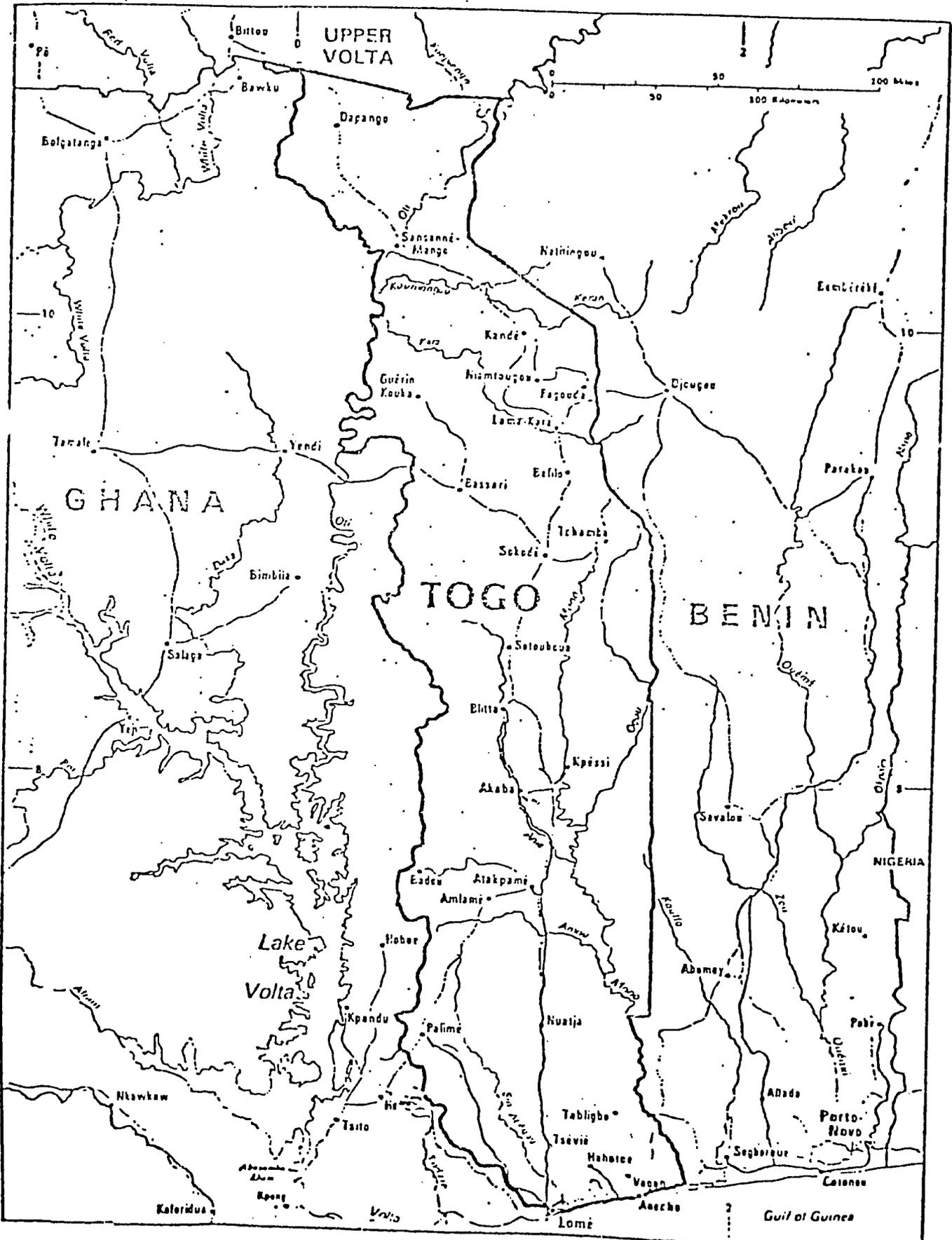
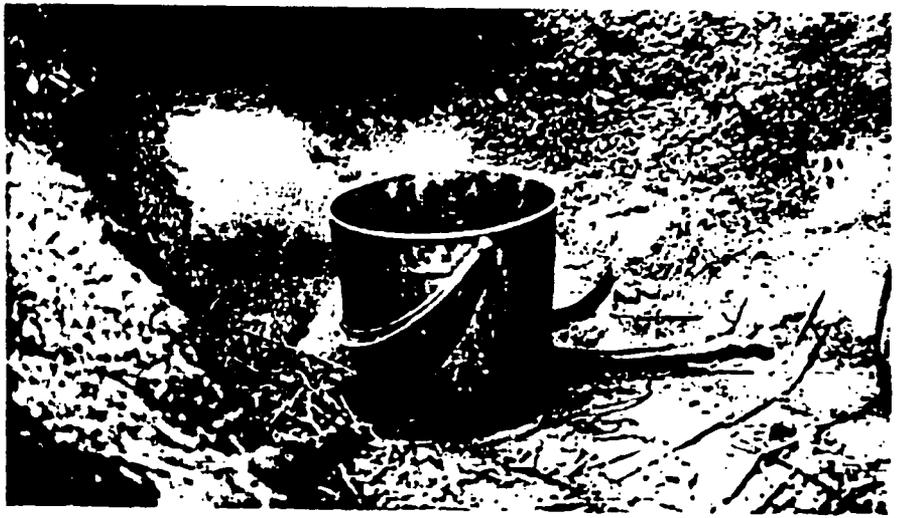


