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HELPING GHANA SEARCH FOR WATER

WATER AND SANITATION
FOR HEALTH PROJECT



COORDINATION AND
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Operated by The CDM
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WASH FIELD REPORT NO. 132 SEPTEMBER 1984

The WASH Project is managed
by Camp Dresser & McKee
Incorporated. Principal
Cooperating Institutions and
subcontractors are: Interna-
tional Science and Technology
Institute; Research Triangle
Institute; University of North
Carolina at Chapel Hill;
Georgia Institute of Techno-
logy—Engineering Experi-
ment Station.

Prepared for:
USAID/Ghana and USAID/W/OFDA
Order of Technical Direction No. 189

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ment Station.

September 14, 1984

Mr. Leroy Wagner
AID/Ghana

Dear Mr. Wagner:

On behalf of the WASH Project, I am pleased to provide
you with 5 copies of a report on Helping Ghana Search
for Water.

This is the final report by Ralph Preble and is based on
his trip to Ghana from July 25, 1984 to August 21, 1984.

This assistance is the result of a request by the
Mission on June 25, 1984. The work was undertaken by the
WASH Project on July 11, 1984 by means of Order of
Technical Direction No. 189, authorized by the USAID
Office of Health in Washington.

If you have any questions or comments regarding the
findings or recommendations contained in this report we
will be happy to discuss them.

Sincerely,

David Donaldson, P.E.
Acting Director
WASH Project

cc: Dr. John H. Austin

DBW:kk

WASH FIELD REPORT NO. 132

HELPING GHANA SEARCH FOR WATER

Prepared for USAID/Ghana and USAID/W/OFDA
under Order of Technical Direction No. 189

Prepared by:

Ralph E. Preble, P.E.
Senior WASH Consultant

September 1984

Water and Sanitation for Health Project
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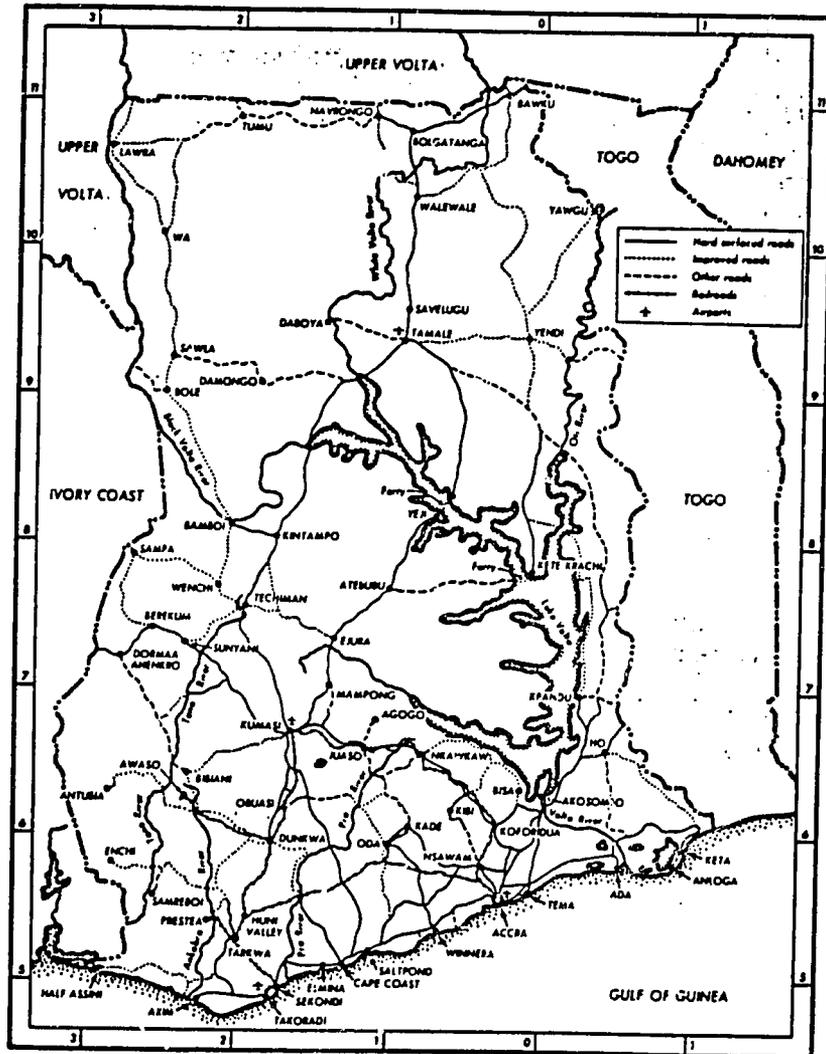
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Transportation System of Ghana

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ACKNOWLEDGEMENTS

The assistance and cooperation of Paul McCabe, AID/Food for Peace Officer; Gary Robbins, AID/Food Monitor; Leroy Wagner, AID/Ghana Director; John Brims, Deputy Chief of Mission; and Ambassador Robert Fritts have been invaluable in preparing this report. Further, the time and effort of Mr. Acquah, the Chief Engineer of the Ghana Water and Sewer Corporation, as well as all the persons whose names appear in the report, are also appreciated, even though space does not permit listing them individually.

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EXECUTIVE SUMMARY

HELPING GHANA SEARCH FOR WATER

This report summarizes the findings and recommendations of a four-week WASH consultancy to Ghana beginning in July 1984. It was made at the request of the AID Ghana Mission and AID's Office of Foreign Disaster Assistance (OFDA) to address the critical shortage of drinking water in many parts of Ghana.

In the northeastern quadrant of Ghana, the summer rains have been below normal. In some areas, village-dug wells are dry or nearly so. Water levels in the Canadian network of monitoring wells are reported to be down by more than four feet from prior measurements in the East Upper Region. Dry storage reservoirs or water levels below intake elevations are reported for a number of town water systems in the Brong-Ahafo and Northern Regions. Electrical service to the nation's capital (Accra) is shut down on alternate days to conserve Lake Volta water levels that are down 11 feet below levels at which unrestricted hydropower generation would be permitted. The drought problems of the northeast are in sharp contrast with the western border area and the Voltaian Region where excess rains have given rise to harvest, storage, and transport problems.

According to village and regional officials, water supply is the problem with the highest priority. Outside assistance -- by the Canadians in the far north and the Germans in the southern one-third of the country -- has given a portion of the rural population access to uncontaminated water through the construction of nearly 6,000 hand-pumped wells. Still, a majority of the rural population does not have access to an adequate water supply, as determined by local standards.

Government figures of the percentage of the urban population served by water systems are misleading. In the two regions where the WASH consultant interviewed regional water supply administrators, it was readily admitted that a majority of the systems were not operating and that in some of the communities listed as operational the systems had broken down periodically for weeks or months. Most people in these urban towns do have some alternate natural source of water. The urban water problem is perhaps most serious in some of the outlying parts of Accra where no such natural sources exist.

Recommendations

Short-term emergency assistance could be provided at a cost of \$894,000. This would provide (1) an information center to increase the efficiency of drought mitigation and preparedness activities underway or being initiated by Ghana, international organizations, and voluntary agencies; (2) a technical assistance team to help all parties in the search for groundwater; (3) equipment, supplies, back-up assistance to carry out (1) and (2); and (4) six water tank trucks for providing water in urban areas on an emergency basis.

In addition to the need for emergency assistance, there is also a need to maintain the facilities in place or being provided under various emergency programs now underway or being initiated. A major need is the replacement

and/or repair of handpumps. Although the issue of handpump manufacture and/or maintenance was beyond the scope of this report, it may be of possible interest to AID.

Long-range programs in water supply appear to be needed most in the central and eastern portions of the Brong-Ahafo region and the Northern region. The most direct and straightforward program would be to adopt one or more districts in a region or regions and to undertake improvements and/or install city, town, and rural water supplies. A variety of options are available for less costly intermediate-range programs.

Chapter 1

PROJECT ACTIVITIES

1.1 Project Background

In response to a determination by AID/Ghana and AID/Washington/Office of Foreign Disaster Assistance (AID/W/OFDA) that a critical need existed to help Ghana search for drinking water, a WASH senior consultant was dispatched to Ghana for one month. This assignment was funded by USAID/W/OFDA and initiated under Order of Technical Direction (OTD) No. 189 (Appendix A), issued 10 July 1984.

In November, 1983 an assessment team was sent to Ghana following a declaration of a disaster situation by U.S. Ambassador Robert Fritts. The Ghana Food Shortage Disaster Team (Paul H. Russell and Paul B. McCabe) recommended a program of food assistance. OFDA responded favorably to those recommendations and funded a massive food assistance program early in 1984. U.S. officials, resident in Ghana, feel that the present water supply emergency is as serious, at least for the northwest quarter of the country as the food emergency was some nine months ago.

1.2 Terms of Reference

The terms of reference under which the WASH consultant was to provide technical assistance to OFDA and USAID/Ghana were included in OTD No. 189 (Appendix A). Cable traffic between AID/Ghana and OFDA was made a part of OTD No. 189 so that technical assistance could be provided within the framework of the positions that AID/Ghana and OFDA had expressed in those cables.

The WASH consultant was to meet with appropriate USAID/Ghana, Government of Ghana (GOG), private voluntary organizations (PVO), and other interested donor staff within Accra and throughout the country to determine those options (emergency, short-term development, and long-term development) available to the Ghana Mission and the GOG.

1.3 Briefings Pertaining to Terms of Reference

Prior to the WASH consultant's departure for Ghana, a series of briefing meetings were held in Washington on 20 July 1984 with State Department staff, AID/W/OFDA, AID/S&T/H, and WASH Project personnel.

The WASH consultant arrived in Ghana on Wednesday, 25 July 1984. On this date, a meeting and a briefing were held with the AID/Food for Peace Officer, Paul McCabe, and the AID/Food Monitor, Gary Rollins. Later, on the same day, separate meetings were held with the AID/Ghana Director, Leroy Wagner; the Deputy Chief of Mission, John Brims; and Ambassador Robert Fritts.

1.4 Overview of the WASH Consultant's Activities

As a result of the foregoing briefings, travel plans and an itinerary of visits outside Accra were tentatively formulated. Travel was to be mainly in the Brong-Ahafo Region and the Northern Region both of which had failed to share equally, or at all, in rural drilled well water supply improvement programs and was designed to:

- Establish the need and potential capability of local villagers to construct hand-dug wells which would not dry up annually.
- Establish contact with GOG officials and Ghana Water and Sewer Corporation (GWSC) administrators and technical personnel and find out what the drinking water supply needs were in their respective jurisdictions.
- Establish contact with various PVOs, find out what they thought drinking water needs were for the rural population, and ascertain what water supply activities, if any, they were undertaking.
- Contact expatriates working on either foreign donor country or international organization rural or urban drinking water supply projects to discuss problems, successes, and perceptions of future activities.
- Visit typical villages that employ traditional well digging, rather than drilled wells, to gain first-hand knowledge of the villagers' problems in obtaining adequate drinking water.

After conducting three days of meetings with various officials and organizations and just prior to leaving for the planned field trip, the WASH consultant received a request from AID/W/OFDA which asked him to assess the proposed well installation program of the Catholic Mission in Wenchi and, in particular, its potential for success. The cabled response is attached as Appendix B. This necessitated a change of the original itinerary. The final itinerary, listing overnight stops and distances traveled and all persons contacted in Accra and throughout the country, appears in Appendix C of this report.

Chapter 2

WATER SUPPLY NEEDS

2.1 Overview

Water supply needs throughout the country are a reflection of the disastrous state that the entire infrastructure and economy is in at the present time. The Accra newspapers publish articles daily about food spoilage in one part of the country, while other sections go hungry for want of storage, operating transport, or diesel fuel. Probably the basic problem is that the country is in a virtual state of bankruptcy. Money problems are reflected in the fact that the official exchange rates are unrealistic. For example, the official rate is ₵35 (cedis) to a U.S. dollar. Black market rates, reported at the border, are in a range of ₵200 a U.S. dollar U.S. if bought by a black market dealer and 150 to \$1.00 U.S. if he is selling. Everyone in the country seems to be engaged in several endeavors in order to exist, and production is a word without meaning. For example, established GOG salaries are unrealistic. The chief engineer for GWSC receives a monthly pay equivalent to a little over \$65. The average GWSC employee's salary is in a range of ₵1,200 per month. The cost of a single pineapple is ₵30; therefore, its purchase represents 2.5 percent of a month's pay. At ₵70 to ₵100 for a loaf of bread (control price is set at ₵25), an average salary could be exhausted in less than two weeks, assuming no purchases other than a loaf a day is made. Apparently, most urban and government workers have two or three jobs, and most of their wives are engaged in some form of sales endeavor.

2.2 Urban Water Needs

Outside of Accra most of the piped water systems that were constructed to serve larger towns and cities are broken down. In some instances, the breakdowns are caused by a lack of diesel fuel. However, all systems have suffered from a complete lack of maintenance. Even if they were supplied with fuel, it is doubtful that they would function.

2.2.1 Urban Systems of the Brong-Ahafo Region

Discussion at the GWSC regional office in Sunyani confirmed that a majority of the piped systems of the region were not functioning. An official quarterly report shows that only 10 of 28 systems were functioning during the second quarter of 1984 (see Appendix E). Presumably they are still functioning, but on an interrupted, part-of-the-week, basis.

2.2.2 Urban Systems of the Northern Region

Discussions at the GWSC regional office in Tamale indicated that of 16 piped systems in the region, eight were operational. Further questioning revealed

that this did not mean that all eight were functioning. For example, the Nalerigu system and the Gambaga system (that used a booster pumped supply from the Nalerigu system) were not functioning because the dammed impounding reservoir was dry. The WASH consultant had observed that practically no water had accumulated in the reservoir, even though August was the middle of the rainy season. (See Appendix D for rainfall data.)

The system serving the City of Tamale, the regional capital of the Northern Region was one of the systems to which operational status was ascribed. Later information revealed that system problems prevent servicing a large portion of the population. The population who live in this part of the city can only get water from standpipes near the city's electrical generating plant.

Unfortunately, a quarterly report (similar to that obtained for the Brong-Ahafo Region, Appendix E) was unavailable.

2.2.3 Problems of Implementing Urban Water Supply Improvements

At present GWSC has no planning or implementation capability to undertake urban water supply improvements without donor-aid supervision. The following excerpt from Northern Region Rural Integrated Programme's (NORRIP) Potable Water Development Program Report illustrates conditions within and facing GWSC in 1982. Discussions with various persons indicate a similar or a worse situation at present.

The maintenance of GWSC's systems, however, presents the most problems. Of the 12 water supply systems visited by the NORRIP project preparation team, not one was operational. A few were maintained as well as could be expected under the circumstances and demonstrated that the operators were competent and took pride in their work. Others were a shambles, and in two the operators had been dead for nearly a year and had not been replaced. The most immediate problems include the:

- lack of fuel to run the generators
- lack of spares
- lack of transport to visit stations
- lack of communications for reporting breakdowns
- total lack of understanding, at the centralized financial decision-making level, of the need for cost-effectiveness of a good maintenance programme
- the need for a good management system with clearcut objectives, reliability targets, cost evaluation and accountability
- lack of communication with the villagers, the customers.

2.2.4 Urban Water Supply Problems of the Greater Accra Area

As serious as the problems with urban water supplies are throughout the various regions, none is more serious than the problems facing the Greater Accra area. In most other places townspeople can carry water from the source of the malfunctioning system and may have alternate handpump or other available supplies. Such is not the case in many areas of Greater Accra where



Illustration 1 - Nalerigu Reservoir
The Nalerigu reservoir held little water in
1983 and in 1984 as this picture shows.



Illustration 2 - North-South Access Road

water distribution depends largely on a mainly inoperative water tank truck fleet.

The entire fleet of Accra's water tank trucks was reduced to two early in 1984. By mid-1984 the World Bank direct hire GWSC Workshop Manager, Ian Anderson, managed, through cannibalization and repair with parts available in country, to get six tankers in operation. The local agents for these Sedoon tank trucks (U.K.) have an order for \$10,000 worth of spare parts to repair six more. Of the 22 remaining trucks considered reparable, a survey of the best 12 showed that \$100,000 worth of parts was needed. A 1,500 gallon tanker, landed in Accra, costs approximately \$60,000. A request was made to the World Bank headquarters in Washington for the needed parts. In any event, it appears that no more than 12 trucks will be serviceable at the end of 1984, when need will be the greatest.*

Shortages are severe. For example, all restrooms at the University of Ghana at Legon had signs reading "closed until further notice." The Vice Chancellor noted that the university could not depend on GWSC water to provide service to the lower areas of the campus at present and were having difficulty in providing water for cafeteria service. He also was concerned that the GWSC tank fleet could not adequately meet the needs of the university and adjacent areas and requested that USAID/Ghana consider a gift of a tanker directly to the university.

