

GHANA WATER RESOURCES MANAGEMENT STUDY

INFORMATION BUILDING BLOCK

**WATER BORNE DISEASES IN THE
VOLTA, SOUTH-WESTERN AND COASTAL
BASIN SYSTEMS**

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Introduction

Water is an essential ingredient of the human body. It contributes about 60% of the human body weight. It is essential for man=s physiology to help clean and flush out undesirable products of metabolism from the body through urine and sweat. It is used to clean the body externally from head to toe ridding it of dirt and discouraging ectoparasites. For all these purposes, good potable water is essential. This is water which is colourless, odourless, tasteless and without any suspended matter.

When water is contaminated or polluted, it poses a health problem and may threaten life itself. What is carried in solution or suspension in water may upset the physiology and cause or result in ill-health.

In particular when drinking water is contaminated by diseases causing microbial agents or pathogens, it causes diseases as these pathogens or microbial agents attack or enter the body tissues and systems. This happens in the case of cholera, typhoid fever and dysentery. Likewise when the water drunk contains infected water fleas (Cyclops) this may lead to Guinea worm infection. While cholera and typhoid may be contracted directly without water, it is also true that water may be used to wash away the pathogens which cause them and thus make the contaminated objects, hands, food items or articles, clean and sterile or infection-free.

When natural water from surface water bodies is drunk untreated, there is often the danger of it being contaminated especially when there is human contact or association with the water body. This is particularly so when sanitary and environmental measures are compromised; when human and animal dejecta and wastes contaminate the source of drinking water.

Water also serves as a medium for the breeding of many organisms some of which are involved in the transmission of diseases eg. Schistosomiasis, onchocerciasis, malaria and filariasis. Mention has already been made of Guinea worm. Diseases that are indirectly associated with water may include typanosomiasis, Cerebro-spinal-meningitis (CSM) and Buruli ulcer.

These various diseases have hitherto been spread and exacerbated by the expansion in surface

water development programmes particularly through the construction of dams and weirs to create reservoirs and to control flow of water or streams. The conditions created favour the breeding of vectors and intermediate hosts of the diseases mentioned above viz planorbid snails, mosquitoes, blackflies and *Cyclops*.

The provision of good potable water, as stated above, could eradicate a number of these diseases but not schistosomiasis or onchocerciasis which result from field contact with vector-infested water bodies through occupation eg. fishing, washing, irrigation/agriculture or recreation during swimming and bathing or malaria which is transmitted by mosquitoes which breed in standing water bodies, small or large (tge littoral areas).

Field observation and studies show that in Ghana, as in many tropical countries, the programmes to conserve water for irrigation, hydropower generation, water supply for human and livestock have all invariably been compromised by the infestation of these water bodies by the vectors of schistosomiasis, malaria and in some cases even onchocerciasis. Once these diseases have been introduced into a river basin it has been virtually impossible to eradicate them. In large scale programmes even control has proven difficult. Thus the projected economic gains have been undermined by insidious ill-health among the expected beneficiaries, the population at risk. It is therefore very crucial to take note of the presence or endemicity of these diseases in the various river basins where surface water development projects involving the creation of open water bodies (eg. Reservoirs) are envisaged.

Common Water Associated Diseases

The common water-associated diseases of public health importance and their vectors in Ghana are:-

- § Malaria transmitted by Anopheles mosquitoes
- § Schistosomiasis transmitted by Planorbid water snails
- § Guinea Worm (Dracontiasis) transmitted by the water flea, Cyclops
- § Lymphatic filariasis (elephantiasis) transmitted by Anopheles and Culex mosquitoes.

Other communicable diseases of microbial and viral origin (eg. Cholera and yellow fever) are also endemic in Ghana and create epidemics from time to time. They may be considered as adventitious in the water bodies and therefore related to river basins.