April 15, 1983



Marigot (waterhole),
former village water source



Village women collecting
water from marigot

Fetish to ward off water-seekers
from neighboring villages





Testing yield at new pump site



Villagers lining up for water



Village girl bathing during pump test



Enfin! L'eau potable

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GLOSSARY OF ACRONYMS AND INITIALS

APS	Agents de Promotion Sociale
BOAD	Bank for the Development of West Africa
BRGM	Bureau de Recherches Geologiques et Minieres
DCD	Division of Community Development
DEH	Division of Environmental Health
DHS	Division of Hydraulic Service
DP	Directorate of Plan
FAC of France	Fonds d'Aide et de Cooperation
FED	Fonds European de Developpement
GOT	Government of Togo
LDC	Less Developed Country
MOH	Ministry of Health
MSA	Ministry of Social Affairs
MWR	Ministry of Public Works, Mines, Energy and Water Resrouces
OAR	Office of the A.I.D. Representative in Togo
PC	Peace Corps
PCV	Peace Corps Volunteer
PP	Project Paper
PSC	Personal Services Contractor

REDSO/WCA	Regional Economic Development Services Office for West and Central Africa
SGGG	Societe General du Golfe de Guinee
USAID	United States' Agency for International Development
WASH	Water and Sanitation for Health Project
WA	West Africa
WHO	World Health Organization

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EXECUTIVE SUMMARY

In line with the statement of the Government of Togo (GOT) in its Third National Development Plan that safe water for the population would be the highest development priority, and in response to a GOT request, the U.S. Agency for International Development initiated the Togo Rural Water and Sanitation Project in 1980. The multilateral project was designed to provide safe water (and the knowledge of how to use it) for 128,000 rural Togolese. As mandated in the project paper this mid-term evaluation was conducted in March, 1983 to assess current project status and make corrective recommendations to facilitate attainment of project objectives.

The project's two major components are the following:

. Drilling component.

USAID is financing the drilling of a planned 400 wells in two regions. Pump installation is the responsibility of the French Fonds d'Aide et de Cooperation (FAC). The Fonds Europeen de Developpement (FED) has financed the services of the project's hydro-geologic technical consultants (Bureau de Recherches Geologiques et Minieres, (BRGM)) and the pump maintenance program. Through February, 1983 a total of 468 wells had been drilled, of which 285 have sufficient yield to be commissioned and 157 are operational with pumps installed. The evaluation team found that the drilling component of the project has been extremely well-executed technically. Technical advice and construction supervision by BRGM has been excellent and has played a key role in the success of the project.

. Health and sanitation education component.

GOT provides most of the manpower for this component. Peace Corps has provided 10 PCVs and USAID provides the additional funding. The objective of this component is to cost effectively enhance the well project's impact on the health status of the Togolese population by providing education on correct water utilization, hygienic practices, and village sanitation. Through this component approximately 100 social promotion agents (representing the primary Togolese contribution to the project) have received special training on these subjects and on techniques of mobilizing the villagers. Using the latter skills, agents have organized health committees in the villages touched by the project. These committees are in turn responsible for educating villagers and assisting them in the identification and design of "micro-projects" which will be in part financed by USAID. The team was impressed by the effectiveness of the health and sanitation education component, particularly by the apparent competence and dedication of the social promotion agents and their collaborative relationship

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with the AID health technical consultants and Peace Corps Volunteers. However serious management problems identified by the evaluation team should receive immediate attention.

The evaluation team concludes that the drilling component of the Togo Rural Water and Sanitation project appears to be steadily progressing toward attainment of the project objectives.

The initial benefit/cost analysis that strongly supported this project underestimated its net economic benefits. The education component appears to be steadily progressing toward attainment. Continued progress of this project depends on resolution of the administrative problems described in the Management Review section. The team strongly recommends that these be addressed by project management, USAID and high level Ministry of Health officials.

MAJOR RECOMMENDATIONS:

The following summarizes the most important recommendations offered by the evaluation team for project improvement.