2.3 Rural Water Supply Problems and Needs

2.3.1 Major Problems Regarding Village Water Supply

Some villages which have acquired drilled wells equipped with handpumps experience problems with taste, odor, or color of the water delivered. This situation presents a problem, for the villagers may reject safe water that is colored red from iron and revert to using a traditional polluted surface source. Unprotected dug wells, dugouts, small dam impoundments and streams all cause parasitic, bacterial, and viral problems.

The most serious parasitic infestations that afflict the rural village populations are as follows:

- Guinea worm (dracunculiasis), a parasite helminth whose alternate host is the copepod Cyclops, which inhabits ponds and dugouts. It is transmitted by drinking water containing the copepods.
- Onchocerciasis (river blindness), which is caused by a tiny filarial worm transmitted from human to human by the bites of the black flies that breed in surface water streams.
- Bilharziasis (schistosomiasis) is caused by a small worm whose alternate host is a water snail. Larvae released from the snail

* Twelve trucks may be optimistic; see Appendix F.



Illustration 3
Guinea Worm Affliction



Illustration 4
Wenchi Well-Drilling Workshop

penetrate the skin and thus infect humans. An increase in bilharzia incidence can be expected to follow the construction of perennial impoundments.

- Other water-related diseases transmitted by biting insects that breed in or near water include malaria, dengue, yellow fever, filariasis (elephantiasis) and trypanosomiasis (sleeping sickness).

Waterborne oral-fecal diseases include cholera, typhoid, bacillary dysentery, and various forms of gastroenteritis.

The most prevalent and debilitating of these afflictions is guinea worm, which causes many farmers to lose four or five weeks of work during the planting season. (It has been reported by missionaries at the Wenchi Mission that in one area of the Brong-Ahafo Region 80 percent of the population of five adjacent villages is so afflicted each year during the harvest season). Bilharziasis is a major health hazard for women and girls who walk into water sources to fill their containers. Enteric ailments affect everyone, causing much infant mortality. Malaria is almost certainly the greatest curse of the regional population.* Onchocerciasis gradually is being controlled by aerial applications of insecticide to the breeding areas of the black fly host (UNDP/IBRD Programme).

During drought conditions more people and animals become dependent upon fewer and fewer sources of supply, and health problems associated with traditional village water supplies magnify to epidemic proportions.

2.3.2 Problems of Implementing a Rural Water Supply Program

As noted earlier, the ability of the GWSC to meet water supply needs in urban areas is essentially nonexistent; the same applies to rural water supplies. Of GWSC's five rotary drilling rigs, none are supplied with down-the-hole rotary hammer capability. Only one was operating in August 1984. Further, half a dozen percussion rigs stand idle. Even though only one rig was working, salaries were being paid to some seven drilling crews.

Both the drilling engineer, Mr. Gyamfi, and the hydrologist, Mr. Kwei, with whom the WASH consultant met in Kumasi, appeared concerned about the need to improve the capability of the GWSC in well drilling. They expressed a willingness to cooperate in any endeavor that would improve the status of the well-drilling unit of the GWSC.

The inadequacies of the GWSC are especially serious because it is charged with all of the water supply activities in the country. For example, the Indian Government is supplying the Ministry of Rural Development with four sophisticated drilling rigs for which the Ministry has no operating crews (see Chapter 3); GWSC is not prepared to operate these rigs, although it may be expected to do so.

* For details, see G. Goldthorpe, Health in the Northern Region of Ghana, Tamale: NORRIP Sector Report, January 1982.

2.4 United Nations Report Section X - Water and Sanitation in Ghana

This report provides background material on the responsibilities of various GOG agencies in rural and urban water supplies. It includes data and information concerning programs for water supply improvement and problems relative to their implementation. This report is included as Appendix G. Caution should be exercised in accepting some of the data, because percentages of rural and urban populations served with water may be overstated as most GWSC piped systems are inoperative.

Chapter 3

CURRENT WATER SUPPLY IMPROVEMENT PROGRAMS

3.1 Water Supply Programs in Progress

The major continuing water supply program is the Accra/Tema water supply improvement project initiated in 1974 with International Development Agency (IDA) funding and augmented by management input as delineated in the Technical Data Sheet of March 1983 and the News Release of April 1983 included in Appendix H.

Since 1974, the Canadian International Development Agency (CIDA) has been actively engaged in both rural water supply (2,500 well programs in the Upper Region -- now East Upper and West Regions) and in stabilization (return to basic use) of certain piped systems in the Upper Region (later expanded to four systems of the Northern Region). Because of this continuing effort, no further action was initiated by CIDA.

UNICEF assisted both the CIDA program, noted above, and the 3,000 well programs in the south with certain supplies (primarily handpumps and electrical submersible pumps), as noted in a description of activities provided by UNICEF for the years 1980-1982 (see Appendix K).

3.2 Donor Response to Drought Emergency

In 1983, foreign donor awareness of Ghana's drinking water problems was awakened when drought conditions reached disaster proportions. In some areas missionaries abandoned all other activities (including health care) to search and bring back water. Baptist missionaries at Naliguri reported round trips of 56 miles. German well drillers reported that water was so scarce in some areas that the asking price for a liter was equal to half a month's salary of the average government employee. CIDA personnel in the East Upper Region reported that 1984 groundwater levels were more than four feet below former monitored levels and that many traditional water supply sources were dry or critically low even in the "wet" season.

The German drilling company, which had just completed drilling some 3,000 rural hand-pumped wells (geographical coverage provided to only the southern 40 percent of the country) and was in the process of shipping drilling equipment back to Germany was asked to extend its program by 90 wells. Because of drought conditions a variety of programs that were on hold or were moving slowly were activated, and new programs of disaster mitigation and disaster preparedness were initiated. A German Catholic church group (Misereor) funded another 165 wells which were contracted to the private German well-drilling company. In addition, the Japanese were asked to fund a drilling operation in a small area. This currently is under consideration (see Appendix I). Other disaster mitigation and preparedness activities directed to relief of the rural drinking water problem on the part of donor countries, international organizations, and voluntary agencies include:

- Seventh-Day Adventists' World Service (SAWS) activities, including

importation of one drill rig (Scandinavian) which is scheduled to begin operations by the end of October. Some ten widely scattered locations have been identified as its initial area of operation. Unfortunately, the Accra office of SAWS is unsure of support and source of pumps for this activity. Also SAWS staff are unaware of the Wenchii project which is planned for the same area as the SAWS's project.

- A second SAWS drilling unit is also planned. A U.S. driller will donate time and equipment for two years or more starting by the end of 1984. The driller surveyed various sections of Ghana in April 1984 and developed a tentative program of drilling along the Wale-Wale River to the Tamale road.
- The Wenchii Water Project, previously noted, anticipates the installation of some 71 drilled wells within a two-year time frame (pumps promised by UNICEF) and anticipates drilling to start prior to the end of 1984. In August of 1984, a maintenance workshop building was erected and various equipment already in country was being installed.
- Catholic Relief Services (CRS) is in the planning stages of a hand-dug well program.
- A Southern Baptist Missionary group has budgeted \$150,000 for well-drilling equipment and is in the planning stages of a potential long-term program. The group anticipates possible 50-50 funding following the development of a definitive program. One suggestion advanced is a pilot program with low-cost farm tractor-towed equipment to reach remote villages.
- Delivery of four sophisticated drilling rigs from the Indian Government (Ingersol-Rand design under U.S. license of top head rotary drive with a down-the-hole hammer drilling capability) consigned to the Ghanaian Ministry of Rural Development. The GWSC was asked to provide initial specifications for the equipment and to anticipate eventually operating it with GWSC drilling crews. It has no planned program, however, for the equipment's use and is unaware of any program which may have been formulated by the Rural Development Ministry.
- Grass-roots interest in hand-dug well programs is apparent (see WASH consultant's memorandum to Ambassador Fritts in Appendix J).
- UNICEF has a program to rehabilitate two obsolete drilling rigs and inoperative hand pumped wells. The program was previously on hold but has now been released and materials ordered (per J.W. Quarm, UNICEF water supply engineer); see project program paper in Appendix K.
- UNICEF is also sponsoring a program of water harvesting equipment rehabilitation at designated rural health centers. The funds, previously on hold, have been released and supplies currently are on order.



Illustration 5
The Village of Nyamebekyere



Illustration 6
Water Source for Binyukuo

Chapter 4

RECOMMENDATIONS REGARDING SHORT-TERM EMERGENCY ACTION

4.1 Introduction

Underlying Ghana's food disaster of 1983-84 was the less well-known water disaster. In several regions, the water table dropped steeply in 1984, while peasant women and girls spent their time walking as many as 28 miles for water of dubious quality. The number of urban water systems out of operation doubled as retreating surface water levels dropped below the system's intake pipes. This added to an already serious problem of systems out of operation due to maintenance difficulty. At least part of Ghana's high level of infant mortality can be traced to the lack of water for sick infants, especially in the Brong-Ahafo and Northern Regions of the country.

OFDA's successful assistance in the area of transport and logistics for an ambitious U.S. emergency food program enabled it to consider emergency aid to the water sector as well. A disaster intervention by OFDA in the water problem is needed to form the basis for a two-pronged approach. For urban sites, it is recommended that six water tankers be deployed. For rural areas it is recommended that 18 man-months of technical assistance be provided and that a National Emergency Water Search Center (NEWS Center) be established. This integrated approach, approved by the USAID Mission, will be a firm beginning to focus on Ghana's water disaster. It is proposed that these efforts be initiated with the establishment of the NEWS center as soon as AID/Ghana and AID/Washington agree on details. Two experts knowledgeable in translating aerial photo interpretation methods used for siting wells to practical field use and a Project Manager/Groundwater Engineer should be recruited and dispatched to Ghana not later than January 1985.

4.2 Rural Water Supply Implementation Program Informational Needs

4.2.1 Background

An important finding of this consultancy is the complete lack of centralized information on water and water resources in Ghana. Further, although foreign country donors, international organizations, and a number of missionary groups are involved in a wide variety of water projects, there is little apparent coordination among them in the field. Both of these represent a severe constraint to efficient and cost-effective water projects and both will be alleviated by the creation and funding of the NEWS Center Project.

For example, in the Brong-Ahafo Region, both the Catholic mission in Wenchi and the SAWS mission in nearby Techiman have plans for drilling in the same villages. Neither seems to be aware of the others' plans. This duplication of effort, found frequently by the WASH consultant, can be reduced by the activities of the NEWS Project. It is anticipated that as the information resources of the project grow, it will be consulted more and more by its principal clients: GOG agencies and donor-funded technicians. First efforts will be in the areas of donor coordination and information-gathering.

There is every reason to believe that the NEWS Project's goals in this vital area can be met. The food disaster of the past year has given rise to regular food-aid donor meetings and the institution of quick information exchange through the National Mobilization Committee (NMC) and AID/Ghana on these topics. All the principal donors agreed that with the amount of emergency aid coming into the country in 1983-84, every effort must be made to coordinate aid. A similar successful effort can be made in the water sector, if the problem is attacked correctly by the NEWS Project coordinator. Monthly meetings might be initiated to facilitate exchange of information and joint planning. It is believed that donors are ready to undertake some steps in this direction, having been encouraged by the results of the food donors' meetings.

4.2.2 Recommendations

The creation of a NEWS Center is recommended to fill a needed role in coordinating the water emergency actions of the GOG and organizations. The NEWS Center would provide a forum and an information resource center on water supply, sanitation, and related subjects.

One expatriate staffer and two nationals should be funded for a period of three to six months. Their tasks should include:

- gathering all water-related information in Ghana, obtaining copies of reports from donors, obtaining and tracing past studies;
- cataloging the information thus obtained;
- working with the GOG and donors to encourage project coordination;
- serving as a central clearinghouse for voluntary agencies, international organizations, GOG, and other donors' efforts on water;
- coordinating a monthly inter-donor meeting on water;
- writing and disseminating a Water Newsletter; and
- performing other functions as assigned.

To relieve AID/Ghana from a press of work that might be generated by an input of technical expertise in groundwater search efforts, it is proposed that the expatriate staffer fill a dual role as AID/Ghana Water Monitor and NEWS Center Coordinator. It is also recommended that, if possible, such a position be filled with an expatriate who may be completing an assignment in Ghana and who AID/Ghana would feel was qualified to be appointed to such a position. To assist in possible recruitment of such a person, a job description or Scope of Work is separately presented in Appendix L.

The function and staffing details of the NEWS Center were thoroughly discussed with AID/GHANA. The physical location of the NEWS Center was discussed but not made definite. AID/Ghana staff favor its location in the AID office in Accra. The only drawback is that the technical team would most likely locate in Kumasi far away from the NEWS Center. Kumasi is the base of the only Ghanaian

well-drilling group, the GWSC's well-drilling unit. The disadvantages of this separation could be largely overcome by providing the technical team with duplicate copies of reference material and stationing a Ghanaian NEWS Center staff member in Kumasi. The advantages of locating the News Center at the AID/Ghana office are the following:

- The NEWS Center staff could be accommodated immediately without any need to negotiate for GOG facilities.
- The expatriot staffer in the dual role of NEWS Center coordinator and AID/Ghana Water Monitor would be able to consult frequently with the AID/Ghana Director.
- The AID/Ghana location would solve an immediate problem of transport through AID/Ghana's existing pool of vehicles.
- An Accra location provides accessibility to all the GOG's head offices, including the NMC with which the NEWS Center Coordinator would need to work closely (see the Role of the National Mobilization Committee in Appendix L). An Accra location provides access to the international organizations, donor country missions, and voluntary agencies that are operating in the country.

4.3 Technical Groundwater Research/Interpretation Needs

4.3.1 Background

A need for technical expertise in siting of wells was expressed by CIDA personnel who were familiar with recent CIDA funded exploratory drilling in the Northern Region. In this instance, reliance for carrying out the program was largely placed on Ghanaian drilling and technical personnel from GWSC. This need for experienced direction in well-siting was underlined by later discussions with German hydrologists and geologists providing such advice to Prakla-Seismos, a West German drilling company which had completed a 3,000-well program in the southern part of Ghana. Their oversimplified observation was that their program produced 80 percent successful wells where 80 percent unsuccessful wells were reported for the GWSC drilling. Of course a direct comparison of this nature is not truly appropriate as drilling equipment and subsurface conditions were contributing factors to the reported problems in the Northern Region. That the problem was real was confirmed by a review of the well-drilling results included in the August 1982 R.K.D. Van Ess report, Groundwater Potential of the Voltaian Sedimentary Basin in the Northern Region of Ghana.

This is not a criticism of the Ghanaian efforts but merely a statement of need. The drilling segments of the PVO programs that are just getting started are anticipated to suffer from the same problem. People with expertise in actual well construction are on hand to do the work but problems remain in the selection of the actual location where subsurface conditions offer the best opportunity for a successful well. German expertise in this area has been demonstrated even though such efforts relied on geologic data and field observations without the aid of aerial photographic interpretation. It is felt that the employment of this type of expertise could substantially reduce the

failure rate especially if basic photographic interpretation is combined with knowledgeable field confirmation at selected sites.

Various new aids in groundwater detection have evolved in recent years. In the 1980's space shuttle-carried synthetic-aperture imaging radar (SIR-A) has been used to locate groundwater in Egypt. Attempts to apply such a technique to Ghana might not work, as flight paths relative to rock structure of Ghana may not be appropriate. However, skylab photographs might be useful and direct aerial photographic interpretation of morphology, shear zones, fractures and vegetative alignment should be possible even with the deeply weathered rock surface of Ghana.

4.3.2 Recommendations

Aerial flyovers of Ghana were conducted in the early 1960s and again in 1982, the latter sponsored by the Food and Agriculture Organization in Rome. Copies of these films and documents and the reports on their interpretation should be obtained as soon as possible. Proposed OFDA-funded experts will use this information in the planning and operation of their fieldwork, because office interpretation needs to be collaborated with actual site inspection to be effective. The same is true of LANDSAT imagery. In December 1983, the Russell/McCabe OFDA team recommended that LANDSAT be used to examine the extent of ecological damage as a result of drought and bush fires in Ghana. An even better use might be in the water sector where the photogrammetric computer-enhanced imagery could likely increase significantly the ability of the OFDA team associates to find water in the driest areas. Recently satellite photos have proven a successful means of finding hidden water in Egypt and some Sahel countries. The WASH consultant found it impossible to obtain copies of the aerial surveys, although the surveys were known to many experts.

This situation underscores what was said above regarding the lack of concise information being a serious problem here. To attack this problem head on, the WASH consultant proposes the creation of the NEWS Center on water supply, previously mentioned, and a technical team to utilize the information.

4.4 Additional Water Tank Trucks Needed for Greater Accra

4.4.1 Background

The urban water supply problems of Greater Accra were briefly detailed in Chapter 2, which also referenced an appended memorandum on the subject. Added discussions revealed that water deliveries were mostly on a daily basis with two areas needing deliveries every other day. The concern is that the tankers operating at present cannot meet current needs and, with scheduled work due to start soon on the city's transmission line from its eastern source of supply, the need will escalate to 30 tankers by the end of the year. If no additional tankers are provided, water deliveries to certain sections of the city will be reduced to one per week -- approximately one day's needs on a weekly basis or little more than that needed for actual drinking purposes.