Schistosomiasis, Onchocerciasis and Guinea Worm and their vectors tend to be directly related

to the nature of the river systems and therefore to be endemic to the river basins. They are also influenced by the nature of the water resource development projects undertaken in the basin. Thus the various water resources development projects undertaken in Ghana since the late 1950s to date have had profound effects on the ecology, distribution and therefore prevalence and incidence of these diseases.

Malaria is holoendemic in Ghana but it is evident that its distribution or prevalence is significantly influenced by the hydro-ecological conditions and could be readily related to the basins.

Lymphatic filariasis which was thought to be rare in Ghana but has suddenly appeared in the South Western and North Eastern regions of Ghana in a rather disturbing manner is transmitted by *Anopheles* and *Culex* species; the former in the rural areas and the latter in the urban areas where it is associated with poor drains and cesspools. The infection and its vectors and their habitats or ecological preferences can also be related directly to the hydrological basins.

The chart below indicates broadly some available records of the diseases and their vectors in the Phase I basins areas.

It may be useful to document the prevalence of Tse-tse flies in the basins for their potential in the transmission of Trypanosomiasis or sleeping sickness.

Objective

This study is to document the distribution of these water related and water associated diseases in the various river basins in Ghana. This is to ensure that appropriate measures are taken to prevent or control such diseases in the course of water resources development programmes.

Method

Due to time constraint, the information is being gathered from existing literature taking, preferably, current data. Where no such data exist, note is taken of old data with a view to recommending measures to update such information.

Sources

The Epidemiology Division of the Ministry of Health has proven a good source of data but these provide only reported cases which do not lend themselves to proper epidemiological analysis. Data is also obtained from research surveys for special purposes which tend to provide isolated and limited information. Data on Guinea worm infection is obtained from Global 2000. Other sources of information are the following:-

- \$ Ministry of Health (MOH) Division of Biostatistics
- \$ MOH Epidemiology and Parasitic Diseases Divisions
- \$ MOH - District Hospitals and Health Centre
- \$ Noguchi Memorial Institute of Medical Research
- \$ Institute of Aquatic Biology (CSIR)
- \$ Volta River Authority Lakeside Health Research Unit
- \$ Onchocerciasis Control Programme (OCP)
- \$ The National Onchocerciasis Secretariat (Ivermectin Distribution Units)
- \$ University of Ghana Medical School
- \$ National Guinea Worm Eradiction Project
- \$ DANIDA Laboratory, Tamale

Results

The results presented in the accompanying tables are based on information from health facilities in the districts through the sources indicated above. It would be necessary to relate the reporting centres to the river basins in the districts. When the districts covered are superimposed on the river basins, they will cover the White Volta, Black Volta, Daka, Oti, the Middle Volta and Lower Volta.

As stated above, however, it must be borne in mind that these data at best can only indicate, after repeated report of the cases, that the diseases recorded may be endemic within the locus/focus of the reporting centres.

The obvious absence of data on malaria from districts in the Ashanti region clearly shows also defects in the nature and manner of reporting from the districts and regions to the Epidemiology Division of the Ministry of Health. Malaria has been taken for granted and hence it is not reported.

[table 1 is missing in this scanned copy]

Region/Districts/River Basins

Greater Accra Region	River/Basin		Major Hydrological Basin
District			
Accra	Odaw	Odaw	Coastal
Ga	Densu	Densu	Coastal
Tema	Sakumono	Sakumo	Coastal
Dangbe East	Volta	Volta	Main Volta
Dangbe West	Dodowa	Dodowa	Coastal