1. USAID/Lome and high level Ministry of Health officials should discuss what steps to take to improve national level project management's responsiveness to the severe administrative deficiencies described in the Management Review section.
2. A financial accounting firm should be utilized to improve project financial management as well as overall project management, institute necessary controls and train project staff as needed.
3. Monthly reporting requirements should be instituted for all GOT regional level staff and the USAID technical advisors. Regularly scheduled meetings between these personnel, USAID/Lome and the National Coordinator should occur.
4. Project personnel transfers should be minimized through an AID/GOT agreement as described in the Management Review Section.
5. Project objectives for the health education component should be restated to focus on behavioral outputs rather than measurable health impacts.
6. The on-going system of data collection for project monitoring and evaluation should be refined to reflect these restated objectives.
7. In dry villages and in those with populations too large for one well, water resource surveys should be undertaken and project funds used to apply appropriate technologies to source improvements.
8. A thorough reassessment of the latrine program, including investigation of various low-cost models, should be undertaken.
9. The project scope should be expanded to include the capability of studying and implementing alternative village water systems such as gravity fed from springs, infiltration galleries, roof catchment, etc. depending on their feasibility.

10. Any continued funding for the project must be based on one pump serving no more than 250 people, or 30 liters per person per day from suitable alternative systems. This criterion must be met in existing project villages as well as new ones where it is technically feasible.

11. Steps should be taken to increase the level of participation of women in the project, both as social agents and on the village health committees.

12. The Hydraulic Service pump maintenance programs should be expanded about four-fold, placing a fully equipped technician with transportation in each prefecture instead of each region.

13. Villages should pay all maintenance, operation and depreciation costs (after an initial grace period).

14. Future wells should be concentrated near regional growth points where time and energy saved from a convenient potable water supply can be used more efficiently and productively.

15. Well drilling should continue beyond the 400 positive wells subject to availability of funds under the present contract.

16. PP amendment should be prepared to secure additional funding to continue project progress.

EVALUATION TEAM COMPOSITION AND METHODOLOGY

A. Evaluation Team Composition

The evaluation team consisted of the following:

John Cloutier, Project Development Officer, REDSO/WCA,
(team leader)
Dr. Richard Sines, Economist, REDSO/WCA
Dr. Raymond Isley, M.D., WASH Health Consultant
Dr. Darlene Bisson, Sociologist, REDSO/WCA
Daniel Jenkins, Hydraulic Engineer, REDSO/WCA.

During three weeks of field work in Togo the team worked closely and continuously with the following project personnel:

Ouro Bawinay-Tchatomby, National Coordinator
Paul Guild, USAID Project Officer
Agma Prins, Technical Advisor
Sarah Fry, Technical Advisor.

The evaluation team also wished to express its appreciation to Gafarou Osseni of the Hydraulic Service, Michel le Joncour of BRGM and all the regional personnel and agents who greatly facilitated the team's work. Finally, the evaluation team expresses its sincere appreciation to Jutta Lausen of USAID/Lome for her helpful efforts during the evaluation.

B. Evaluation Methodology and General Approach

This midproject evaluation has involved:

1. The study of documents, technical papers, and correspondence related to the Togolese rural water project and the general literature on rural water systems.

2. Discussions with representative individuals and groups at all levels of the program: (a) the drilling, installation and maintenance of the pumps; and (b) the delivery of public health education services. Other persons knowledgeable of the program or its economic, political and social environment were also interviewed

3. Field - sits to study the pump installation process and the health education program centered around the newly installed pumps. Villages were chosen with the help of project personnel to obtain a broad view of all activities and to visit the whole spectrum of villages covered by the program.

(c) First, the team visited villages at each stage of the pump installation process. The site generally was determined by where each different activity (i.e., drilling, testing, installing, etc.) was occurring on the day the evaluation team was in the region. The evaluation team visited sites where:

- . no pump operations were underway;
- . drilling was taking place;
- . well was being tested for yield;
- . cement encasements (aprons) were being built;
- . pumps were being installed and village pump repairers were being trained in simple maintenance techniques;
- . pumps had been recently installed; and
- . pumps had been installed for a longer time (up to 9 months);

(b) Criterion Two was to choose a wide variety of villages participating in the health education program. At the time of the evaluation, this was limited to the Plateau region since the health program had barely begun in the Savannah region. The team visited "dry" villages^{1/} and villages with a pump; villages where a pump was working well

^{1/} Villages where the drilling teams did not find sufficient water pressure to install a pump.

and where it was working inefficiently or not at all; small villages (less than 350 inhabitants) and larger villages (more than 350 inhabitants); villages where the health program has been in operation for almost a year and villages where the health program was just beginning; and villages with pumps that still had adequate water supplies and those where available water was still inadequate due to large village size;

- (c) Criterion Three was to visit villages with alternate sources of water that might provide a more cost effective water supply.