4.4.2 Recommendations

To circumvent almost certain life-threatening health problems associated with the problem of water delivery by tanker trucks to something greater than a bare subsistence level the furnishing of six tank trucks is recommended. This would provide three-fifths of the need if the hoped-for repairs to six other tankers can be effected. More realistically it would achieve no more than one-half of the estimated need with a potential of close to a full complement of tankers in a subsequent year -- assuming that by that time all equipment deemed potentially serviceable has been repaired.

4.5 U.S. Backstop of Volunteer Organizations' (VOLAGS) Well-Drilling Efforts

4.5.1 Background

Every foreign assistance operation invariably generates unforeseen needs, especially during the early stages of implementation. Failure of the very part that was not included in the list of spare parts or the disappearance during shipment of a vital item is the rule rather than the exception. Such problems lead to down time that just cannot be afforded given the limited tour of duty for some volunteer personnel.

A breakdown in communications, assembly and operating problems has already occurred with the Scandinavian-furnished drill rig to SAWS now sitting unused in Techiman.

4.5.2 Recommendation

Not previously mentioned in prior recommendations, but permissible under disaster preparedness and disaster mitigation activities, according to the AID Handbook 8 Foreign Disaster Assistance Tm 8:13 October 1, 1983, are provisions for the transport of VOLAGS equipment. With SAWS and Wenchi Water Project equipment anticipated in country before the end of 1984, it is proposed that technical U.S. backstop for communications, ordering (not purchasing), and air freight of emergency needed spare parts be provided for the life of the NEWS Center. The Center would coordinate Ghanaian needs and the WASH Project office would handle U.S. technical and shipping activities.

4.6 WASH Support

4.6.1 Background

One need for potential WASH backstopping was identified in subsection 4.5. Additional WASH backstopping is anticipated to be needed in the following areas:

- identifying, purchasing and shipping of equipment necessary for NEWS Center operation and technical team,
- recruitment of technical team staff,
- logistical support for technical staff,

- identification, acquisition, and shipment of expendible field and office supplies for NEWS Center and technical team, and
- identification of remote sensing/SKYLAB photographic program, work assignment, report review and information transmission to the technical team.

The purpose of these backstop activities is to insure efficiency by one central U.S.-based point of operations supporting the short-term emergency operation in a useful time frame. The tools needed to work with are nearly useless if they are not available until halfway through a project.

4.6.2 Recommendations

The basic elements of the proposed WASH support are as identified in Subsection 4.6.1.

4.7 Estimated Funding Levels Required to Implement the Recommendations

Funds needed for implementation of the recommended USAID response to short-term emergency actions are detailed below.

1. NEWS Center Budget

Monthly budget for one local hire expatriot and two local Ghanaian assistants estimated at \$5,000 (U.S.) and with a proposed 12-month duration total costs exclusive of equipment	\$ 60,000
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2. Groundwater/Hydrology/Geology Technical Team

Salaries and subsistence for two experts in the activity described and a project manager/groundwater engineer for a total of 15 person months	218,000
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3. Urban Emergency Water Equipment

Proposed 6 water tank trucks for greater Accra area	375,000
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4. U.S. Backstop for Volunteer Organizations (VOLAGS) Well Drilling Efforts

Communications and backstop on replacement and spare parts needs (equipment costs by VOLAGS) logistical support and air/sea shipment recommended to be through WASH	20,000
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5. Other Recommended WASH Backup	
a. Personnel recruitment and logistical support to (1) and (2) above except for (6) below	10,000
b. Equipment and supplies to support (1) and (2) above	<u>130,000</u>
Subtotal of recommended emergency aid	\$813,000
10 percent contingency	<u>81,000</u>
TOTAL	\$894,000

Chapter 5

POTENTIAL INTERMEDIATE AND LONG-TERM AID WATER PROGRAMS

5.1 Introduction

Throughout Ghana a genuine need exists for better water supplies. Even in those geographical areas where donor countries have invested heavily in water supply improvements, villages of under 500 persons have not been helped and a majority of urban piped systems remain out of service. This widespread need provides an opportunity to develop a variety of small scale programs or enter into longer-term and more extensive activities.

Intermediate or long-term programs could be developed that would address the following needs:

- the rehabilitation of selected piped urban water systems where the GWSC has suspended service for want of spare parts or because of general deterioration;
- a rural water supply program in a defined geographical area in concert with the GWSC;
- partial funding, supply of certain technical expertise, and back-up for PVO water supply activities;
- future problems with PVO handpump supply and maintenance is an element that is ill defined and warrants attention; and
- the expansion of the information dissemination activities, recommended as a basic current need, into an intermediate or long-range project.

5.2 Potential AID Water Programs with the GWSC

The GWSC is officially charged with the implementation and administration of water supply on a country-wide basis. Its inability adequately to meet the country's water supply needs has led other organizations to undertake certain activities that the GWSC shows no signs of getting involved in. Programs that the GWSC would be receptive to are briefly described in the following subsections.

5.2.1 Urban Water Supply Rehabilitation

CIDA has been providing technical assistance and funding for the rehabilitation of several piped water systems in the East Upper Region and West Upper Region. In the Northern Region this program was expanded to 4 of 16 piped urban water systems. The GWSC is actively soliciting similar assistance from donor countries for the rehabilitation of additional systems in the

Northern Region and other regions of the country. The GWSC currently views the urban need as a top priority; however, urban needs should be weighed against rural water supply needs in any potential AID effort directed towards the country's water supply problems.

5.2.2 Rural Water Supply Programs

CIDA backed a major planning study of integrated development in the Northern Region. This planning effort identified water supply as a major need, because nowhere in the entire region are water supplies adequate. To engage in a region-wide program was deemed beyond the scope of CIDA, and the GOG has been seeking other donors to fund and adopt water programs in separate subdivisions of the region. The proposal made to the Japanese for funding the Nanumba District (Appendix I) is the type of program, with appropriate modification, that a future AID effort might be interested in.

CIDA is considering adopting two districts and providing assistance to meet both their rural and urban water supply needs in a 1985-1990 program. Even if both the Canadian and Japanese proceed with these programs they would address only three geographical areas out of ten with similar needs in the Northern Region without consideration of the needs of other regions.

5.2.3 General Technical Assistance

The need for information exchange and technical expertise, similar to that previously identified as a short-term emergency measure of greatest immediate impact, will not go away in six months or a year. Continuation of similar activities would be an opportunity for an intermediate or long-term program. Apparently the World Bank-funded management report on GWSC's organization and operation, not yet completed, will recommend that the GWSC's well drilling unit, which now employs six or seven drilling crews, be restructured and given a new name -- the Rural Water Division of the GWSC Department of Engineering. In its restructured form this division would seek to have its budget funded in part by the Ministry of Rural Development, the Ministry of Health, and some 70 percent by new donor programs. This division will require assistance in management, maintenance, and technical expertise in order to function effectively. Essentially, this would be an expanded scope and extension of the short-term emergency technical assistance recommended in the previous chapter.

5.3 Potential AID Water Programs Through Private Organizations

Private organizations, representing a number of religious groups, have sponsored various projects to provide improved village water supplies; additional projects are being planned. Some, but not necessarily all of the projects being implemented or planned by private organizations are as follows:

- Wenchi Mission Program

Funding: Divine Mission Missionaries, a Roman Catholic order headquartered in Techney, Illinois, USA

Ghana Contact: Brother John Heckel

Initial Program: Drilling of 71 identified village wells with drilling equipment shipped August 1984 to Ghana with AID funding of shipping costs.

Needs: Longer-term needs in handpumps and well-construction materials (the first 85 handpumps were provided by UNICEF). Technical expertise in well construction available for two years but technical expertise in well siting would save time and equipment by bettering the ratio of successful wells. Well siting technical assistance and back-up in U.S. for unforeseen emergencies, spare parts shipments, etc., as identified in short-term emergency program.

- SAWS Well Drilling Program

Funding: Ghana/African and Indian Ocean Division of SAWS

Ghana Contact: Pastor Glen Howell

Initial Program: Drilling of 12 wells at rural health centers, secondary and technical schools with a Norwegian-furnished drilling rig reported to have been loaned to SAWS for a three-year period. The rig has been in country at the Techamin technical school for some months without information as to how or when it will be operated.

Needs: To sort out operating details and provisions for materials and pumps. Local Ghanaian expectations are for a continuing program of village wells, but details on an overall project are not readily available or perhaps they have not been formulated. Back-up for small parts and expertise as mentioned for Wenchi project are potential immediate and intermediate AID programs.

- Southern Baptist - Nalerigu Well Drilling Program

Funding: Southern Baptist Convention, Richmond, Virginia with 1985-85 budget of \$150,000 for project.

Ghana Contact: Mr. Byrd at Nalerigu Mission

Initial Program: A village well drilling program, including rural health centers and hospitals, to the west and east of Nalerigu. No equipment available but local contact envisions potential AID matching funds for a pilot project with inexpensive light-weight commercial drilling equipment that could be brought to remote villages.

5.4 Other Programs

Some programs are in a developing state without funding or formal plans. Interest has been expressed, some tentative proposals have been or are being developed, and some AID assistance may be asked in the future relative to the following:

- U.S. Ambassador Fritts may provide support to a pilot program in hand-dug wells. In addition, the Catholic Relief Service of Ghana is currently developing a program in hand-dug wells.
- The Catholic Diocese in Sunyani is interested in rain-water harvesting systems. UNICEF has rehabilitated a number of such systems at certain rural health centers. However, UNICEF has no program to provide systems for health centers that do not have them. These are the centers which are of interest to the Diocese.
- Gravity spring-fed water supplies have been constructed for fish-pond farms in the Ashanti Region. Peace Corps volunteers working with the fish-farming project report local interest in the development of these spring-fed supplies for local villages.
- It was originally anticipated that the WASH consultant be accompanied by a handpump expert. Therefore, the WASH consultant was not directly charged with investigating the viability of an AID handpump program. The workshop manager of the CIDA-backed technology transfer effort in Kumasi, however, expects to stop in Atlanta in mid-September while he is on home leave. He will discuss the potential for an AID handpump program with a person from the Georgia Institute of Technology originally designated as the handpump expert for the Ghana investigation.

APPENDIX A

Order of Technical Direction No. 189

WATER AND SANITATION FOR HEALTH (WASH) PROJECT
ORDER OF TECHNICAL DIRECTION (OTD) NUMBER 189 . . . 11 1984
10 July 1984

TO: Dennis Warner, Ph.D., P.E.
WASH Contract Project Director

FROM: Victor W.R. Wehman Jr., P.E., R.S. *VWW*
AID WASH Project Manager
AID/S&T/H/WS

SUBJECT: Provision of Technical Assistance Under WASH Project
Scope of Work for OFDA and USAID/Ghana

- REFERENCES:
- A) State 182003, dated 21 June 1984
 - B) Accra 04592, dated 25 June 1984
 - C) Accra 02130
 - D) State 097604
 - E) Accra 02661
 - F) State 114183
 - G) Accra 02999
 - H) Accra 03159
 - I) State 154225
 - J) Memo OFDA to Wehman, TA request, dated 10 July 1984
 - K) Accra 04024
 - L) Accra 04922, dated 9 July 1984 (obtain from OFDA)

1. WASH contractor requested to provide technical assistance to OFDA and USAID/Ghana as per Ref A. para 2. Previous extensive USAID/Ghana and AID/W/OFDA cable traffic describes the general situation and positions of the parties involved. The contractor is to send a mature, experienced rural and urban, water supply expert to identify for the mission both emergency short term actions/programs and longer term development actions/options/programs that could be taken to assist Ghana in its drinking water problems related to the drought. Contractors consultant is anticipated to need to travel extensively in Ghana to acquire the insites necessary. Travel is very difficult, sometimes dangerous (obtain breifing from Ghana Desk Officer). Ghana is experienci considerable contagious disease problems at this time. Consultant should be prepared to go to considerable lengths to anticipate and prepare for a difficult and arduous trip.

2. WASH contractor/subcontractor/consultants authorized to expend up to 39 person days of effort over a 4 month period to accomplish this effort.

3. Contractor authorized to expend up to 25 person days of inter-national/domestic per diem to accomplish this effort.

4. Contractor to coordinate with USAID/Ghana, OFDA (Tim Knight), AFR/TR/HN (C. Gurney), AFR/TR/ENGR (J.Snead), Ghana Desk Officer and should provide copies of this OTD along with periodic progress reports as requested by USAID/Ghana, AFR Bureau, OFDA and S&T/H/WS staff.

5. Contractor authorized to provide up to one (1) international round trip from consultants home base through Washington D.C. to Accra, Ghana and return to consultants home base through Washington D.C. during life of the OTD.
6. Contractor authorized to provide up to (2) domestic round trips from consultants home base to Washington D.C. and return to consultants home base during life of the OTD.
7. Contractor authorized local travel within Ghana as necessary and appropriate to accomplish tasks NTE \$1700 without the written approval of the AID WASH Project Manager.
8. Contractor authorized to obtain secretarial, graphics, reproduction or interpreter services in Ghana as necessary and appropriate to accomplish tasks. These services are in addition to the level of effort specified in para 2 and 3 above. Costs of these services NTE \$2100 without the written approval of the AID WASH Project Manager.
9. Contractor authorized to provide for car/vehicle rental with drivers if appropriate and necessary to facilitate effort. Mission is encouraged to provide Mission vehicles if available and appropriate.
10. WASH contractor will adhere to normal established administrative and financial controls as established for WASH mechanism in the WASH contract.
11. WASH contractor should definitely be prepared to administratively or technically backstop field consultants and subcontractors.
12. New procedures regarding cost estimates for subcontractors and approval of selection/justification of consultants/subcontractors remains in effect.
13. Contractor to prepare coordinated field report in English and discuss with USAID/Ghana before the consultant leaves the country. Upon arrival in the U.S., consultants coordinated field report should be immediately provided to OFDA (Tim Knight)--4 copies and to the Ghana Desk Officer (3 copies). No final report is to be prepared until direction is obtained from OFDA through the AID WASH Project Manager in S&T/H/WS.
14. Mission and individuals identified in para 4 should be contacted immediately and technical assistance initiated as soon as convenient to the Mission.
15. Appreciate your prompt attention to this matter. Good luck.

APPENDIX B

WASH Consultant's Radio Recommendations
on WENCH Project as Cabled to
Washington USAID/W/OFDA

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ADM AID

OFDA FOR THE WENCHI WELLS PROJECT

L.O. 12355: 1/2

SUBJECT: WENCHI WATER PROJECT.

1. WASH CONSULTANT PREBLE SENT A LONG BY RADIO REPORT 3 AUGUST AFTER DISCUSSIONS WITH APCC, PCVS, AND TRUSTEES AT WENCHI MISSION. SUMMARY BELOW:

-- A. THIS PROJECT HAS ASSURED POTENTIAL OF MEETING ITS OBJECTIVES AND ONLY THE DEGREE OF SUCCESS IS VARIABLE. A SUCCESSFUL WELL FOR ALL 71 VILLAGES INITIALLY SCHEDULED CANNOT BE GUARANTEED DUE TO VARIANCES IN SUB-SURFACE CONDITIONS. THE NEED FAR EXCEEDS THE 71 WELLS INITIALLY IDENTIFIED AND IT IS PLANNED TO EXPAND THE PROGRAM IN ACCORDANCE WITH THE MAXIMUM CAPABILITY OF MEN, MACHINES AND MATERIALS AS AVAILABLE.

-- B. PCVS ARE AN UNUSUAL COUPLE NAMED PECK, DEDICATED TO WHATEVER WILL BE REQUIRED FOR PROJECT SUCCESS. THEY HAVE SOME 40 YEARS EXPERIENCE WITH WELL CONSTRUCTION AS WELL AS EXTENSIVE EXPERIENCE WITH WINDMILL PUMPS COMPARABLE TO HANDPUMPS. MRS. SCHELTZ HAS LONG EXPERIENCE WITH THE EQUIPMENT ACQUIRED FOR THIS PROJECT AND IS CONTINUING FOR 2 YEARS. COMPETENT PERSONNEL AND MANAGEMENT ARE THUS ASSURED.

-- C. RAINS THIS YEAR HAVE BEEN UNUSUAL. I CANNOT WRITE A DROUGHT/DISASTER CASE FOR ALL OF THE WELLS SCHEDULED. SOME AREAS ENCOMPASSED BY THE WENCHI PROJECT HAVE HAD ABOVE NORMAL RAINS. BUT OTHER AREAS OF BRONG-AHAFO REGION ARE STILL SUFFERING PROBLEMS RESULTING FROM LAST YEAR'S DROUGHT AND CONTINUED DROUGHT CONDITIONS THIS SEASON.

