 3. Vrederust Meriba	[ Pump 5 (1080 ha, dry) Malips River & Dam
Camp 4. Rondeklip (Portion) Meriba Vrederust	[ Pump 5 (dry) Malips & Dam

#### CONCLUSIONS

In this study of the water supply in what is regarded as a typical Bantu area of the drier parts of the Northern Transvaal, the following conclusions are derived:

##### Boreholes

The present number of boreholes intended to supply water for human consumption in the Mamabolo Location is inadequate mainly because of the long distances which people have to travel between residence and borehole. Apart from the problems that arise when boreholes dry up, which obviously can not be foreseen, water storage at the boreholes should receive attention, so that people need not spend a long time waiting for their turn to fill containers. The Supervisor responsible for the implementation of the reclamation plan has recommended that six additional boreholes be sunk bearing out the present finding regarding the inadequate number of boreholes. These are to be sunk in the following vicinities:

- 2 near Residential Area No. 15
- 1 near Residential Areas Nos. 12, 13, 14.



- 1 near Residential Area No. 11.
- 1 near Residential Areas Nos. 6, 7
- 1 near Residential Area No. 5.

The watering places in the grazing camp in the location are sufficient and would be even more so with the recommendation of more boreholes for household water supplies, but in the other three grazing camps ( $\pm$  830 ha each) additional boreholes are necessary if the long distances, and consequent destruction of the veld which results from the daily movement of animals to the drinking places is to be avoided. The Supervisor has also recommended one additional borehole on the farm Hardetyt.

#### **Dams and Rivers**

Because of hygiene considerations the water from dams and pools should be used by inhabitants for non-drinking purposes only and by animals. Their value is limited since the pools in the Pou River are stagnant or nearly stagnant and the streams flow for only a short period after thunder showers, while the dams dry up when they are most needed because of the high evaporation rate, their shallowness and poor inflow. No irrigation is possible. For the grazing areas the Supervisor has recommended two more dams, one on Meriba and the other on Rondeklip, but these will most likely also be dry during winter.

#### **Sub-Surface Drainage**

The techniques devised by the local inhabitants to obtain water for household purposes from sub-surface drainage in dry rivers and channels, although they are very significant at present, should be regarded as of secondary importance. These techniques may however be improved but unhygienic conditions and crowding at peak periods make them less desirable.

#### **Tanks**

Although only used on a small scale there is no reason why water tanks should not be used in ever increasing numbers as sources of household water and even small scale irrigation of gardens and orchards on the 0.2 ha plots. The use of more water tanks should be encouraged.

## **OPSOMMING**

Die watervoorsieningstoestand in 'n Bantoegebied, Mamabolokasie, word ondersoek met betrekking tot

1. die huidige waterbrontipes en
2. die geskiktheid van hierdie bronne om water aan mens en dier te voorsien op die huidige tydstip en gesien in die lig van die herwinningsplan wat tans uitgevoer word.

Die bevindings dui daarop dat die huidige waterbronne, nl. rivierbeddings, damme, boorgate en putte onbevredigend in die waterbehoefte van die lokasie-inwoners en -diere voorsien. Aangesien die waterbronne wat beoog was vir die herwinningsplan van 1963 reeds ten volle aangebring is, beteken dit dat die plan geheel en al ontoereikend blyk te wees.

Onlangse aanbevelings vir die sink van 6 boorgate naby residensiële gebiede sal toereikend wees vir die inwoners se behoeftes, maar sal nie die toestand in die weidingskampe verlig nie. Die huidige tegniek om water in die droë rivierbeddings te bekom kan verbeter word, maar dié voorsieningsbron moet slegs as van sekondêre betekenis geag word. Tenks waarin reënwater vir huishoudelike gebruik opgevang word behoort aanbeveel te word, aangesien water uit die bron dwarsdeur die jaar beskikbaar kan wees.



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