In meeting these three criteria, the team visited both major regions: the hot and dry Savannah and the slightly less harsh Plateau regions. At the time of the evaluation, all new drilling was taking place in the Savannah region. Most health education activity (which relies heavily on the existence of a convenient source of potable water) was in the Plateau region, where most pump installation (i.e., up to the time of the evaluation) had taken place.

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C. Specific Evaluation Procedures

In addition to general observation and exchange of ideas, management efficiency was examined through a series of one-on-one interviews with all principle management staff and a representative selection of persons involved in both health education and the pump installation program.

In order to assess the functioning of the village health committees and the influence of the social promotion agents on village-level activities, a series of pre-arranged meetings with the health committees in nine different villages selected from all five prefectures of the Plateaux region was held. A list of the villages is found in Annex VA. With one exception, all the meetings were attended by a large number of other villagers and participation in the discussions tended to be general. So as to provoke discussion, a series of questions was asked (see Annex IIB).

To examine the project's functioning at the level of the social promotion agents and their supervisors (chief secteurs), a series of interviews was conducted with 16 agents and 4 supervisors; the latter also performed the work of social promotion agents. A series of questions (see Annex A) was posed in interviews of 1 1/2-2 hours. Some were one-on-one interviews and several were conducted with groups of 2-5 agents. In the groups, the interviews also noted the agents' interactions and opinions expressed among themselves.^{1/}

Discussions at all levels took place often on-site with personnel involved in the technical and engineering aspects of the project: drilling site selection; pump installation criteria; and pump installation techniques, operation, and maintenance; etc.

No formal economic evaluation plan was adopted. A short time frame prevented obtaining adequate economic data. Data was studied from the Togolese Rural Health Program; project reports by USAID, the World Bank, WHO, etc.; and related academic and practical literature on rural water systems. Field visits included talks with villagers, transporters, small and large traders, and others knowledgeable of the Togolese economic structure. These discussions enabled a cross verification of existing but scarce data found in the various reports.

^{1/} The results and recommendations of interviews with village health committees, social promotion agents and supervisors appear in the sections on technical analysis (part 2) and health and social aspects (part 2).

A. ADMINISTRATIVE DATA

1. Date of this Sheet: 31 Dec. 1982 5. Country/Region: TOGO
2. Field Project Officer: Paul Guild 6. Project Title: TOGO RURAL
3. AID/W Backstop Officer: AFR/DR: Speers WATER SUPPLY AND SANITATION
4. Implementing Agent: Min. of Public Health & Social Affairs, Min. ~~PUBLIC WORKS~~ - AID - Peace Corps - FED - FEC 7. Project No: 693-0210

B. FINANCIAL DATA (\$000)

8. Type of Funding: Grant (ARDN) bilateral 11. Date of Initial Oblig: 8/80
9. Life of Project Auth: 7,839 12. FACD: Sept. 1984
10. Oblig-Cum. Proj. to Date: 7,140 13. Expend-Cum. Proj. to Date: 2,633

C. PROJECT PROGRESS AND STATUS

14. Project Purposes:
To improve the health and living condition of 128,000 rural persons living in two regions of Togo by drilling 535 tube wells equipping approx. 400 with pumps and by providing a complementary health education, village sanitation community development component!
15. Conformance of Project Activities with the Implementation Schedule in the Project Paper and Progress Towards Achieving Project Purposes Since Last Report for Major Project Inputs:
To date more than 80% of the planned boreholes have been drilled which is ahead of the implementation schedule. 60% are positive which is under the PP planned 75%. Positive wells are being equipped with pumps on schedule. Training of Social Affairs and Min. of Health Staff continues as planned.
16. Essential Actions Planned next 90 days: and Primary Action Agents:
A. Amend G.A. to conform with PP calling for 400 productive wells and amend contract accordingly, amend PIL budget, obligate dols 600,000, sign sanitation implementation plan. AID/GOT
B. Complete project in-progress evaluation. Plans for eval. team arrival/deployment completed
17. Major Issues Requiring Resolution: and Primary Action Agents:
- Delay of RLA concurrence with G.A. Amend. # 6 OAR/REDSO
- Allotment of additional funds to bring final funding increment to total of \$699 thousand. AFR/DP
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PROJECT DESCRIPTION

A. Introduction

In its Third National Development Plan the Government of Togo (GOT) identified the provision of potable water to be the top priority for 1976-1980. To attain this goal the GOT sought the assistance of several donors, including the U.S. Agency for International Development. The Togo Rural Water Supply and Sanitation Project was implemented by USAID in response to this request. Its purpose is twofold:

- . First, the project is to provide safe drinking water for approximately 128,000 rural poor, primarily through the drilling of 400 tube wells.
- . Second, recognizing that health benefits are not automatically realized with the simple installation of wells, the project included a health education and sanitation component, focusing on training of social promotion agents and mobilization of villages.