VILLAGE OF KWAME-DANSO, FOR EXAMPLE (POPULATION 4,000) FORMERLY USED LAKE SURFACE WATER, BUT THE SHORELINE HAS RETREATED TWO AND A HALF MILES FROM THE OLD WATER SYSTEM INTAKE. THE NEED HERE IS SO URGENT THAT IT COULD NOT WAIT FOR THE WENCHI PROGRAM. THE NATIONAL CATHOLIC SECRETARIAT IN ACCRA CONTRACTED THE ONLY PRIVATE WELL CONTRACTOR HERE FOR TWO WELLS AT THIS PLACE.

-- D. A QUOTE TYPICAL UNQUOTE VILLAGE IS DIFFICULT TO DESCRIBE, AS THE POPULATION VARIES FROM UNDER 100

31

TO OTHER VILLAGES THERE ARE BOTH WELL-OFF VILLAGES AND POOR VILLAGES. WHAT IS SURE IS THAT A WATER SHORTAGE DOES EXIST. THE DRY SEASON DRIES UP MOST OR ALL OF THE SURFACE WELLS--DROUGHT OR NO DROUGHT-- ON WHICH THE VILLAGES ARE DEPENDENT FOR WATER SUPPLY. WOMEN TRAVEL TRADITIONALLY SPEND THREE TO SIX HOURS OF THEIR DAY GOING FOR WATER RATHER THAN WORKING THE MEN'S FIELDS. THE POINT IS THAT THE AREA IS ONE OF THE POORER PARTS OF THE COUNTRY AND THAT THE TIME TAKEN IN GETTING WATER CAN SERIOUSLY IMPACT THE AMOUNT OF FOOD REACHING THE MARKETS, BECAUSE OF THE LABOR INVOLVED IN LABOR.

2. ALL DISCUSSIONS AND VISITS IN THE PROJECT AREA. I STRONGLY ENDORSE ANY ASSISTANCE TO THIS PROJECT BY AID/W. ALSO UPON RETURN, I WILL PERSONALLY REQUEST ADDITIONAL HELP THROUGH WELL DRILLING ASSOCIATIONS FOR THIS PROJECT.

3. MISSION CONCURS IN ABOVE RECOMMENDATION AND URGES PROMPT ACTION RE SHIPPING ON THE M/V TAMA. PREBLE'S REPORT ABOVE UNDERSCORES ON A LOCAL LEVEL OUR IMPRESSIONS REPORTED IN THE PAST SEVERAL MONTHS.

4. FOR WASHINGTON: YOUR CABLE RECEIVED. MR. PREBLE IS DOING FINE AND HAS COMPLETED THE FIRST LEG OF HIS FIELD TRIP AFTER SEVERAL DAYS' ORIENTATION IN ACCRA WHICH WAS REPORTED IN ACCRA 05614. HE WILL KEEP YOU ADVISED. D. BRIMS

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APPENDIX C

Itinerary and List of Persons Contacted

OVERVIEW OF MEETINGS

Following the initial day of briefings at USAID Ghana and the U.S. Embassy on Wednesday, 25 July 1984, a series of meetings was attended that had been previously scheduled. These meetings were with GOG agencies, PVOs, and others with knowledge of or activities relating to drinking water. This series of meetings took place on Thursday, Friday, Saturday and the following Monday, 30 July 1984, in Accra.

Persons with whom meetings were held, on the four days noted above, included:

Mr. Archie Book - Canadian High Commission, re: Canadian International Development Agency (CIDA) programs and listing of individuals involved with these programs resident in country who might be available to interview.

Mr. Acquah - Chief of Planning for Ghana Water and Sewerage Corporation (GWSC).

Dipl.-Ing. W.R. Schottler - Project Manager for International Drilling Consultants (IDC) a consortium of IGIA - Darmstadt, Electro-Watt-Zurich and AESC - Accra generally charged with: Management of GWSC 3000 Well Program (German funded).

Ama Dapah - Financial Planner for GWSC.

Mr. Shan - CIDA consultant assigned to work with GWSC.

Mr. Eric Amoo - engineer (water division) with Agricultural Engineering and Structural Consultants (AESC) a GOG consulting group; noted, that while they were originally and still a part of the consortium of IDC they really had not participated because they had no one on the staff trained in groundwater development.

Mr. Dapaah - engineer with the Water Resources Research Institute; noted, that they did not have anyone on their staff trained in groundwater studies.

Michelle Fruge - Deputy Director Peace Corps

Prof. R.F. Amonoo - Acting Vice Chancellor for the University of Ghana at Legon and:

Asst. Registrar (Estates) - Mr. V.O. Korda
Works Superintendent - Mr. E.A. Asagaba

Mr. George Tomsho - Senior Consultant for Public Administration Service (PAS) McLean, Virginia, who with 2 other PAS employees are preparing a management report on GWSC operations in joint venture with TAHA Consulting Engineers Ltd. (Tahal) for GWSC.

Mr. Glen Ehrich - World Bank direct hire who is functioning in the role of GWSC General Manager as GOG has left the post vacant since resignation of former GOG manager and:
World Bank direct hire - William Bailey, whose original assignment was to assist in planning but is filling the vacant post of Personnel Director

Later meetings with World Bank direct hire personnel referred to as a Technical Management Team, were held with:

Helmut Kock - filling the vacant post of Commercial Manager
Peter Howth - filling the vacant post of Financial Controller
Ian Anderson - filling the vacant post of Workshop Manager.

Mr. Paul Cunningham - Catholic Relief Service (CRS) Director and:
Joan Mitchell - Asst. to Mr. Cunningham

Later meeting with:
Nancy Keteku - CRS Program Director

Mr. Emauel Eliaz - Senior Project Manager for Tahal consultants who are in joint venture with PAS on GWSC Management report and ongoing major transmission (Accra) work.

Mr. J.W. Quarm - UNICEF water supply engineer.

Field Trip

An initial itinerary was drawn up whereby meetings in Kumasi, Sunyani, and Wenchi were left to the end of the field trip. Special requests from Washington prompted a reversal of the direction of travel, with stops in Kumasi and Wenchi rescheduled to the early part of the trip.

Revised Field Trip Itinerary

The trip started on Tuesday, 3 July 1984, with the first night spent at the Peace Corps training camp at Akrofufu and ended on the evening of Friday, 10 August upon return to Accra. The total distance covered amounted to 2,595 kilometers. The final itinerary and distances between overnight stops was as follows:

31 July	ACCRA - AKROFUFU	141 km
1 Aug	AKROFUFU - KUMASI - SUNYANI	311 km
2 Aug	SUNYANI - WENCHI	141 km
3 Aug	WENCHI - WA	305 km
4 Aug	WA - KALEO - BOLGATANGUS	321 km
5 Aug	BOLGATANGUS	-
6 Aug	BOLGATANGUS - NALERIGU	257 kkm
7 Aug	NALERIGU - TAMALE	202 km
8 Aug	TAMALE - ATEBUBU	387 km
9 Aug	ATEBUBU - KUMASI	186 km
10 Aug	KUMASI - ACCRA	344 km

Special Washington Requests

Just prior to the start of the field trip, a message was received from Washington for as early a reply as possible, from the WASH consultant, regarding the potential success of the Wenchi Water Project in view of possible OFDA assistance under consideration. The cabled response of the U.S. Mission/Ghana to this request is attached as Appendix B.

A second Washington message concerned a Congressman's concern about a U.S. citizen's health and possible hospitalization in Kumasi. While it would have been impossible to check private clinics, a search of the records of the two major hospitals in Kumasi for the prior three months failed to uncover any information on the individual in question.

APPENDIX D

Rainfall Data

Table of Monthly and Annual Rainfall
from Volume 3 Development Programmes and Projects
by the NORRIP Technical Unit, December 1982

1983-84 Rainfall at Tamale

TABLE 2.4.2

MONTHLY AND ANNUAL RAINFALL, UPPER AND NORTHERN REGIONS OF GHANA

North Central		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Bolgatanga (Tono)	highest (1)	12	79	64	137	210	247	329	460	416	154	44	20	1,400
	average	1	6	15	49	112	144	201	263	229	68	6	1	1,095
	lowest	0	0	0	2	37	60	49	56	124	?	0	0	647
Central														
Tamale	highest (2)	25	50	200	200	225	250	325	450	425	200	100	50	1,542
	average	0	0	50	75	125	150	150	200	225	100	25	0	1,065
	lowest	0	0	0	0	25	25	50	50	50	50	0	0	670 (1)
South														
	highest (1)						N/A							
	average	10	22	64	102	147	175	142	198	260	152	30	15	1,317
	lowest						N/A							
Tamale - Estimated (1) (Botanga) Consumptive Use (Blaney-Criddle)		170	163	188	183	185	175	170	173	155	170	165	168	2,083
Tamale - Estimated (1) Evaporation from an open water surface (Penman)		150	155	185	165	163	132	127	124	117	155	152	147	1,768

Sources: (1) FAO, op cit. Last 15 years excluded from these averages.

(2) NORRIP: Phase II Final Report, Vol I, op cit.

Note: The highest and lowest monthly figures do not add to the annual total because they did not all occur during the same year.

RAINFALL RECORDS FOR TAMALE, NORTHERN REGION 1983-84

	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG</u>	<u>SEPT</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>
1983	0.0 ⁽¹⁾	0.0	20.9	47.8	N/A	N/A	129.9	81.3	234.6 ⁽²⁾	4.6	0.0	0.0
1984	0.0	0.0	27.4	66.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes: (1) Figures in mm.

(2) While figures are not available local people and missionaries, in eastern part of the Northern Region, indicate a report of 1983-84 problems - which occurred last season, in spite of September rains.

(3) See averages on previous table.

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APPENDIX E

Ghana Water and Sewerage Corporation
Brong-Ahafo Region
Quarterly Report

GHANA WATER AND SEWERAGE CORPORATION - BRONG AKAPO REGION

WATER PRODUCTION - APRIL, 1984 - JUNE, 1984

SYSTEM	WATER PRODUCED (M.G.)	CHEMICALS £	FUEL £	ELECTRICITY £	LABOUR £	REPAIR PARTS AND REPLACEMENT £	REMARKS
1. Abesim	23.619	100,661.45	103,035.00	245,305.95	209,382.16	65,837.00	
2. Bereku	2.804	2,554.30	-	526.16	38,519.97	4,158.00	
3. Wanchi	4.660	-	1,260.00	-	27,057.84	1,992.00	
4. Adamu	0.709	-	4,578.00	-	10,274.90	741.00	
5. Techiman	1.179	-	14,060.00	-	17,617.23	1,357.00	
6. Seikwa	0.438	-	4,474.00	-	7,736.78	609.00	
7. Japokrom	0.678	-	12,334.00	-	16,037.64	1,416.00	No fuel, no production in April
8. Biso	0.972	10,865.12	20,524.00	-	55,089.00	7,560.00	No fuel
9. Dwomo		NO PRODUCTION	-	-	37,517.10	1,875.00	Defective Generating Set
10. Acherensua		NO PRODUCTION	-	-	46,996.17	4,698.00	No fuel
11. Nsawkav		NO PRODUCTION	-	-	7,779.95	388.00	No fuel
12. Atabubu		NO PRODUCTION	-	-	57,361.14	2,868.00	Intake dried up
13. Kajaji		NO PRODUCTION	-	-	10,044.33	502.00	Needs overhauling
14. Kintampo		BREAKDOWN	-	-	-	-	Intake choked
15. Yeji		NO PRODUCTION	-	-	24,639.54	1,230.00	No fuel
16. Prang		NO PRODUCTION	-	-	7,001.81	348.00	No fuel
17. Nohiraa		BREAKDOWN	-	-	7,967.39	230.00	Defective Pump
18. Badu		BREAKDOWN	-	-	11,733.37	585.00	Defective Pump
19. Nkoranza		NO PRODUCTION	-	-	4,483.06	748.00	Defective Pump
20. Jinijini		NO PRODUCTION	-	-	8,348.52	416.00	No fuel
21. Offuman		BREAKDOWN	-	-	11,476.73	573.00	Intake dried up
22. Kwame Danso		NO PRODUCTION	-	-	6,541.00	325.00	Intake dried up
23. Wamahinso		NO PRODUCTION	-	-	11,791.94	589.00	No fuel
24. Bowa		NO PRODUCTION	-	-	11,100.69	553.00	P. O. I. fault
25. Sampa		NO PRODUCTION	-	-	14,970.39	746.00	No fuel
26. Abense		NO PRODUCTION	-	-	10,182.64	508.00	No fuel
27. Akrodie	0.086	298.00	1,325.00	-	15,137.56	836.00	No fuel
28. Ooaso	0.074	511.12	695.00	-	45,644.36	2,366.00	No fuel, no prod. in May/June
TOTAL	35.219	11,890.00	163,023.00	245,832.11	732,432.61	104,054.00	- do -

E-1

4/1

APPENDIX F

Memorandum on Status of GWSC
Water Tanker Fleet

GHANA WATER AND SEWERAGE CORPORATION
INCORPORATED UNDER ACT 379 OF 1965

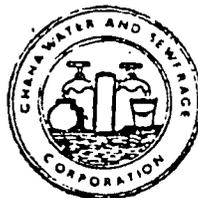
Telegram: EN 31040, ACCRA

Telephone: 77383, 74011, 74012, 74013

Please Quote:

Your Ref: Verbal Request.

My Ref:



Area Manager's Office

P. O. Box 1840

Accra, Ghana

ACCRA/TEMA WATER & SEWERAGE
AREA MANAGEMENT

..... August 18, 1984

Water and Sanitation
for Health Project,
ACCRA, Ghana.

Attention : Mr. Ralph Preble
Senior Consultant.

Dear Ralph:

Following is a brief summary covering the past and present
tanker fleet operating from the Accra Tema Metropolitan
Area garage:-

(1) Fleet in 1978

Twenty three new 2000 gallon
Seddon tankers with the capacity
to pump water 50ft.

(2) Fleet Status in 1984

Daily 6 tankers will be operat-
ional, but on average only 4 are
in service as minor repairs are
frequent.

(3) Four deadlined tankers are
scheduled for repair in the next
6 months, depending on the avail-
ability of spare parts.

(4) Attached is a route map for water
distribution in Accra only.
However; water is distributed to
the following towns and villages:-

cont'd....

Tem, Dodowa, Pram Pram, Botianor,
Peduase and other locations in-
cluding hospitals.

Due to the shortage of tankers many locations are without water for weeks, and the situation for delivery of water will become more critical when the repairs to the Kpong pipe line commence in the near future.

Hope this information will be of assistance to you.

Regards,

GHANA WATER AND SEWERAGE CORPORATION,



Ian Anderson
Workshop Manager.

c.c. Mr. G. Ehrich, General Manager.
Mr. D. T. Addy, Area Manager.
Mr. C. B. Burgesson, Area Engineer.

APPENDIX G

United Nations Report - Section X - Water
and Sanitation in Ghana

WATER AND SANITATION

The importance of good drinking water as a basic human need not only for personal use but also for health reasons and for economic development cannot be overemphasised. Over the years therefore, successive Governments have given priority to water development. In order to facilitate the expansion in water supply and sewerage disposal envisaged in the 1960's the Ghana Water and Sewerage Corporation (GWSC) was inaugurated in 1966. Today, GWSC, the District Councils and other agencies of Government are responsible for various aspects of water and sanitation development in the country.

GWSC (under the Ministry of Works and Housing) is however, the main agency responsible for the provision, distribution and conservation of the supply of water for public, domestic and industrial use.

The Corporation is also responsible for water-borne sewerage in some large urban areas. The provision of sanitation facilities in other urban as well as in rural communities is the responsibility of District Councils under the Ministry of Local Government. Specifically, the functions of the District Councils are to

- 1) establish, install, build, maintain and construct public latrines, lavatories, urinals and wash houses.
- 2) establish, maintain and carry out services for the removal of night - soil from any building and for the destruction and disposal of such night soil.
- 3) prevent the pollution of water in any river, stream water course etc. to prevent the obstruction of any river, stream or water course.

The Ministry of Health is responsible for

- a) designing and developing systems for waste and excreta disposal
- b) development of sector control programmes
- c) training of staff to assist District Councils in the discharge of their duties.
- d) surveillance over drinking water distributed to consumers by various agencies.

There is also the Department of Community Development under the Ministry of Rural Development and Co-operatives which has responsibility for the provision of rural water supply and sanitation facilities particularly the construction of pit latrines in the villages through self-help programmes.

Research into problems facing the water and sanitation sector is undertaken by the Water Resources Research Institute of the Council for Scientific and Industrial Research (CSIR) and the Environment Engineering Department of the University of Science

and Technology.

The above set-up coupled with other problems which will be discussed later has made the co-ordination planning and implementation of water and sanitation programmes (but especially the latter) very difficult.