Region/Districts/River Basins

Eastern Region	River/Basin		Major Hydrological Basin
District			
Afram Plains	Afram, Obosum	Volta	Main Volta
Kwahu South	Afram	Volta	Main Volta
Fanteakwa	Afram	Volta	Main Volta
Manya Krobo	Pawnpawn	Volta	Main Volta
Asuogyaman	Volta	Volta	Main Volta
Yilo Krobo	Volta	Volta	Main Volta
Akwapim North	Densu, Asuoaya	Densu	Coastal
Akwapim South	Densu, Bobro	Densu	Coastal
New Juaben	Densu	Densu	Coastal
S.K. Coaltar Sukum/K/Coaltar	Densu, Kuia	Densu	Coastal
West Akyem	Ayensu	Ayensu	Coastal
Birim South	Ochi, Nakwa	Nakwa	Coastal
Birim North	Birim	Birim	Pra
Kwaebibirem	Birim	Birim	Pra
East Akim	Birim, Densu	Birim, Densu	Pra/Coastal

Region/Districts/River Basins

Central Region	River/Basin		Major Hydrological Basin
District			
Cape Coast	-	-	-
Kom-Edi-Egua-Abrem	Ante Elua	Ante Elua	Coastal
Mfantiman	Ochi Amissa	Amissa	Coastal
Abu-Ase-Kwamankese	Kakum	Kakum	Coastal
Assin	Pra	Pra	Pra
Ewu-Effu-Senya	Ayensu	Ayensu	Coastal
Gomoa	Ochi Brocher	Brocher	Coastal
Agona	Akora, Ayensu	Ayensu	Coastal
Asi-Odo-Brakwa	Amissa, Nakwa	Amissa Nakwa	Coastal
Aju-Enya Essiam	Ochi Amissa Nakwa	Amissa Nakwa	Coastal
Upper Denkyira	Ofin, Mansi	Pra, Ankobra	Pra/Ankobra
Twifo-Hem-Low-Den	Pra, Kakum	Pra, Kakum	Pra/Coastal

Region/Districts/River Basins

Upper West Region	River/Basin		Major Hydrological Basin
District			
Wa	Black Volta Kulpawn	Black Volta Kulpawn	Black Volta White Volta
Nadowli	Black Volta	Black Volta	Black Volta
Lawra	Black Volta	Black Volta	Black Volta
Jirapa	Kuori, Black Volta	Black Volta	Black Volta
Tumu	Sisili, Kulpawn	Sisili, Kulpawn	White Volta

Region/Districts/River Basins

Upper East Region	River/Basin		Major Hydrological Basin
District			
Bolga	Ve, Red Volta, White Volta	White Volta	White Volta
Bawku East	Tamne, White Volta	White Volta	White Volta
Bawku West	White & Red Volta	White Volta	White Volta
Kasina-Nankana	Tono White Volta	White Volta	White Volta
Builsa	Sisili, Tono	White Volta	White Volta
Bongo	Ve, Red Volta	White & Red Volta	White Volta

Region/Districts/River Basins

Northern Region	River/Basin		Major Hydrological Basin
District			
Tamale	Pasam, Kalurakan	Kalurakan	Main Volta
TCL-KUMB	White Volta	White Volta	White Volta
Savel-Nant	Nabago, W. Volta	White Volta	White Volta
Yendi	Daka, Bapore	Daka, Kalurakan	Daka/Main Volta
Saboba-Chereponi	Oti, Kulaw	Oti	Oti
Gusheigu-Kaaraga	Nasia, Nabogo, Daka, Bapore	White Volta, Daka	White Volta/Daka, Main Volta
Zabzugu-Tatale	Oti	Oti	Oti
East Gonja	Daka, Bapore	Daka, Kalurakan	Daka, Main Volta
West Gonja	W. Volta, Mole, Sori, B. Volta	White/Black Volta	White/Black Volta
Nanumba	Daka, Oti	Daka, Oti	Daka/Oti
East Mamprusi	Nasia, Oti	Nasia, Oti	White Volta, Oti
West Mamprusi	Nasia, W. Volta, Kulpawn	White Volta	White Volta
Bole	B. Volta, Sori, Mole	Black/White Volta	Black/White Volta