B. The Project Setting

Togo is a small and poor country with an area of 56,500 kilometers and a population estimated at 2.8 million in 1982.^{1/} Togo shares the social and economic characteristics of the developing countries of West Africa: low GNP per capita (\$410), rapid population growth (2.9% annual rate of natural increase), high infant mortality (109 per 1000 live births) and low life expectancy (46 years).

Although many factors account for the poor health status of the Togolese population, lack of access to safe water is a major contributor. In 1975, the World Bank estimated that only 16% of the population had a safe water source. A variety of diseases are associated with unsafe water: diarrhea and dysentery, intestinal parasites, schistosomiasis, onchocerciasis, Guinea worm and, indirectly, malaria. The high incidence of these diseases leads not only to high infant, child, and adult mortality, but to decreases in labor productivity due to morbidity.

The water situation in Togo is acute in the rural regions (where 83% of the population live) and particularly in the Sahel-like areas of Northern Togo. Because water is essential to life, rural people are forced to walk, often many miles, to draw water from polluted sources. During periods of drought (such as that being experienced in early 1983) even contaminated water may be in short supply.

The Togo Rural Water and Sanitation Project addresses this crucial need for water. As it focuses on the rural areas, the project's potential beneficiaries are those who suffer the most severe water deprivation and negative health impacts. Through its well-drilling and accompanying health/sanitation education component, the project seeks to improve the health status, productivity, and general living conditions of the Togolese rural population.

C. The Project

In early 1977, the AID officer opened discussions with GOT officials regarding a rural water project. Discussions continued for over a year and a team of technicians was sent from USAID in Washington to Togo in 1978 to conduct preliminary project design work. A number of donors were involved, and multilateral discussions were held. After the approval of the Project Paper, USAID's participation began in 1980. The roles of the various donors were as follows:

Fonds d'Aide et de Cooperation (FAC) was to provide \$0.75 million for purchase and installation of pumps. Fonds Europeen de Developpement (FED) was to provide \$0.8 million for maintenance of all project pumps through 1983 and to finance the management services of the Bureau de Recherches Geologiques et Minieres (BRGM). USAID's contribution was to be \$7.8 million, to provide drilling and finance the health education/sanitation component. In addition, the U.S. government was to provide the services of Peace Corps volunteers. The GOT was to provide the equivalent of \$955,000, principally in salaries of government employees assigned full or part-time to the project.

Due to the need to co-ordinate with rural water projects funded by other donors, USAID was asked to concentrate its project activities on the northernmost Savannah region (150 wells) and the Plateau region (250 wells), just north of the coastal region.

Drilling activities, under the direction of BRGM, got underway in the Plateau region in November 1981. Before drilling could begin, regional committees in Savannah and Plateau, consisting of the prefets and regional representatives of various ministries, were asked to draw up lists of 150 and 250 villages, respectively. These became the lists upon which drilling was begun in the Plateau region.

1/ Source for the following data, except where noted, is 1982 World Population Data Sheet of the Population Reference Bureau.

The definitive list of villages in the Plateau region differed somewhat from the original list submitted by the regional committee for several reasons. Early on, the drilling team encountered geologic difficulties in some of the villages. In these cases they replaced these with neighboring villages. Unfortunately, USAID personnel working on the health/sanitation component were not always aware of the changes. Thus, some villages were mobilized and did not end up receiving wells. Additional deviations from the original list occurred because of changes desired by local political authorities for various reasons.

Thus, during the early phases in the Plateau region, the project suffered somewhat from a lack of coordination between the drilling team and the health/sanitation personnel. This resulted in a number of disgruntled villages and some ill feeling among authorities and personnel. Fortunately, all seem to have learned from the Plateau experience. As drilling now takes place in the Savannah region, steps have been taken to avoid similar problems. To date, these appear to be successful.

As described above, BRGM has been responsible for supervising drilling activities and appears to have been highly effective in carrying out these tasks. The health and sanitation education component has been the responsibility of two health education specialists on Personal Services Contracts to USAID, one since September 1981 and a second since early 1982. A Togolese national co-ordinator was also appointed. In addition, Peace Corps has come to play a vital role in this project component, for the past two years in the Plateau region and since mid-1982 in the north. A total of nine exceptionally competent volunteers currently work full-time as counterparts to the social promotion agents and/or the agents' supervisors.