Water Supply

A sector study(8) which was conducted on water resources development in Ghana in 1974 indicated that Ghana is endowed with sufficient water resources to serve identified needs for the foreseeable future. However, it is important that a gradual process of development and conservation should be undertaken to make water available in adequate quantity and quality at the proper time and location. The study also indicated that the country's ground water resources are limited but represent the most economic source for domestic and municipal water for most rural and many urban communities. The ground water resources are inadequate for large-scale industrial and irrigation use.

Sources of Water Supply to Urban and Rural Communities

As has been stated in section X, the 1970 census classifies all communities with populations above 5,000 as urban. All communities with populations below 5,000 are therefore classified as rural.

Most urban communities have pipe-borne water supply either through house to - house connections or through public stand

pipes. Some urban communities depend on ground water resources for their water supply. It is estimated that of the 135 urban towns in the country (according to the 1970 census), 117 towns have water systems(1). These are either conventional treatment plants or package treatment plants, utilising surface water resources. About 27 systems are based on ground water resources. There is generally no treatment for such supplies.

Provision of water to rural communities fall under the following categories: -

1. Pipe - borne water supply from extensions from urban systems and from separate treatment plants treating surface water.
2. Untreated pipe - borne water supply based on ground water from drilled wells mechanised with submersible pumps.
3. Non- pipe borne water supply from shallow boreholes fitted with hand pumps.
4. Supply from dug - wells.
5. Supply from ponds, springs, lakes, rivers and streams.

Coverage

Various estimates have been made on the percentage of the population with access to good drinking water. These estimates all point to the fact that over the years, there has been a progressive improvement in the percentage of population served

with potable water. In 1960 about 27.0% of the total population of Ghana had access to potable water. By 1980, this has increased to 52.3% as indicated in Table XI.7.1

Table XI.7.1 Population served with water (in 000's)

Year	Pop	Urban			Rural			National %served
		pop	pop served	% pop served	pop	pop served	% pop served	
1960	6727	1556	1302	83.7	5171	560	10.8	27.0(1)
1970	8559	2472	2017	81.6	6087	773	12.7	32.6(2)
1975	9680	2756	2547	92.4	6924	1148	16.6	38.2(2)
1977	10331	3099	2915	94.1	7232	1424	19.7	42.0(2)
1980	10956	-	-	93.8	-	-	37.0	52.2(3)
1983	12700	-	-	94.0	-	-	46.0(4)	

Sources

1. Proceedings on the conference on water for social and economic progress, sponsored by GWSC.
2. WHO, Report by the Govt. of Ghana, Community water supply and sanitation, Rapid Assessment of current and projected sector development.
3. first Draft Report on the International Drinking Water and Sanitation Decade, Vol I, GWSC, Planning and Research Dept Accra Feb 1980(unpublished).
4. Decade Review unpublished.

It is obvious from this table that a large proportion of resources to the water sector has been expended on the provision of pipe - borne water to urban communities. Whilst in 1960, only 10.8% of the rural population has access to water supply, 83.7% of urban dwellers were already served by pipe -borne water supply. Between 1960 and 1983, the urban situation improved further with coverage being estimated at 94%. It is however estimated that with the present poor condition of the urban systems, effective coverage may be about 72% (4)

The improvement in the water situation over the decade has been significant in the rural sector where the percentage of population served has increased from 10.8% in 1960 to about 46% in 1983(4). It is important to note that until recently about 63% of rural dwellers particularly in communities of 2,000 people or below draw their water from dug wells, ponds, streams and lakes. The situation has generally improved for communities with populations above 500. The communities which have so far not been given much attention are those communities with populations below 500. Table XI.7.2 clearly shows that by 1983 only 27.0% of such communities was estimated to have access to good drinking water. The situation was even worse for communities with populations below 200, where the coverage was estimated at only 2.4%. The low coverage may be due to the small size of these communities their scattered distribution and the cost involved in providing each of these with a well or bore-hole.

Table XI.7.2. Water Coverage by Reg. & Com. size, 1980 & 1983

	Total	Below	200-	500-	2,000-	5,000-	10,000	50,000+
	-----	-----	-----	-----	-----	-----	-----	-----
	199	499	1,999	4,999	9,999	49,999		
	-----	-----	-----	-----	-----	-----	-----	-----
National								
1980	52.3	2.25	24.29	34.00	69.41	81.38	94.19	100
1983	59.3	2.4	27.3	61.9	80.6	97.5	97.2	100
Gt. Accra								
1980	92.99	10.22	31.07	58.18	10.0	100	100	100
1983	94.64	10.81	40.91	88.27	100	100	100	100
Eastern								
1980	34.42	2.13	2.53	13.10	68.85	67.03	100	-
1983	48.55	2.13	2.53	45.22	83.88	94.83	100	-
Volta								
1980	31.14	0.48	6.43	28.46	61.49	89.67	76.08	-
1983	39.14	0.50	7.58	53.79	64.33	89.67	76.08	-
Central								
1980	57.9	5.54	20.58	57.20	75.16	81.86	100	100
1983	68.66	6.04	22.44	80.25	84.75	100	100	100
Western								
1980	43.53	1.51	3.68	21.13	93.90	85.18	82.44	100
1983	54.88	1.79	8.85	45.06	98.06	100	100	100
Ashanti								
1980	40.05	0.66	5.58	13.76	53.94	76.86	91.32	100
1983		0.96	8.06	80.20	80.34	100	100	100
B. Ahafo								

1980	34.79	0.40	2.76	9.73	76.05	84.94	100	-
1983	42.01	0.57	4.72	22.63	85.02	100	100	-

Northern

1980	30.03	1.48	6.67	10.84	63.12	100	100	100
1983	30.8	1.48	6.67	12.96	66.63	100	100	100

Upper

1980	80.16	9.32	89.64	91.87	58.33	-	100	-
1983	82.12	9.32	100	100	-	-	100	-

Source: first Draft Report on the International Drinking Water and Sanitation Decade, Vol. II G.W.S.C. February 1980. Unpublished.

(The 1983 figures show projected % of pop. with Drinking water at end of on-going programme if all on going schemes started earlier were completed).

The major thrust for rural water development came about in the mid-seventies, when the country embarked on an accelerated rural development programme. During this period specific rural programmes were initiated in specific regions of the country and were aimed at communities with populations above 500 as indicated in Table XI. 7.2

Bilateral arrangements were made with the Governments of Canada and the Federal Republic of Germany for the implementation of two major well drilling programmes. Under the Canadian Project, 2,500 wells were drilled and fitted with hand pumps, in the Upper West and Upper East Regions (formerly Upper Region) of the country. With the completion of this programme, over 80% of the populations of these Regions now have access to potable water. The second phase of the project deals with the

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problem of water utilisation and community participation in pump maintenance. Under the West German bilateral assistance, 3,000 wells fitted with hand pumps have been drilled in six regions of the country, namely the Eastern, Volta, Western Ashanti, Brong-Ahafo and Central Regions. This programme has brought water to more than 1.0 million rural dwellers in these regions. This accounts for the increase in coverage of the rural population from 37% in 1980 to 46% in 1983. Here also pump maintenance is emphasised. Under a more recent bilateral agreement with the Government of Canada for the implementation of the Northern Region Rural Integrated programme (NORRIP), about 1,000 test boreholes have been drilled in the Northern Region of Ghana.

The health consequences for villages with inadequate water supply can be serious as can be seen from the section dealing with diarrhoeal diseases. Also in 1980/81 Abraham et al from the Noguchi Memorial Institute for Medical Research in Accra, studied 38 samples of water drawn from sites on the banks of the Densu River in the Eastern Region where 19 villages obtain their water supply. (8)30 samples of water from 15 wells used in villages located away from the Densu River were also studied.

It was found that all the samples from the Densu River were heavily polluted with E. Coli indicating faecal contamination. It was observed that the pollution may be due to the following factors: -

- a) the littering of the banks of the river by human and livestock excrement.
- b) the discharge into the Densu River at Aikaidobro of the

partially treated sewage effluent from the Nsawam medium security Prison.

- c) the washing of garments by villages along the banks of the river
- d) the absence of bridges causing villages to wade through the river when crossing.
- e) children bathing or urinating into the river.

Similarly water samples from 14 out of the 15 wells were found to be polluted also with E. Coli. Samples from the well at Omenako were however, found to be safe for drinking because the facility at Omenako was a deep well, well protected, fitted with a hand pump and well maintained. Indeed the pollution of the 14 wells in the other villages studied was attributed to

- a) the shallowness of the wells
- b) Surface water which was already polluted with human and animal excreta gaining access to the wells.
- c) Lack of any cover on the wells
- d) the mode of fetching water from the wells - buckets used for fetching, water may be contaminated by human or animal faecal matter.
- e) Lack of care and maintenance of the wells.

Another study done by the same workers at Gomoa Fetteh, a coastal village in the Central Region, which depended on wells a pond and a reservoir as their sources of water supply, also found all these sources to be contaminated by faecal matter

From either human, animal or birds. Here also the reasons given for the pollution of the sources of water, supply are very similar to those already mentioned above. Typhoid, dysentery and cholera are therefore prevalent in this village. An intensive health education programme is needed in many communities, both rural and urban in this country, if wells and other sources of good drinking water should be free of pollution.

Consumption

The average per capita consumption of water varies from area to area. The highest consumption figures have been recorded in the large urban towns of Accra, Kumasi, Sekondi-Takoradi, where the average per capita consumption per day is estimated at 181.8 liters (40 imperial gallons) The consumption in other urban centres is 45.5 litres per capita/day. (10 imperial gallons per capita / day): Whilst consumption in the rural areas is 31.8 litres per capita / day(2). (7 imperial gallons /capita/ day).

In some urban areas, the age of the installed equipment and their poor working state have affected the daily production of water which is estimated to be as low as 22.7 litres per capita/day (5 gallons/capita/day) During times of water shortages, water purchase becomes a common feature. In the rural areas, many of the mechanised systems are operated for 8 hours per day and this is sufficient to provide 18 - 22 litres per person /day. This consumption pattern might not be applicable to all rural communities which have been provided

with boreholes or wells since most of the wells have fallen out of use as a result of inadequate maintenance of pumps, deterioration of water quality or depletion of ground water resources. A survey conducted in 1977 in six Regions, for instance, showed that out of 411 shallow boreholes fitted with pumps, only 42 were in use.

The need to rehabilitate water systems in both the urban and rural areas is urgent to ensure continuous supply, since people tend to look for other sources of supply which may be polluted to satisfy their water requirements.

Decade Programme

The United Nations have declared 1980- 1990 as the International Drinking water and sanitation Decade. Countries are therefore required to prepare Action Programmes which would result in the total coverage of their populations with adequate water supply and basic sanitation facilities. A draft Action Plan(1) was prepared for Ghana in 1982. The Plan aims at correcting the imbalances in the provision of water supply in the country by giving priority attention to communities with less than 2,000 people and extending supply to populations living in urban fringes where the supply is inadequate. It is expected that with the implementation of the Decade Programme, 80% of the rural population and the entire urban population will be provided with drinking water.

The strategy that has been proposed for the Decade are as follows: -

1. existing water systems in large and small urban towns are to be rehabilitated and stabilised to restore these to their original capacities. Already systems in all District capitals in the Northern Region are being stabilised with assistance from the Canadian Government.

2. All hand - dug wells and shallow boreholes with unserviceable hand pumps are to be rehabilitated. The dug wells will also be deepened.

3. hand pumps are to be installed on boreholes which have been capped. UNICEF has already provided 108 hand pumps to be installed on existing boreholes.

4. Communities with over 2,000 people utilising ground water resources will be provided with boreholes mechanised with submersible pumps. The ultimate goal here is to provide these communities with pipe - borne water.

5. Communities with over 2,000 people utilising surface water will be provided with treatment plants.

6. Communities with between 100 and 2,000 people will be provided with hand dug wells and shallow boreholes. The target here is to provide one shallow borehole or well for every 500 people. Where the community lies on or is close to a pipe line pipe borne water will be extended to that community.

7. For the 36,000 communities with populations below 100 efforts will be made to protect their sources of supply in view of the cost involved in providing each hamlet with a dug - out well or a borehole.

8. Support services such as workshops, equipment,

vehicles, stores training schools etc. will be provided to enable the decade programme to be implemented effectively.

The rural programme will call for the selection of the most appropriate type of hand pump which can easily be maintained, not necessarily by GWSC but by the rural communities. Luckily Ghana is one of the countries participating in the World Bank /UNDP "Global Hand Pump Testing programme" aimed at selecting a suitable hand pump for rural communities.

Constraints

The problems facing the implementation of water programmes in this country can be related to the present state of the economy. It has therefore been difficult to make adequate foreign exchange as well as cedi allocations for the importation of equipment (e.g. drilling equipment laboratory equipment, spares, chemicals, fuel, lubricants etc.) This has resulted in the frequent break downs of existing systems, (because of lack of maintenance) and has affected supplies, the purification of water since chemicals are not ordered on schedule, and the drilling programme of GWSC.

Secondly, GWSC lacks the full complement of staff required to handle the increased workload resulting from the addition of new systems or expansion of existing ones over the years. It is estimated that the number of engineers, for instance, in GWSC decreased from 77 in 1972 to 39 in 1980(1).

Thirdly there is a lack of maintenance workshops in the country although GWSC plans to establish District maintenance Workshops to cater for the maintenance requirements of both the urban and rural sectors. With the installation of many hand pumps in the rural areas, the stabilisation and expansion of water systems in the towns, the importance of these workshops cannot be over-emphasised. External assistance will however be required to equip these workshops and to train maintenance crews some of which can in turn train selected people from rural communities in pump maintenance. This is to ensure that effective coverage can be maintained.

Fourthly GWSC faces management problems which have adversely affected its functions and activities. Fortunately, under the World Bank Water supply Technical Assistance and Rehabilitation Project, the management capabilities of GWSC is to be strengthened to enable it play an effective role in planning and carrying out the rehabilitation of water systems and the further development of the water and sewerage sectors.

Impact of Improved Water Supply

In a study undertaken by the Institute for Social, Statistical and Economic Research in 1979 on "Water utilisation in the Weija Dam area(6)", it was observed that an understanding of a community's knowledge, behaviour and beliefs about water are important in the realisation of the full benefits of improved water supply systems. The mere provision of standpipes or boreholes is not enough. Communities may show preferences for certain water sources because of their belief that these

sources may have curative qualities.

Secondly, with the intermittent interruptions in water supply where communities depend on stand pipes and with the exposure of many rural communities to improved water supply, there is the tendency to store water in homes in containers which are contaminated. The water stored therefore becomes contaminated also. In the Upper Region for instance, where 80% of the population has access to good drinking water through the Canadian - assisted well drilling programme, it was observed, during the 1983 yellow fever epidemic, that the lava of the vector mosquito (*aedes aegypti*) was growing in the water pots of many compounds. This is a problem which has not been foreseen even under the water utilisation component of the Upper Region water programme.

It is clear from the Weija study that the provision of water per se will not bring the full benefits of improved water to the communities concerned unless this is accompanied by good utilisation behaviour. This can be achieved through health education on water usage and personal hygiene. There is thus a strong need for health education to form an integral part of any water development programme.

Another important finding of the study is the role played by women and children in fetching water for the household. This is considered a traditional role for women and children and is not usually assigned to adult men. There is no doubt that the extension of water supply to more rural communities will free women and children from this drudgery. Women, in particular could then have more time for home-making and could also take

advantage of economic opportunities available.

Another study 7 on the impact of the Upper Region Water Supply Project (URWSP) on village women in the Bolgatanga District has also confirmed that about 95.7% of women in that District fetch water each day of their lives. Assistance in water children also help at times. The provision of water by women for the household has been a task demanding a lot of time and energy especially during the dry season when other sources of supply dry up. It is reported that before the implementation of the well-drilling programme, women used to spend between 30 minutes to 6 hours, of their time on fetching water. Secondly, they have to walk on the average 3.78 miles to fetch water from the former source of supply. With URWSP, distances have shortened since one drilled well serves 300 villages and less time is spent on fetching water. It was also found that the time and energy released by the Upper Region Water Supply Project have been put mainly to Social benefit like home care, construction activities (e.g. plastering collection of sand etc.) rest and relaxation, food preparation rather than to economic benefit. For children, the time saved is spent on playing and bathing. The study points out that the economic impact of URWSP has been insignificant with respect to the income generating activities of women "although the increased activities of women resulting in social improvements could produce economic spin-offs"(7). Secondly, although the Water Utilisation Project (WUP) which covers areas like community development, health and sanitation education has dry season gardening as one of its objectives, this has not become a

widespread activity. Its potential in improving the dry season diet and in generating income for women has not been tapped.

Resource Dimensions

GWSC obtains its revenues from Government through budgetary allocations, collections of water rates levied on consumers in some urban areas and through external (bilateral or multi-lateral) loans or grants.

For the Accra-Tema Metropolitan area, funds for the financing of operation and development costs come from the Corporation's own resources and from long-term loans obtained to carry out major development projects like the Weija Water Project and the rehabilitation of the Kpong-Tema pipeline. The financing of operation and maintenance costs in Kumasi and Sekondi-Takoradi, two large urban centres in Ghana, is through revenues collected from consumers whereas development works are financed by government grants or external loans or grants.

