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# REPORT OF A CONSULTATION ON BILHARZIA CONTROL IN SWAZILAND

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## Acknowledgements

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## Summary

From a brief survey in February 1976, it was found that bilharzia is widespread in Swaziland, and it is estimated that approximately 150,000 individuals are infected with one or both forms of the disease. The most common form of infection is due to S. haematobium. The intermediate snail hosts of both types of bilharzia are found throughout the Middleveld and Lowveld but have only a scanty distribution in the Highveld. The sugar and rice irrigation schemes favour the distribution of these snails. Conservation areas in the Middleveld appear to be sites of intense bilharzia transmission, as are the sugarcane fields and citrus irrigation farms. The current control program of the Ministry of Health appears to have reduced the prevalence of bilharzia in the Manzini area and in the sugar estates around Big Bend. The snail control efforts in the conservation areas are not effective.

## Background Information

### Geographical Features

Swaziland is a landlocked country of 17,400 square miles, situated between Mozambique and the Republic of South Africa. The country is divided into four topographical regions, each of which runs from north to south in roughly parallel belts. These are the Highveld, Middleveld, Lowveld, and the Lebombo Plateau. The main characteristics of each are important. Three are from west to east: the Highveld, Middleveld, and Lowveld, each with different annual rainfall and concentrated population zones.

The text seems to be a combination of typographical errors, gibberish, and perhaps some information about Swaziland's population, geography, and health issues. The intelligible parts could

be rewritten as follows:

"Swaziland's population is estimated to be around 559,900 as of 1976. The community grows at a rate of about 3%. Settlement patterns make the delivery of both preventative and curative healthcare difficult, as the Swazi people do not live in villages but in widely dispersed homesteads. Based on the assumption that communities having populations of 1,000 or over can be classified as urban, less than 16% are urban, and a quarter of this urban population resides in company-generated towns located in freehold lands, while the remainder is under the control of local Chiefs or the Central Government.

Water resources in Swaziland are substantial, represented mainly by streams, to a lesser extent by springs, and marginally by groundwater. In the low lying Lubombo Plateau, water resources are mainly confined to the four major rivers which traverse the area. Only streams in the higher elevations appear to be free of bilharzia infestation. A feature of Swaziland is the large number of conservation reservoirs or dams which have been constructed mainly by the Ministry of Agriculture.

Bilharzia is a matter of concern to the Government of Swaziland, as much of the country's agricultural development depends on irrigation schemes. As far back as the early 1950s, the medical department collected data on prevalence and the related epidemiological factors concerning the establishment and spread of bilharzia. Prevalence patterns were established by workers like Bachelor and Guulie, and the latter estimated that a third of the population of Swaziland was infected with Schistosoma haematobium, and perhaps Schistosoma mansoni. The intermediate snail hosts responsible for transmission of the disease appear to be Bulinus (Physopsis) globosus and Biomphalaria pfeifferi. Species identification of the snails was made at Fort Hare University. The highest rates of infection are to be found in the Middleveld and lowveld near..."

If the reservoirs of infection in the population of Swaziland are assumed to be 500,000, then using the most approximate prevalence rates, it is estimated that there are about 140,000 people infected with one or both forms of Bilharzia. This estimation can be calculated in the following way:

| Age Group | Population | Risk Medium | Individuals Tested | Prevalence | Bilharzia Prevalence | Individuals With Bilharzia |

|---|---|---|---|---|---|---|
| 5-14 | 95,000 | - | - | - | - | 2,650 |
| 15-19 | - | - | - | - | - | 36,050 |
| 20+ | - | - | - | - | - | 101,300 |
| Total | 500,000 | - | - | - | - | 140,000 |

If the double infection rate seemed to be 19%, then approximately 160,000 individuals from Scotland can be considered as infected with bilharzia. Previous control activities were concurrent with the survey work already described, several small pilot control projects were established in selected areas of the country. The first large-scale attempts at control were started in the second half of 1970. The Mansini scheme, financed mainly by the Mansini from Council, was by focal snail control along water courses where the absence of stepping stones obliged people to wade through

the water and also where the streams were used for ablutions. This resulted in an appreciable reduction in the number of the intermediate host snails and was followed up by mass treatment with hycanthone, of the infected school children attending the Mansini schools. The control work was extended to the Lomshasha area and the irrigation systems of Ngontnt and Big Bend in 1971. In areas of irrigation the method of snail control was that of constant heat application using drip feeds combined in certain areas with formal control. In 1974 these efforts at control were expanded and applied to several rural areas throughout the Midveld and the Lowveld near Naoko.