The major aspects of the health and sanitation component of the project are the following:

- . Training of Togolese social promotion agents. These are trained social workers provided by two divisions of the GOT Ministere de la Sante (Affaires Sociales and Assainissement). Specialized training is given by the two project PSC's and Togolese collaborators, on general management skills and specific aspects of project implementation.

- . Organization of village health committees. Social promotion agents learn how to do this during their training. They then organize committees of 10-12 members in each village for which they are responsible (the number of villages varies from 3-20). The committees are then responsible, with the agents, for educating the villages on proper water utilization and hygiene practices and for mobilizing them to conduct various "micro-projects" which they themselves will identify and implement with additional USAID financed funds and village contributions.

D. Achievements

Since its inception the project has moved steadily toward attainment of its stated objectives. The major achievements through March, 1983, are as follows:

- . Over 157 working wells have been completed, providing water for approximately 47 thousand rural Togolese;
- . Approximately 100 social promotion agents have received special training for the project and are actively working in the field;
- . Village health committees have been organized in all affected villages (including dry villages);
- . Village health committees, working with the agents, have mobilized their villages to conduct various activities including village clean-up, disease prevention, and fund-raising for pump maintenance.

In the immediate future, project activities are to include:

- . Continuation of drilling in the Savannah region. Due to an unanticipated favorable change in the exchange rate since the project was budgeted, an estimated and lower than expected drilling costs, more wells will be drilled than what was originally planned;
- . Continued training of social promotion agents and work with village health committees;
- . Launching of the micro-projects which villages have been discussing during the past months.
- . Initiation of a region-wide health education campaign in the Plateau.

MANAGEMENT REVIEW

The evaluation team concluded that the project is weakest in the area of administrative and managerial performance. The major difficulties identified from interviews at all levels of project implementation and from document review included insufficient financial management procedures, excessive personnel transfers, insufficient staffing in certain prefectures, infrequent reporting by GOT and U.S. project personnel and organizational flaws at the top of the hierarchical structure. These problems and others have resulted in poor communication and coordination between national level project officials and subordinates in the Dapango and Atakpame areas. (Management of technical inputs from the Hydraulic Service and BRGM was found to be very good and is discussed in the Engineering Analysis and Annex.)

A. Financial Management

A review of the accounting procedures in effect in the Savannah and Plateau regions as well as project headquarters in Lome indicates severe control deficiencies. Accurate inventories of project assets are not maintained, many basic accounting ledgers simply do not exist and control over the petty cash fund of one million CFA in Lome is not adequate. Regular small purchases which should be paid from the petty cash fund remain unreimbursed for months partly because of the liquidity problem resulting from having over two thirds of this fund lent out for personal advances. If this project is to administer over one million dollars in local currency for village level activities and other CFA expenditures in a manner consistent with the criteria for certification of host country accounting systems per Section 121 (d) of the 1981 Foreign Assistance Act, it is essential that project financial management be greatly strengthened. Therefore the evaluation team strongly recommends that short-term and periodic financial management technical assistance be secured from an accounting firm with offices in West Africa and preferably with some familiarity with USAID control procedures.

The purpose of the accounting firm's initial involvement would be to install a simple, timely and reasonably accurate management reporting and monitoring system. This would also entail assistance in financial staff recruitment and training as well as financial management training aimed at project decisionmakers whose primary responsibilities are nonfinancial. The system should provide adequate internal control for cash flows, account balances, property, and financial reporting and eventually yield budget expenditure estimates with identification of significant cost variances. Quarterly reports should be submitted to USAID describing the status of the system and an assessment of project

management progress in attaining organizational and managerial objectives as described in the accounting firm's scope of work and project documents. An annual audit should be performed with special emphasis on effectiveness of internal controls, implementation of recommendations in previous reports, financial statement assessment and variations in input utilization. Finally, during each quarterly report to USAID, the firm should assess the progress made in implementing the recommendations proposed in this evaluation report. Thus the role of the accounting firm is to ensure adequate project financial accountability and provide useful project monitoring information for managerial level officials. A sample scope of work for such a professional engagement, not necessarily tailored to this project, is provided in Management Review Annex A. (See Annex B for a summary of USAID expenditures).

B. Administrative Issues

Comments made during interviews conducted by the evaluation team invariably involved issues related to project management efficiency. Management concerns were expressed by interviewees at both lower and middle levels of project administration. The following summarizes concerns of lower level management personnel (agents and their immediate supervisors) as expressed to evaluation team members:

. Difficulty in obtaining funds for their transportation. Most frequently mentioned was the delay in receiving gasoline coupons and/or money. Agents frequently are forced to advance money from their own pockets for fuel and/or vehicle repairs and complain of several months delays for reimbursement of such expenses. In periods of gasoline shortage, agents report having to "negotiate" with dealers; not having cash available makes their position more difficult.