In other urban areas and in rural areas, operations and maintenance costs are financed from government grants which are designed to subsidise the Corporation's activities in these areas and also from the corporation's revenue. All development projects are however financed through government grants and external loans or grants. GWSC is responsible for collecting all revenues from water sales directly from consumers. Since 1974, there have been two changes in water rates. A third proposal which will increase water rates seven fold has just been approved by Government. This has become necessary since income from water sales has never been

sufficient to cover operation and maintenance costs. In 1968/69, for instance, income from water sales amounted to about one point two million cedis as compared to operation and maintenance expenditures of three point eight million cedis. By 1978/79, although expenditures have increased to about twenty-nine point eight million cedis, collections from water rates were only six point zero million cedis. The proportion of the national budget that goes into water development increased from 1.3% in 1973/74 to 6.8%. There was a 6.8% significant increase between 1977/78 and 1978/79 when the proportion jumped from 2.13% to 6.83%. This may be a result of special allocations made in 1978/79 for the purchase of water tankers. There was, however, a significant drop between 1981/82 and 1983. (see Table X1.7.3.)

Budgetary allocations to the water sector and collections from consumers have not, over the years, been able to meet the operation maintenance and development expenditures of GWSC. The shortfalls in GWSC's financial requirements for many years have cumulatively been responsible for the poor condition of most water system in the country.

The involvement of multilateral and bi-lateral aid agencies in the Water Sector has been quite substantial. More assistance will however be required for the rehabilitation of existing systems.

Table X1-7.3.

Budgetary Allocations to the Water Sector

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Fiscal Year	Budgetary Allocation to Water Sector	Total National Budget	% of Water to Nat. Budget
1973/74	6,394,000		
1974/75	3,215,200	246,000,000	1.3
1975/76	4,532,700	322,000,000	1.4
1976/77	10,460,000	360,000,000	2.9
1977/78	10,204,000	480,000,000	2.13
1978/79	61,460,000	900,000,000	6.83
1979/80	52,080,000	900,000,000	5.79
1980/81	54,980,000	900,000,000	6.11
1981/82	80,245,000	1,170,000,000	6.86
1983 (Jan-Dec)	142,426,000	3,127,300,000	4.55

Source: Ministry of Finance and Economic Planning

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SANITATION

This section will deal with three main areas which have created serious health problems in this country and which have today deteriorated to such an extent as to call for a concerted and national effort in the solution of the problems. These are the disposal of human and solid wastes and drainage.

Sanitation, as a national programme, was introduced into Ghana with the establishment of the health services during the colonial era. The then Health Department of the Gold Coast was responsible for the development of sanitation services. The main Urban centres had their respective Public Health Boards to oversee the provision of good sanitation services in the country. The local authorities were responsible for the provision of such services in the towns and villages of the other districts. Although at this time, coverage was inadequate, the facilities provided were adequate and well maintained.

The post independence era saw the introduction of a three-tier local Government system which comprises Regional, District and local Councils. As has already been mentioned, by legislation, the district councils have the responsibility for the provision of good sanitation services in the country. Unfortunately, these Councils have not developed over the years the expertise and support services necessary for the development, implementation and efficient management of their respective sanitation programmes.

The result is that the provision of facilities for the

disposal of both human and solid wastes lags behind the provision of other services in spite of the growth in population which have occurred in both the urban and rural areas. Unlike water supply for instance, where there have been programmes/ projects aimed at extending coverage and improving accessibility to the rural poor, there has been no comparable programme in the area of sanitation. Yet good sanitation has been recognised as an important means of breaking the cycle of such communicable diseases as cholera, typhoid, schistosomiasis, hookworm infection etc. Unfortunately, it is difficult to put a price tag on the losses which the country suffers as a result of the poor state of sanitation in the country. The above situation has arisen because of :

- 1) the apparently low priority which has been accorded to sanitation in development programmes over the years.
- 2) the absence of a national policy on sanitation
- 3) the poor co-ordination between various Government Institutions responsible for the provision of such services.

There is also a dearth of comprehensive information on this sector. It has therefore been necessary to rely, for information on reports and surveys done by the University of Science and Technology in some Regions, project reports and annual reports of the Health Department of the Accra City Council.

Rural Sanitation

In the mid-seventies, the environmental Quality Division of the Civil Engineering Department of the University of Science and Technology with the support of IDRC (Canada) mounted a research programme(14) to assemble and evaluate technical information on existing technology for rural excreta disposal. This was to assist in the selection and development of appropriate systems to meet the need of the rural poor. As part of the programme a survey of rural latrines was conducted at the national level and in two regions (the Volta and Upper Regions)

The villages selected for the survey were mostly from settlements with populations below 2,000. 20 villages were selected at random from each of the Regions and for the regional surveys, a 10% random sample was adopted for large communities and 50% for small communities. At the national level, eight regions participated in the survey. It was found that four types of latrines are commonly used in the rural areas. These are the pit latrine, bucket latrine, (or removable pan latrine), aqua privy and the conventional water closet. It was also observed that the pit and bucket latrines are used as both private and public latrines although the pit latrine is more popular for communal use whereas the water closet is used only in private homes in the larger towns and the aqua privy in communal places of convenience.

The results of the survey also indicated that only a small proportion of rural dwellers have access to private house latrines. In the two regions surveyed (ie the Volta and Upper Regions), the percentages of the population with private house

latrines are 14.1% in the Upper Region and 10.8% in the Volta Region.

In the subsequent survey conducted by the same Department in 1982 in the Northern and Upper Regions(4), it was found that only 5% of the 66 households surveyed have private house latrines. These have been constructed by individuals for their exclusive use in spite of the absence of such facilities in their neighbourhoods.

A large percentage of the population in the rural areas therefore use communal facilities or the bush for defecation. It was found that in the Upper Region where communal facilities are located far from the compound houses, 68.8% have been using the bush all their lives. This is in contrast to the situation in Volta Region, for instance where about 1.2% of the population indulge in such practices possibly due to better coverage. In the subsequent survey in the Northern and Upper Regions, it was indicated that 33.3% use communal facilities, 22.7% use the facility in a nearby house, 34.8% use the bush and 9.1% did not respond. It was however, observed that households which did not disclose the facility used mainly resort to the use of the bush. This means that in the two regions about 44% of the households surveyed use the bush for defecation. An important observation made was that in the design of the traditional houses in these regions no place is provided for a toilet.

Although in the rural areas, most people use communal facilities, these are not readily accessible. Firstly, one has to walk over 50 metres to an available communal facility - this

was the general situation in the Upper Region, where only 1.2% of respondents indicated that the latrines were within less than 50 metres. In the Volta Region, about one-third of the respondents lived within 50 metres of their communal latrines. Secondly, the ratio of people to a communal latrine is very high. On the average, there are about 389 rural people to one communal latrine. This was exceeded in the Volta, Western, Central and Brong-Ahafo Regions where the ratio of people to communal latrine are 1,713, 1,195, 686 and 428 respectively.

Usage

There are many problems associated with the systems used in the rural areas. With respect to the pan or bucket latrines, there is rapid rusting or deterioration of the pan or bucket which shortens its life span. Secondly, it is difficult to recruit conservancy labourers who remove the buckets for emptying into sewage holding tanks. The aqua privies require water and a special vehicle (the cesspool emptier) for deslogging the system. Most districts, as reported from Ashanti Northern and Upper Regions do not either have any cesspool emptiers or those which have them cannot use them because they have broken down due to lack of spare parts. The septic tanks therefore overflow thus creating a nuisance and health hazards.

Although the water closet is the most hygienic, it is expensive to build and to maintain and requires pipe-borne water and appropriate cleansing material. It was reported (13) in Ashanti, Northern and Upper Regions(12) that there was irregular flow of water and the absence of appropriate

cleansing material leads to constant choking of the system. The pit latrine, on the other hand, creates obnoxious odours and fly nuisance.

The above problems associated with the various systems have made it necessary for most rural people to resort to the bush. Furthermore, these have created generally unacceptable habits in the use of these systems. There is the apprehension of children falling into the conventional pit latrines unless these are specially constructed for them. Children may also be afraid to walk the 50 metres distance or so to a communal latrine especially at night and may thus be encouraged to defecate in the compound of houses or in nearby bushes.

It was observed during the surveys that the premises of the latrine are fouled to such an extent that most of the respondents considered the latrine "unfriendly and unhygienic" as compared to the bush. This means that even where a public place of convenience has been provided, human waste is still not properly disposed of. The pollution of the sources of water supply that can result from poor sanitation and the health consequences have already been discussed in the section, on water.

The University of Science and Technology has developed the Kumasi Vented Improved Pit Latrine (K-VIP) to replace the traditional one. The K-VIP has major prospects for sanitation development in rural and Sub-urban communities in the country. Pilot projects which have been implemented in the rural areas, in mining communities, resettlement towns at the new dam site at Kpong and at Labadi, a Sub-urban settlement near Accra, have

proved that once the pit latrine is properly ventilated, safely built and maintained, it can be the ideal sanitation solution for many low-income communities.

It is important to note that in view of the critical sanitation situation in the country the K-VIP is not only being introduced in the rural areas, but it is also being introduced as an appropriate first level of service in Sub-urban areas. This has become necessary because of the very high installation and maintenance costs of conventional sewerage systems with their heavy demands for water. Secondly, the K-VIP lends itself to community involvement both in its construction and maintenance.

In the attempt to improve the rural sanitation situation and to achieve adequate coverage in fulfilment of the objectives of the "Water and Sanitation Decade", it is necessary to strengthen the waste management and disposal services of District Councils and to assist rural communities with the building materials that they so need for the construction of sanitation facilities. Of primary concern also is the urgent need for a national sanitation policy and the articulation of strategies and programmes for both rural and urban sanitation.

Urban Sanitation

There are three community water-borne sewerage systems in the country at Tema, Accra and Akosombo. In Accra, only a very limited part of the older section has been seweraged. It is estimated that only 30% of private houses in Accra use this

facility because of the high cost of connection. In addition to these systems, there are institutional water-borne sewerage systems operating in the Universities, large hospitals and some of the prisons and Secondary Schools. The 1977 house to house survey in some cities and the 1982 consultant's Report (Tahal Report on the Accra - Tema Water Supply and Sewerage Project) (10) provide some information on eight major urban areas in the country. Table X1. 7.4 gives indication of the percentage of the population using a particular system in these towns.

It can be seen from the table that apart from Tema, which is fully seweraged, the percentage of population with private water closets range between 19% in Ho and 40% in Kumasi. There is therefore heavy dependence on the use of private pan latrines, public facilities, other means of defaecation. This ranges from 88% in Koforidua to 66% in Accra.

Table XI. 7.4.

Percentage of population and type of facility

Town	1970 Pop.	No. of houses 1970	% of pop with private water closets	% of pop with pan latrines in houses	% of pop using pan public facility & other means
Accra	564,194	35,835	30	44	26(1)
Tema	60,767	10,021	100	-	-
Kumasi	260,286	11,755	40	50	10(1)
Sekondi- Takoradi	91874	4,469	20	27	53(2)
Cape Coast	51,653	3,037	20	40	40(1)
K'dua	46,235	2,332	12	58	30(2)
Sunyani	23,780	1,114	33	30	37(2)
Ho	24,199	1,871	19	70	11 (3)

Sources: (1) 1982 consultant's Report on Accra-Tema water supply and sewerage Project by Tahal and consultants Report on Cape Coast Municipality Sewerage and Drainage.

(2) 1977 House to House survey by GWSC

(3) Ho District office

Problems associated with the management and disposal of human wastes in the urban areas are enormous. The problems in Accra epitomise on a large scale the problems facing the other urban areas. The Tahal Report and the 1979-1982 Annual report of the medical officer of Health's Department of the Accra City Council(10) give a very gloomy picture of the sanitation problems in Accra. The Tahal Report estimated that in 1981 there were in Accra, 188 public toilets, 31 bath and / or laundry houses, 34 underground holding tanks for night soil, 130 refuse depots and 21,300 pan /bucket latrines. The report also indicated that the majority of public toilets are of the septic tank (cesspool) type. This tank also acts as a receptor

point for the emptying of the nightsoil buckets which are brought to the site by the few labourers who are still in the employment of the Council. Ideally, the public toilets should be emptied once or twice every week, but this is at best done once a month. The reason being the limited number of cesspool emptiers which are available for use at a particular time because of poor maintenance and over-usage. The result is the overflowing of the system. Secondly, the capacity of the holding tanks is inadequate. There is therefore excessive fouling of the premises. All 34 tanks should normally be completely emptied daily. In practice only 20% of the contents is removed daily.

Thirdly, because the contents of the public toilets have not been regularly diluted and evacuated, the sludge in the public toilets has caked up. Since the 3 de-sludging gangs have been slow in rehabilitating these public toilets, it has been necessary to close down some of these toilets until they can be de-sludged, thus creating a lot of inconvenience to residents.

Fourthly, illegal modifications have been made to buildings and toilets in some private homes have been converted into sleeping rooms and rented out. The result is that some public installations meant for the use of passers-by have become the sole sanitary provision for people living in the vicinity.

Since no new sanitary sites are been provided to balance the increase in population of the city, many people foul the environment with both human and domestic waste. In spite of the health consequences.

The Problems of Nima - Maamobi

The management of human wastes has reached unmanageable proportions in Nima - Maamobi, the largest slum area in the country and located only three miles from the centre of Accra. It has a total population of 80,000 which represents about 9% of the total population of Accra although it accounts for a much higher percentage of the low income population. Densities are very high and net residential density is estimated at 931 persons / hectare (296 persons / acre).

One of the major problems facing this overcrowded residential area is that of sanitation. There are only eight sanitary sites in the area with aqua privy blocks serving the population of 80,000(17). The sites are therefore grossly overloaded and there are on the average 400 persons per drop hole. The sanitary blocks are therefore misused and some potential users are discouraged from using them.

In houses where there are private latrines, the City Council is able to collect nightsoil from only 5% of such houses. Indiscriminate defaecation therefore occurs particularly around sanitary blocks and in the Odaw stream which flows through the area. Most natural surface water drainage channels contain a mixture of excrement and solid waste. The rapid spread of infectious diseases in such a crowded and insanitary environment where there is also communal usage of cups, clothing etc between adults and children, is obvious.

Refuse Disposal In the Rural and Urban Areas

Information on solid waste management in the towns and villages is not available. The little information that one could gather from the few reports on the subject indicate that the pattern of problems is the same as with the area of human waste management. The problems are beyond the capacity of the District and City Councils.

In both the rural and urban areas, house-hold refuse is stored in disused buckets, old boxes and baskets and conveyed later to public dumping sites for disposal. The refuse is not collected from these public disposal sites because of lack of refuse trucks. The cities, especially, have therefore become the scenes of huge heaps of refuse which have created serious smell and vermin nuisance, and have become scavenging and playing grounds for children especially in slum areas.

In Accra, for instance, inspite of the 115 permanent sanitary sites and about 200 temporary sites(10) provided, much of the general environment is normally littered with a "indiscriminately jettisoned industrial and household wastes."(10).The reason for this is the inadequacy of the sanitary sites both in size and numbers. In an effort to solve the refuse disposal problem in Accra. A compost plant was installed in Teshie - Nungua, a suburb of Accra, to process the solid waste material. Unfortunately because of the mechanical failures experienced and the lack of the special vehicles required to convey the fresh solid waste material to the plant. it has not been possible for the plant to operate at its capacity of 200 tons per day. The Accra City Council will soon

receive assistance from the West German Government in the amount of DM9.00 million for the implementation of the Accra City Council Refuse and Nightsoil Disposal Project. It is expected this project will go a long way in solving the sanitation problems at least in Accra and in revamping the organisational and management structures of the City Council. There are, however the problems of the other urban communities to solve. Simple, mechanisms will need to be designed for these communities to lessen the dependence on technologies which we are not in a position to support.

Drainage -----

Drains provided in both the urban and rural areas are of the open type. Some of these are concrete drains and some are just earth drains. The earth drains grow weeds and thus encourage water stagnation and the breeding of mosquitoes. The open nature of the drains invite the emptying into them of waste other than liquids.

Children have the habit of playing in these insanitary drains. Occasionally, accidents happen and children may get swept away by the on-rush of water from a sudden down-pour. In slum areas and villages, gullies may develop after heavy rains and these are left as "natural" drains which also become overgrown with weeds, leading to water stagnation thus increasing the number of mosquito breeding sites and creating unhygienic conditions in the neighbourhood.

In conclusion, it is obvious from the foregoing that the standard of sanitation in the country is very low. In the towns

and cities, the problems posed by poor sanitation are overwhelming especially taking into account the uncontrolled growth of these towns and cities and the absence of health education.