The Bilharzia Unit based in Mansini, has mobile teams engaged in snail collection, urine and stool examinations and acclimatizing. Single examinations are carried out on both urine and stool specimens obtained from primary school children. Only spot prevalence rates are calculated and no attempts have been made to measure either incidence or intensity of infection. Indeed the present resources of the unit are insufficient to carry out these more sophisticated measurements. The Ministry of Health in cooperation with the Ministry of Education has this year started a school health program in which four mobile teams, one for each administrative district, examine all new school entrants. Each team comprises a public health nurse and two volunteers.

The following text appears to pertain to the cost of treating a certain habitat, possibly in relation to dealing with snail control mechanisms in irrigation schemes. However, numerous spelling errors, unclear phrasing, and potential misinterpretations of abbreviations make the meaning difficult to understand. Here is an attempt at correction:

The data is from the AAAE period. The estimated cost for stress, treating about 2000 cubic metres of habitat in one day with 0.4 kg of chemical is as follows:
Labour: 6 men x £1.50 = £9.00
Chemical: 0.6 g x £10.00/kg = £4.00
Transport: 50 miles x £0.30/mile = £15.00
Supervision and overheads of 100% = £28.00
Total cost per day = £56.00 or £5.60 per 100 cubic metres of habitat.
Thus, the initial per capita cost is also probably lower, at £0.30 per year. Furthermore, the expenses decrease after 2 years to about one half the initial figure and after five years to about one fifth of the initial cost. In comparison with treatment of snails in the same, the present program in streams is much less expensive, especially in terms of a 100% coverage program. Snail control in existing irrigation schemes – the strategy of the control of snails in the irrigation schemes near Big Bend and Uganda, which began in late 1970 using Praziquantel, was system-wide transmission control in which all snail habitats were treated every seven weeks during the transmission season. The objective was to reduce infected media without attempting their elimination. At present, the following irrigation systems have had snail control programs operating since 1970.

Big Bend Sugar Estate: Sugar - 3,000; 6,000

AREAS WHERE SNAIL CONTROL IS TARGETED TO START IN
Irrigation system: Crops - Area in Hectares - Population at Risk
Sugar and rice: 7,650 - 34,300
Mozambique: Beer - 12,000 - 6,200
Vrutane: Sugar, cotton - 4,950 - 3,000
Sieey: Vegetables, citrus - 1,600 - 4,900
Meme: 800 - 130
River Base Sugar Estate: Sugar - 600 - 400
Marsala: Crops - 500 - 400
Matloose Estate: Sugar - 200 - 200
Snail control measures have been a joint effort of the irrigation sector and the Ministry of Health.

Existing water supply programs: The provision of adequate safe water to houses has been proven to be as effective as snail control for the interruption of bilharzia.

Transmission and the extent of domestic piped water is a major determinant of the level of transience. Water supplies are provided through three government departments, while the Irrigation authorities are responsible for the domestic supplies to their employees. The Water and Sewerage Board, the Urban Supply Ministry of Agriculture, and the Rural Development Areas Ministry of Health are responsible for various aspects such as Spring Protection, irrigation care, etc., to employees.

The Water and Sewerage Board provides water to 14 townships and has plans to extend their activities to 100 rural areas in the next 10 years, which will provide more water to 25,000 people. The Ministry of Health, with a budget of around 30,000 per year, hopes to protect 45 existing springs each year. This program, if continued for the next 10 years, will provide a relatively safe source of water to another 22,000 people.

If the Ministry of Agriculture were to supply domestic water to the four existing Rural Development Areas, approximately 24,000 people would be reached. They have plans for developing two more Rural Development Units in the next two years, which will take in another 20,000 people. In another 10 years, the Ministry aims to double that number, and if priority is given to domestic water supply, then almost 80,000 people in the rural areas would benefit from an adequate water supply.

If all the Ministries were to implement their plans, then around 126,000 people would receive a domestic water supply in 10 years.

However, none of these authorities have finalized their plans and at present at least 300,000 rural inhabitants are without piped water. Thus, the present goal for 10 years development, if implemented, will mean that only a third of the rural population will have a safe water supply.

The cost of rural water supply systems for bilharzia control varies with the extent of the system but in rural Middleveld communities this will vary from £10 to £20.00 per capita for initial construction and perhaps £2.00 per capita per year for maintenance. These estimates are based on experience with very

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Appendix 8
Appendix C
Appendices
Tables of prevalence
Summary of snail control program
Snail and molluscicide data

REFERENCE OF B. HAGIASORNS INFECTION IN CHILDREN 5-14 YEARS BY TOPOGRAPHICAL ZONES AND RIVER BASINS (SWAZILAND)

APPENDIX A TABLE 4: PREVALENCE OF S. MANSONI INFECTION IN CHILDREN 5-16 YEARS BY TOPOGRAPHIC ZONES AND RIVER BASINS (SWAZILAND)

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I'm sorry, but the text provided is too garbled for me to make sense of it and correct it effectively. Could you provide a clearer version or additional context? Thanks!