. Perceived inequities in per diem and supplies allocated to agents. In addition to logistical and bureaucratic difficulties involved in obtaining per diem, agents feel the system is not fairly administered, as there is variation among the amounts received. Hard feelings also arise because some agents are provided motorcycles while others must rely on public transportation.

. Highly centralized financial management of the project. Many agents feel the problems described above are related to over-centralization of the project's financial management. Clearance for even minor expenditures must come from the national coordinator. Several suggested the establishment of regional petty cash funds to facilitate cash flow.

. Frequent reassignment of agents among regions. Unexpected personnel changes were felt to affect negatively the morale of agents, as well as detracting from their effectiveness in the field. Agents feel it is disruptive for one of them to be "affectee" to another region after having been trained and having gained the confidence of villagers in a particular region.

. Procurement of spare parts for motorcycles is too slow. Agents report being on "waiting lists" for spare parts for many months even though the parts are readily available.

. Agents are aware of project management inaction which has resulted in about 15 badly needed motorcycles being kept in storage in Lome and Atakpame for several months instead of being distributed to project personnel.

. The USAID project technical advisors are often forced to be involved with administrative issues at the expense of frequent visits to the field.

. A summary of concerns and desired recommendations prepared by the USAID technical advisers as presented to the evaluation team shortly after its arrival in Togo appears as Management Review Annex C. Comments and concerns of all other project personnel above the levels of agents and chef-secteurs are summarized below:

- . Advisory committees on the regional and national levels often attempt to exercise direct control over project activities.
- . In several instances the Director General for Social Affairs vetoed project related travel to Lome by regional personnel. (See project organization Chart 1 in following section).
- . USAID technical advisers spend too much time in Lome. Even the Atakpame based technical adviser spends the majority of her time outside of the Atakpame area.
- . A third technical adviser is needed, preferably based in Dapango.
- . A turnaround time of several months for per diem and small expense reimbursement from project headquarters in Lome is inexplicable and adversely impacting on employee morale and productivity. For example, gas receipts turned in March, 1982 were finally paid in November, 1982.

- . The project lacks a vehicle maintenance policy.
- . The creation of a National Coordinator position with full-time project responsibilities did not enhance project independence. The project is basically under the control of the Director General of Social Affairs.
- . Top level project management in Lome regards USAID's policy of not paying "indemnities" as a disincentive.
- . USAID's financial management requirements are not clear to project managers.
- . Disagreements and clashes between the National Coordinator and the Technical Advisers are disruptive to project progress.
- . Transportation, particularly for training participants, is inadequate.
- . Agents are transferred without input from regional project managers.

Many of the projects' administrative deficiencies result from inconsistent implementation of existing procedures. For example, the per diem (paid with USAID funds) policy was formalized in a letter dated April 15, 1982 from the Acting USAID Representative to the Minister of Planning and Finance. The policy was based on the Togolaise government per diem system whereby different levels of project officials receive their respective per diem compensation.

In the opinion of the evaluation team, the persistent complaining about per diem stems from national level project management's failure to adequately inform project personnel of the existing policy and to consistently implement that policy on a timely basis. The gasoline allocation problem would be alleviated if the regional office would receive coupons or reimbursement for gasoline purchases from national headquarters in sufficient quantity and on a timely basis. Present delays with per diem and gasoline do not result from a shortage of USAID financed project funds.

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C. Project Reporting and Communication

The lack of an institutionalized reporting system for both GOT and US personnel makes monitoring project activities more difficult and has resulted in a significant lack of documentation from which to assess and summarize project status. Even in instances where personnel were sent on international travel at project expense, no documents describing the purpose and results of the travel were required.

The evaluation team recommends that all project staff at or above the regional level prepare monthly activity reports for their supervisors. Reports should generally not exceed two pages in length. The National Coordinator should submit his report to the Chef du Cabinet with copies to USAID and the President of the National Committee. USAID technical advisors should submit their monthly activity reports to USAID with a copy to the National Coordinator. Although the monthly reports need not be exhaustive they should summarize travel performed, problems encountered, elaborate on concerns and describe major work tasks.