The absence of data makes it difficult to appreciate the full extent of the problem and to make it possible to devise meaningful programmes for its solution. The health implications of the present situation, particularly for the groups which are most at risk (ie mothers and children) are obvious. More effort will have to be made for the effective management of both human and solid waste and for health education campaigns to be mounted on the usage of sanitary facilities where these are provided.

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APPENDIX H

Technical Data Sheet and News Releases
of World Bank and UNICEF (1980-1982)



**TECHNICAL
DATA SHEET**
for World Bank Projects

COUNTRY/PROJECT: Ghana/Water Supply Technical Assistance and Rehabilitation Project

DATE APPROVED: March 31, 1983

TOTAL COST: \$22.4 million IDA CREDIT: \$13 million

OTHER FINANCING: Government of Ghana, \$9.4 million

IMPLEMENTING ORGANIZATION: Ghana Waters Supply and Sewerage Corporation (GWSC)
P.O. Box M194
Accra, Ghana
Cable: DIRWAT

PROJECT DESCRIPTION: The project includes: a) a comprehensive review, by consultants, of GWSC's organization, management, operating and financial policies, and staff and manpower development to result in recommendations for improvement; b) technical assistance to implement these recommendations and to strengthen GWSC's higher level staff; c) emergency rehabilitation of the Kpong-Tema-Accra pipeline and provision of supplies and equipment urgently required for repairs and maintenance of the distribution network in the Accra/Tema Metropolitan Area; d) preparation of final engineering design and contract documents for a future water supply and sanitation project.

PROCUREMENT: Contracts for goods totaling more than \$250,000 and for pipeline rehabilitation will be let through international competitive bidding procedures in accordance with IDA guidelines. Prequalification will be required. Contracts for all works required for installation and repair of public standpipes will be let through local competitive bidding (LCB) procedures or carried out on force account by GWSC's services, according to a work program and procedures to be approved by IDA. Contracts for goods totaling more than \$100,000 but less than \$250,000 will be let through LCB procedures satisfactory to IDA, up to an aggregate total of \$1.25 million. Contracts for goods totaling less than \$100,000, up to an aggregate of \$500,000, will be let through negotiation after solicitation of price quotations from at least three established and reliable suppliers.

CONSULTANTS: Tahal Consulting Engineers, Ltd., of Israel (54 Ibn Gvirol Street, Tel Aviv 64-364, Telex: 033-654, or P.O. Box 1645, Accra, Ghana) provided assistance during the appraisal period and, in joint venture with Public Administrative Services of the United States, will provide most of the consulting and technical assistance services included in the project.

ESTIMATED COMPLETION DATE: December 31, 1986

FOR IMMEDIATE RELEASE

GHANA, GROSSER & MFKOS, Inc.
WASH PROJECT



World Bank

APR 11 1983

1818 H Street, N.W., Washington, D.C. 20433, U.S.A. • Telephone: (202) 477-1234

IDA NEWS RELEASE NO. 83/59
April 4, 1983

Contact: Pam Brennan
(202) 477-3293

GHANA TO BENEFIT FROM IDA CREDIT FOR WATER SUPPLY

Emergency repairs will be made on rapidly deteriorating water transmission pipelines in Ghana through a project using an SDR 11.8 million (\$13 million) credit from the International Development Association (IDA). The concessionary lending affiliate of the World Bank will also provide technical assistance to strengthen the Ghana Water and Sewerage Corporation (GWSC), as well as urgently needed spare parts.

Pipelines linking the Kpong Waterworks on the Volta River, the city of Tema, and the capital at Accra, are in danger of failure because of corrosion and lack of maintenance. The project will finance replacement of badly corroded pipe sections and cleaning and external recoating of damaged sections. Supplies and equipment urgently required to carry out repairs and maintenance of the Accra/Tema distribution network will be provided, including installation and repair of public standpipes.

The government's objective of strengthening the institutional capability of the Ghana Water and Sewerage Corporation will also be supported. Consultants will undertake a Management Improvement Program of GWSC's operational and financial policies. To assist in the implementation of these recommendations, 30 work-years of consultant services will be provided to assist GWSC's 700 higher level staff. Preparation of final engineering design and contract documents for future investment in water supply and sanitation will also be undertaken by consultants.

The Republic of Ghana will provide \$9.4 million toward the costs.

IDA has previously approved \$13.9 million under two credits to Ghana for water supply and sewerage projects.

The IDA credit is for 50 years, including 10 years of grace; it carries no interest but has a small service charge (0.5% on the undisbursed balances of the credit and 0.75% on the disbursed balances).

NOTE: IDA credits are denominated in SDRs (Special Drawing Rights), which are valued on the basis of a "basket" of currencies. The U.S. dollar equivalent of the SDR amount of the IDA credit reflects the exchange rates existing at the time of the negotiation of the credit.

UNICEF
Water and Sanitation Activities

Country: Ghana
July 1980

Responsible/co-operating agencies:

Ghana Water and Sewage Corporation; UNICEF Office of the Director, Abidjan, Ivory Coast; Governments of Canada and the Federal Republic of Germany; UNDP.

Beneficiaries:

Objectives:

To rehabilitate, maintain and modestly expand rural water supply systems.

Funding:

<u>UNICEF commitment</u>	<u>Specific purpose contributions sought</u>	<u>Duration</u>
\$305,000	\$890,000	1980-82

Programme activities:

Water supply and training:

The Governments of Canada and the Federal Republic of Germany are assisting the Government of Ghana in providing potable water to serve 1.8 million people by sinking 5,800 shallow wells. The Canadian-assisted project concentrates in the Upper Region, while the German-assisted project covers the South. Both projects have elements of training and equipment maintenance. UNICEF would assist in the rehabilitation of the old systems which are not functioning for lack of spare parts and facilities for repair and maintenance; and in the continuation of training of water technicians and operators. Ninety piped water supply systems will be rehabilitated.

Environmental sanitation:

Community participation:

Health education:

UNICEF supplies:

Handpumps, submersible pumps and spare parts; training grants.

APPENDIX I

GOG Proposal for Japanese Government Aid for:
Urban Water System Development -
Brong-Ahafo Region

Rural Water System Development -
Northern Region

Discussion with GWSC Chief Engineer, E.F. Quashie, revealed that the Japanese government is favorably considering a proposal by GOG to fund two proposals for water system improvements.

One proposal involves mechanized water systems in 37 urban towns in the Brong-Ahafo Region. This request includes all the provision of all system components; pumps, engines, generator sets, piping, and so forth, and all equipment necessary to construct the systems; a well drilling rig, trucks, various vehicles and other equipment. Spare parts for all system components and equipment are included in the request as well as Japanese expertise in the completion and maintenance of the systems.

An estimated U.S. dollar cost for equipment and system components totals \$3,950,000 without including Japanese expertise during the maintenance phase. The request for aid in connection with rural water supply systems in the Northern Region was one whereby the Japanese government would assume financial responsibility for providing piped water supplies to the two towns of Bimbilla and Wulensi in the Nanumba District of the Northern Region and handpumped wells for all villages of the district of over 300 in population. The number of villages where handpumped wells were proposed totaled 54 and the number of wells involved was quoted at between 120 and 130. These numbers included a few villages of less than 300 people due to their remote location in respect to the larger villages that would benefit from the project. Including those smaller villages, the total number of communities to be included in the program was quoted at 60.

Two components of the proposed program were a construction phase and a maintenance phase. GWSC would install wells in a two-year schedule (working only in the dry season -- October to July) with two drilling rigs that were to be provided under the proposed program. The total of the capital costs of equipment and handpumps included in this proposal was \$2,174,191. This detailed listing did not include mention of any components for the two piped water systems identified in the text of the proposal. In addition to this figure technical assistance in the amount of \$1,000,000 was quoted which brought the total for the construction phase to \$3,174,191 (U.S.).

The maintenance support component totaled \$739,083 U.S. and was made up of the following:

1. Truck (8 ton)	1 at \$67,550	=	\$ 67,550
2. Jeep pick-up	2 at \$16,782	=	33,564
3. Jeep station wagon	1 at \$18,619	=	18,619
4. Motorcycles	3 at \$1,450	=	4,350
5. Workshop equipment			110,000
6. Spare parts for Items 1-5			<u>55,000</u>
	Subtotal		\$289,083 (U.S.)

Seven Technical Assistants

For 3 man years of maintenance
and local staff training

3 man years at \$150,000 =

450,000 (U.S.)

Total

\$739,083 (U.S.)



LIST OF CAPITAL COSTS
EQUIPMENT FOR NANUMBA DISTRICT PROGRAM

<u>Description</u>	<u>Estimate in U.S. Dollars</u>
1. Well-drilling rigs with top head drive and down-the-hole hammers (2 at \$407,000 ea.)	\$ 814,000
2. Air compressors - 300 psi/750 cfs trailer mounted (2 at \$187,353 ea.)	374,706
3. Electric logging systems (2 at \$17,997 ea.)	35,994
4. Cargo truck - 8 ton equipped with 3 ton cranes (2 at \$67,554 ea.)	135,108
5. Water tank truck of 1500 gallon capacity (2 at \$62,500 ea.)	125,000
6. Diesel station wagons (2 at \$18,619 ea.)	37,239
7. Diesel pick up trucks (2 at \$16,782 ea.)	33,564
8. Diesel generator/welder (2 at \$6,228 ea.)	12,456
9. Camping equipment (2 at \$115,995 ea.)	231,890
10. PVC well casing - 6,000 m.	58,194
11. PVC slotted well screen - 2,100 m.	48,744
12. Water analysis kit (2 at \$1,598 ea.)	3,196
13. Moyno handpumps (120 at \$978 ea.)	117,360
14. Spare parts for items 1 through 13	146,740
15. Consulting services (6 man years at \$150,000 ea.)	900,000
16. Contingency for item 15 only	<u>100,000</u>
Total	<u>\$3,174,191</u>

Note: Nanumba is one of ten areas of the Northern Region targeted by NORRIP for separate donor funding requests.

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APPENDIX J

WASH Consultant's Memorandum to Ambassador Fritts
on Proposal for Hand-Dug Wells in Bolgatanga Area

August 13, 1984

Ralph Preble, Sr. Consultant
(USAID WASH Project)

Assessment of Bolgatanga Self Help Program

THRU:

Roy Wagner, Director

Ambassador Robert E. Fritts

Country Director, USAID
Accra, Ghana

Subject: Bolgatanga Self Help Program

Introduction

In compliance with your request that I see the Bolga Naba, Martin Abilba III in Bolgatanga and discuss the merits of his proposed self help program, I visited with him on Sunday 5 August, 1984. At that time he gave me the attached application which describes the program to construct hand-dug wells at 10 individual villages in the Bolgatanga District of East Upper Region. The application is made by Martin Abilba III, the Bolga Naba or titler chief of some 75 percent of the villagers of the Bolgatanga District. I understand that this is the one and only copy and the Bolga Naba requested that a photo copy be made and returned to him.

Also, attached is a memorandum from David Green and Peggy Ellis-Green (Peace Corps Volunteers who are completing their work with the CEDA well program in the East Upper Region this month) to Paul McCabe, Food for Peace Officer, which sets forth certain observations concerning water in the Upper Region. One of these observations mentions the Bolga Naba's application for U.S. assistance to carry out the proposed dug well program.

On 11 August 1984 I had the opportunity to meet with Dave Green (Dave and his wife Peggy left the country the following day). Dave fully endorses the project as one which could be of great benefit - not only in the "Bolga" District but if successful and expanded, throughout the Region. He also added the insight that, while item 13D of paragraph 12 of the application indicates that it is understood that any U.S. contribution would be on a one time basis, over 700 other villages in the "Bolga" district (in addition to the 10 identified in the application) need to seek alternate water sources during the annual dry season when their traditional supplies dry up.

Best Available Document

While I did not visit any of the specific villages identified in the application my visits to other villages in this and other districts has convinced me that there is a definite need for a program of this nature. However, to improve the chances of a successful well which would have the potential for a water source during the dry season of drier than normal year, certain additional technical and sociological consideration should be considered. These considerations are discussed in the following paragraphs.

Recommendations

The following recommendations are presented as descriptions of specific actions that can be taken to overcome certain technical problems and to improve the chance that a well will be successful.

1. Siting the well is foreseen as a potential problem. One aspect is that soil cover over the decomposed underlying rock is thin and offers little in the way of cleansing action to protect groundwater from potential sources of pollution that are most prevalent within the village where the well would be most convenient.

It is recommended that the well be sited near the villages traditional wet weather water source. It is recognized that such a location will undoubtedly be downhill from the village and possibly in the path or direction that pollution would take in leaving the village. However, bacteria do die off with time and are unlikely to persist beyond a few hundred feet from their source. Siting near a traditional water source is likely to encounter groundwater at shallower depths and thus reducing the effort required for the well digging.

2. Digging of the well below the groundwater level is a definite problem. Traditionally once water was encountered, water buckets would be dropped around the man excavating the rock with chisels and hammer. Bailing out the water by this manner allowed him to keep digging but seldom to a depth of more than a couple of feet below the original level at which the water was found.

It is recommended that wells be dug to 5 or preferably 6 feet, or more, below the groundwater level which is encountered so that greater assurance is provided against the well going dry in a subsequent dry year. It is unlikely that this recommendation could be implemented using the traditional bailing technique of water removal during the final stages of digging. In place of bailing, two hand pumps could be mounted on a pair of planks - nozzle to nozzle - and their suction pipe and piston cylinders down the well adjacent to the sides. It would not be possible to have the piston cylinders submerged so a semi flexible PVC pipe or tubing would need

to extend from the bottom of the piston cylinder to the bottom of the digging. This should be sufficiently long to form an arc that would straighten out as the digging got deeper. Pumps for this purpose could be "junk" Beatty pumps that the CEDA people are replacing. The head caps could need to be modified to provide a large opening where the piston rod passes through it. This would permit priming the pump cylinder with water, from the surface, which might be necessary due to its position out of water. Provision for pumping water out of the wall being dug through a pair of hand pumps should permit the digging to continue to greater depths than has been traditionally possible. More sophisticated means to accomplish this result are available but their introduction, at this time, does not appear practical of course, a trough (wooden) would be necessary to convey pumped water away from the wall construction.

6. I would recommend that an alternate to the metal roofing material be utilized for the wall cover. Such a cover must necessarily be placed on the ground when the wall was being used, take much abuse (if used at all) and most likely be stolen. A permanent 1½ inch thick plank cover appears most practical with a hole ½ the big covers diameter at one side of the wall covered by a separate small cover.
3. A single bucket and rope, rather than every one using their own is recommended for sanitary reasons. For the same reason training in wall and water use - possibly by Peace Corps volunteers - is recommended.
4. Another problem is anticipated with the quantity of materials identified in Item 12 of the request. If my recommendation of (2) above is adopted then wells would be at least 3 feet deeper than proposed. An original depth upon materials were based (17 feet) is probably optimistic.

It is therefore recommended that cement in an average quantity of 12 bags per wall rather than 8 be provided. Also - please note from (3) above that we recommend that metal roofing be deleted. Also - hammers and digging chisels have a tendency to break. At least 2 additional hammers and chisels should be provided to be given to the team or 2 teams proposed to be assigned to the pumping operation discussed in (2) above and 2 spare sets be placed with the Peace Corps person we anticipate would be coordinating the project.

August 13, 1967

Re: In total quantities of material recommended are as follows:

(USARV Form 100)

- | | | |
|-------|---------------------------------|----------|
| THRU: | 1. Cement | 120 bags |
| | 2. Metal Roofing | none |
| | 3. Steel buckets | 10 |
| | 4. Hardened steel chisels | 14 |
| | 5. Two lb. double faced hammers | 14 |
| | 6. Nylon rope 10 x 24 ft. | 250 ft. |

6. Finally, it is recommended that digging tools be returned to the Peace Corps Coordinator at the time digging is completed using pumping technique of (2) above. Also - that he explore the potential for their use in deepening existing dug wells which do dry up in the dry season. I presume that the Peace Corps Coordinator (Bolga CEDA Project assignee) would maintain records of location, depth to water, total depth, digging time and other pertinent data for transmitting to and recording in your files for the project.

In addition, to a copy of this report, a copy of the application for the project is being furnished to the District Office, Bolga, and a copy of the report is being furnished to the District Office, Bolga, and a copy of the report is being furnished to the District Office, Bolga.

Also, attached to this report is a copy of the application for the project (Peace Corps File # 100-100-100) and a copy of the application for the project (Peace Corps File # 100-100-100) and a copy of the application for the project (Peace Corps File # 100-100-100).

On 11 August, 1967, I met with the District Office, Bolga, and his wife and discussed the project in the District Office, Bolga. He also added the freight charge, which is included in the application. indicates that it is understood that the U.S. Government would be on a one-time basis, about 700 cubic yards in the Bolga District (in addition to the 10 identified in the application) and to seek alternate water sources during the annual dry season when their usual supplies dry up.