Region/Districts/River Basins

Volta Region	River/Basin		Major Hydrological Basin
District			
Anlo	Avu	Avu	Todzie Aka
Ho	Todzie	Todzie	Todzie Aka
Nkwanta	Oti	Oti	Oti
Hohoe	Dayi	Dayi	Main Volta
Jasikan	Volta	Volta	Main Volta
Krachi	Volta	Volta	Main Volta
Ketu	Aka Belkpa	Aka Belkpa	Todzie Aka
Kpando	Dayi	Dayi	Main Volta
North Tongu	Volta	Volta	Main Volta
South Tongu	Volta	Volta	Main Volta

Region/Districts/River Basins

Brong Ahafo Region	River/Basin		Major Hydrological Basin
District			
Tano	Tano, Pru	Tano, Pru	Tano/Main Volta
Berekum	Parmu, Bia, Tain	Parmu, Bia, Tain	Parmu, Bia, Black Volta
Jaman	Tain	Tain	Black Volta
Asunafo	Tano, Bia	Tano, Bia	Tano/Bia
Sunyani	Tain	Tain	Black Volta
Asutifi	Bia, Tano	Bia, tano	Bia/Tano
Dormaa	Parmu, Bia	Parmu, Bia	Parmu/Bia
Techiman	Tano, Fia	Tano, Pru	Tano/Main Volta
Wenchi	Tain	Tain	Black Volta
Nkoranza	Fia, Afram	Pru, Afram	Main Volta
Kintampo	Volta	Volta	Black Volta
Atebubu	Pru	Pru	Main Volta
Sene	Sene	Sene	Main Volta

Region/Districts/River Basins

Ashanti Region	River/Basin		Major Hydrological Basin
District			
Kumasi	Oda, Ofin, Parko	Ofin, Oda	Pra
Offinso	Ofin, Pru, Afram	Ofin, Pru, Afram	Pra, Main Volta
Atwima	Ofin	Ofin	Pra
Ejisu-Juaben	Oda, Anum	Oda, Pru	Pra
Bosomtwi-Kwanwoma	Oda, Bosomtwe	Oda, Bosomtwe	Pra
Asante-Akim North	Subin, Afram	Pra, Afram	Pra, Main Volta
Asante-Akim South	Subin, Anum	Pra	Pra
Adansi West	Ofiri, Fum	Ofin	Pra
Adansi East	Fum	Ofin	Pra
Ahafo-Ano North	Tano	Tano	Tano
Ahafo-Ano south	Pru	Pru	Main Volta
Amansie West	Oda, Ofin	Ofin	Pra
Amansie East	Jimi, Ofin	Ofin	Pra
Ejura-Sekyere Dumase	Afram, Pru	Afram, Pru	Main Volta
Sekyere West	Sene, Afram	Sene, Afram	Main Volta
Sekyere East	Obosum, Afram	Obosum, Afram	Main Volta
Kwabre	Oda, Parko	Oda	Pra
Efigya-Sekyere	Oda, Ofin	Ofin	Pra

Region/Districts/River Basins

Western Region	River/Basin		Major Hydrological Basin
District			
Shama Ahanta East	Pra	Pra	Pra
Nzima East	Ankobra	Ankobra	Ankobra
Jomoro	Tano	Tano	Tano
Sefwi-Wiawso	Tano	Tano	Tano
Bibiani/Anhwiaso/Bekwai	Ankobra	Ankobra	Ankobra
Juabeso-Bia	Bia	Bia	Bia
Wassa Amenfi	Ankobra, Mansi	Ankobra	Ankobra
Aowin Suamae	Tano, Disue	Tano	Tano
Wassa West	Ankobra, Mani, Bonsa	Ankobra	Ankobra
Mpohor Wassa East	Pra	Pra	Pra
Ahanta West	Nyan, Butre, Hwim	Nyan, Butre, Hwim	Coastal (Western)

[The records of endemic diseases in districts are missing in this scanned copy]