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APPENDIX K

UNICEF Well Rehabilitation Program

COUNTRY: GHANA (MSA)

PROJECT TITLE: Water Supply and Environmental Sanitation

Proposed Funding: 296,000 USD

Objectives:

General: To support the government's efforts to rehabilitate and expand rural water supply systems and use these as a base for strengthening and developing environmental sanitation activities. UNICEF will assist in rehabilitating or replacing broken down handpumps fitted on boreholes already drilled several years ago.

Specific: This project will cover the Western, Eastern, Brong-Ahafo and Volta Regions and will

- (1) rehabilitate existing boreholes drilled some years ago and either loosely capped or where mechanised with handpumps which are now broken down.
- (2) Re-mechanise the boreholes with handpumps
- (3) Offer assistance for the creation and operation of pump maintenance teams at village and district levels.

Background to the Project:

The overall water supply situation in Ghana has sharply deteriorated over the past few years. Regular field visits by UNICEF staff in recent months have provided enough baseline data to fully measure the extent of the problem. In many rural areas a simple pipeborne system was installed several years ago but it was let to deteriorate because of poor maintenance and lack of spare-parts. In some other communities this year's drought has been so severe that practically all the usual sources of water are running dry. Villagers have to fetch water out of highly polluted ponds or simple holes dug in the ground. As the discharge is extremely low, some of them have even to sleep next to the water source waiting for their turn. This situation has triggered an impressive self-help spirit among communities to improve their water supply.

Project Strategy

- (1) Integration: The project will be strongly linked with and sometimes, even integrated into, existing UNICEF assisted programmes. In particular by providing safe water supply UNICEF will be helping the sound development of PWC activities.
- (2) Maintenance and follow-up: A strong emphasis will be put throughout on maintenance and repair so that the rehabilitated water supply systems will not any longer be allowed to deteriorate.

DETAILED PROJECT DESCRIPTION

Structure: There is a total of 583 boreholes in Eastern, Western, Brong-Ahafo and Volta Regions drilled some years ago. Some were loosely capped awaiting pumps. Others were mechanised but with time the pumps have broken down or fallen into disuse. This project will, as an initial intervention, rehabilitate 250 out of the 583 boreholes and remachinize them with handpumps, spread regionally thus:-

B/A Region	145	106
Eastern Region	160	29
Western Region	106	84
Volta Region	<u>163</u>	<u>31</u>
	583	250

The locations (see map) coincide with the areas which did not benefit from the two major rural water drilling projects recently completed in the country namely the 2500 wells CIDA project in the Upper Region and the 3000 wells KFW West German Bank assisted drilling programme in Southern Ghana.

UNICEF has provided 108 replacement handpumps under its regular programme in 1982 which will not reflect in the list of candidate locations.

2. Inputs: Project inputs will include spare-parts for drilling rigs and transport, handpumps, tool kits at village and workshop equipment and vehicles at district levels for handpump maintenance. In addition UNICEF will recruit a national water/sanitation project officer to supervise project's implementation.

3. Implementation

The major components will be

- (i) Rehabilitation of the boreholes with drilling rigs (including borehole construction if need be) and boiler test for 1 hour.
- (ii) Construction of concrete pad and sanitation/drainage area.
- (iii) Handpump installation
- (iv) Maintenance

On the technical side the Ghana Water and Sewerage Corporation's (GWSC) Drilling Unit in Kumasi will be assisted to execute the project. A 12-ton Leyland logistic truck has already been provided and a 2-3 ton pick-up will be made available. 2 Tuston Bucyrus Percussion drilling rigs will be rehabilitated and given some off-shore inputs, to clean the boreholes including fishing out all dropped pipes. In cases where the boreholes are not cased some will be done in 4 1/2" or 6" UPVC to prevent the collapse of the boreholewalls later. Mobilization requirements are detailed in appendix (1).

Closely following behind will be the concrete pad construction team.

Local resources like labour, sand and aggregate will be requested of the Chiefs, Town Development Committees and PDCs as part of their participation for the pad construction. Thereafter a drainage/sanitation area around the pad will be undertaken by them.

Another GWSC team will be raised to install the handpumps. So in all the rehabilitation and installation team will comprise

Supervisor	1
<u>Cleaning</u>	
Foreman	2
Artisan	4
Drivers	3
Mechanic	<u>1</u>
	10

Concrete Pads

Artisan (Mason) 2

Handpump Installation

Artisans 2

M'tce Trainees 1

Drivers 4

17 allow for 20

The teams will be provided camping tents, beds and messing kits and food to reduce their dependence on local facilities.

4. Maintenance

It is largely expected that GWSC will maintain these handpumps. Handpump maintenance workshops are being established under the '3000 wells programme. These workshops will be expected to envelope the new areas. It is however necessary to open two new maintenance centres at Techiman and Atebubu to the same standard in equipment and transport to cater for Northern Brong Ahafo. The staff will be drawn from within GWSC and given on-the-job training during the installations. The running of these centres will thus become part of the GWSC maintenance budget, although some provision has been made for \$-assistance.

For each centre there will be:-

- 1 Supervisor Supt/s. supt.
- 1 Foreman
- 2 Artisans
- 2 Mechanics
- 2 Trainees
- 1 Driver
- 1 Storekeeper/General duties

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5. Time Table for Implementation

The bar chart for the implementation (see appendix (1) calls for completion of installations within 11 months of receipt of Donor funds.

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On receiving the advice of release of Donor funds, there will be call forward for the Handpumps, Maintenance equipment and vehicles (as per specifications Appendix (ii)).

Concurrently mobilization of two borehole cleaning teams from GWSC Drilling Unit will commence together with 2 concrete pad construction teams capable of completing 6 pads a week and therefore 24 in a month.

The Ghana Water and Sewerage Corporation workshop building at Techiman and Atabubu intended for use as additional Maintenance Centres will be prepared for this function within 6 months.

A handpump installation team capable of completing on average, two installations a day, will start work on receipt of the pumps to complete work in 4 months.

Training of GWSC Mtee staff will be on the job, i.e. during the installation of the handpumps. Also at every village two literate pump caretakers will be nominated by the village/community to be trained and equipped with simple tools for "first aid" mtee and repairs.

6. Monitoring and Evaluation

Monitoring and evaluation will be carried out by systematic field observation by UNICEF-Government teams based on a specific schedule of visits established well ahead of time. Six monthly UNICEF-Government reviews co-ordinated by the Ministry of Finance and Economic Planning will also be conducted. They will be based on the reports established twice a year by the regions concerned.

PROJECT BUDGET

	<u>Government Budget</u>	<u>UNICEF Budget</u>
	₹ <u>Local costs</u>	\$ <u>Off-Shore</u>
1. 250 India MkII handpumps		125,000
2. M'tce Centres		
(i) Rehabilitation of bldgs	50,000	
(ii) Workshop Equipment		21,000
(iii) 4 M'tce vehicles + Spare parts		50,000
(iv) 215 Tool kits for village caretakers		10,000
3. Handpump spare parts		10,000
4. Boreholes Rehab/Installation		
(i) Mobilization (app.1)	691,000	
(ii) Rehabilitation (ap.1v)	220,000	10,000
5. Running Costs - 1 year (mainly staff salaries etc.)	1,440,000	
	<hr/> 2,901,000 <hr/>	<hr/> 296,000 <hr/>

Mobilization + Installation

	<u>Government Budget</u>	<u>UNICEF Budget</u>
	£	US\$
62 assorted tyres + tubes rims 14, 16 + 20		21,000
Generator + submersible pump		6,000
1000 bags cement	300,000	
2 drums Engine Oil, lubs	26,000	
1200 galls Diesel	360,000	
5 tents for 4 persons at \$800)		9,000
20 beds, kitchen utencils)		
Extra parts for		
6 Rigs (22RW + 6ORL))		15,000
Supporting Vehicles)		7,000
2 New Replacement Engines .		
1200 lengths 4-1/2 UPVC, threaded)		12,000
1200 lengths 6" UPVC, threaded)		
20 yds ³ Gravel packing	6,000	
Wave Boards, nails, shovels etc.	5,000	
	<hr/> 691,000	<hr/> 70,000

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Specification of Mcca vehicle

Diesel Pick-up 1-1/2 ton

4 x 4 wheel drive

Tripod with mechanical hand operated winch to be mounted at the rear of the flat body, capable of hauling 10' RM

II. Specification of Mcca Centres Equipment

Bill of Quantity 'B'

General Equipment

Hand Tools

Special Tools

Measuring Instrument + Tools

Recommended spare parts

III. Specification of Handpumps

From India

BHALSA brand of India MkII handpump to GWSC/IDC

Specification provided with all-brass cylinders

10% of cylinders of larger diameter (high yield wells)

10% of connecting rods of 16mm diameter (shallow wells)

From Germany

32 N.B. Heavy gauge, Galvanized Rising mains 3m length

10% of 3" diameter for high yield wells installation

IV. Camping Equipment

RACLETT Tents

Type "Prospecteur Sahara" 4 x 4m

- Double Toit

- Tapis de sol

- Montiquaire

Manufacturer: 72600 MAMERS
Telex 720493
19 rue POISSONNIERE
75002
Paris

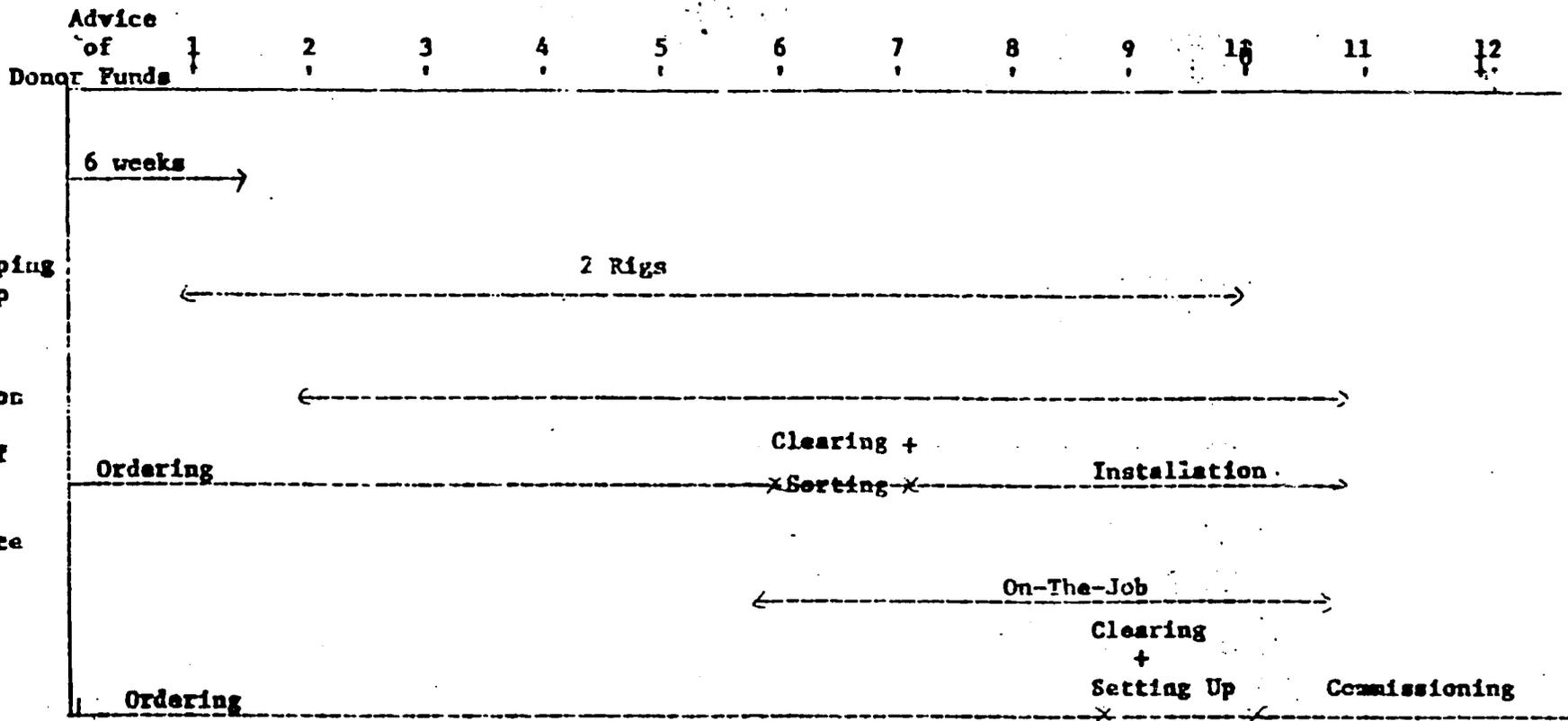
Camp beds

- to be collapsable but of rigid metal construction with poles for mounting mosquito net
- to be covered with strong canvas

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HAND PUMP INSTALLATION PROGRAMME

MONTHS



K-9

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Rehabilitation + Installation

	<u>Government Budget</u>	<u>UNICEF Budget</u> US\$
1. Salaries + allowances for 20 people/month for 10 months	120,000	
2. Running charges for 2 rigs and two supporting vehicles (see mobilization)		
3. Repair costs of 2 above	100,000	10,000
	<u>220,000</u>	<u>10,000</u>

	<u>Govnt. Budget</u>
1. Salaries for 10 staff	10,000.00
2. SSF	1,250.00
3. 20% Housing All.	2,000.00
4. Overtime 50%	5,000.00
5. Night Allowance	30,000.00
6. Other All. Hospital Bills etc	<u>10,000.00</u>
	58,200.00
Av.	60,000.00

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APPENDIX L

Recommended Scope of Work
for NEWS Center Coordination/Water Monitor

SCOPE OF WORK

USAID/GHANA: NATIONAL EMERGENCY WATER SEARCH (NEWS)
CENTER COORDINATOR

Under the direction of the USAID Mission Director, the NEWS Center Coordinator/AID Water Monitor shall:

- Research, compile, and organize information regarding all continuing water projects throughout Ghana.
- Obtain and assemble data of rural water supplies and sanitation in Ghana.
- Serve as an information source to all water development client agencies, including GOs*, NGOs*, PVJs, and USAID in Ghana, making available all water development-related resources, publications, and so forth.
- Produce a monthly or bimonthly newsletter to serve as an information source and forum for all water development client agencies in Ghana.
- Assist in establishing a collective organization of water development client agencies in Ghana.
- Maintain liaison with WASH Project, USAID/Washington.
- Submit timely reports on selected water-related topics through USAID.
- Work closely with Ghanaian counterparts to train for long-term commitment to the USAID NEWS Center.

Coordinate with, assist, and provide logistical support for technical groundwater experts recruited through AID/W/OFDA and dispatched to Ghana to provide lacking technical expertise in Ghana's search for water.

To make a NEWS Center viable, the coordinator shall investigate and compile comprehensive data of all existing water projects and client agencies in Ghana, including these categories:

- PVJs
- GOs, NGOs
- current funding and budgets of client agencies
- geographical distribution of continuing water development projects
- available resources, both local and abroad

* GO - government organization
NGO - non-government organization

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SCOPE OF WORK

NEWS CENTER COORDINATOR (Continued)

To establish a newsletter, the coordinator must first determine the scope of readership and identify readership interest through a questionnaire to determine the intended audience and its interest.

The coordinator shall be responsible for keeping abreast of current issues relating to water development, having access to water technology journals and other publications in the field.

To produce the newsletter, the coordinator shall investigate the costs of materials and production and assist in determining how the newsletter shall be printed and distributed. Important considerations include circulation rate (how many newsletters to print?), distribution strategies (local vs. international), production staff (USIS? local printers?), and interagency support. The coordinator will be responsible for compiling, editing, and writing articles for the newsletter.

To establish a NEWS Center, the coordinator must first consider who will benefit from the center, where the center can contribute (that is, universities and client agencies) to building and maintaining the center.

To establish an association of water development agencies in Ghana, the coordinator shall be responsible for overseeing and generating interest and support from the agencies. The coordinator also shall organize all input and proposals regarding the viability of a water resources center and newsletter for the water development community in Ghana.

APPENDIX M

The Role of the National Mobilization Committee

The National Mobilization Committee (NMC) was originally established to repatriate and resettle Ghanaian returnees from Nigeria in February 1983. Since that time, the Committee has added food distribution to its sphere of influence. In this interest they have been instrumental in accomplishing improved efficiency in distributing food under USAID's food assistance program and in resolving a variety of problems related to this effort. On 17 August 1984, the Peoples Daily Graphic published a news release from NMC announcing the establishment of new subcommittees to provide a similar function for several sectors of additional interest which include a water committee. The National Mobilization Committee has provided valuable oversight and has served effectively as an expediter -- two functions that cross ministerial lines where seemingly unresolvable conflicts often occur.

The addition of the Water Sector to NMC activities promises to minimize duplication of effort and maximize efficiency in bringing uncontaminated drinking water to the rural villagers, as well as to the urban population of the country.

Any proposal for OFDA funding should be brought before the NMC as it has assumed a major role concerning foreign aid.