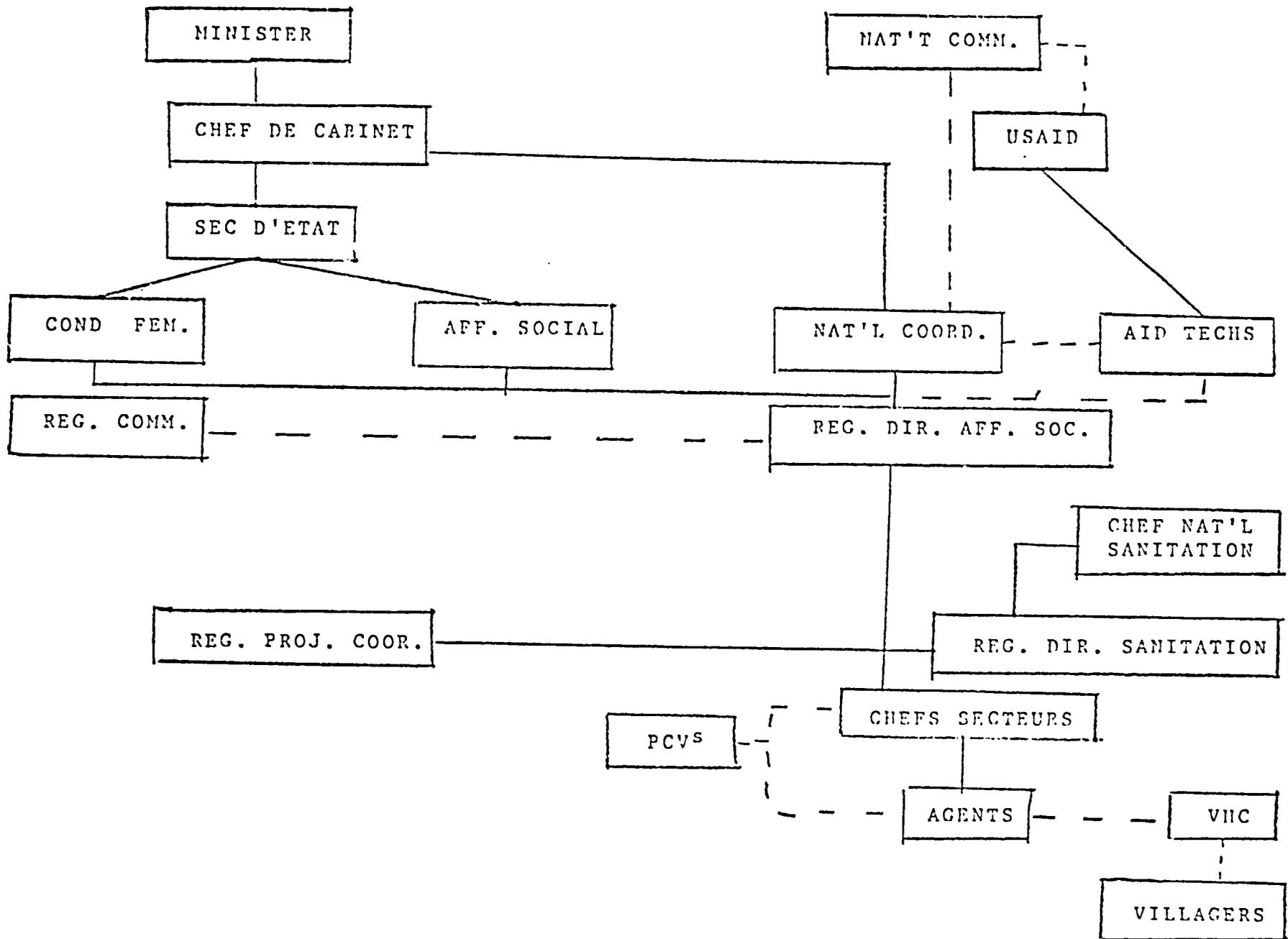
Due to a lack of documentation the evaluation team was not able to judge the effectiveness of some project activity. For example, the Atakpame based technical advisor spent over 110 days from September, 1982 to February, 1983 outside of the Plateau region. Much of this time was spent in Lome, but no reports exist from which to judge the appropriateness or even the purpose of much of this travel. Also monthly reports by regional staff will document the administrative problems described in the previous section as well as progress made toward their resolution.

Besides written reports, project communication can be strengthened through more frequent meetings in Lome between Regional Directors, USAID technical advisors, national project management and the USAID project manager. Such meetings, perhaps on a quarterly or bimonthly basis, will help to emphasize the effects of administrative problems on field staff and in general facilitate communication. When the National Coordinator and counterpart, the Lome based technical advisor, visit regional offices, meetings with regional and some lower-level staff should be used as working sessions to discuss project problems and concerns rather than just being of a perfunctory nature.

D. Organizational Structure

Chart 1 illustrates project organization as it fits into the Ministry of Health. Difficulties inherent in this structure are described below.

Chart 1
PROJECT ORGANIZATION



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Villagers are organized by village health committees who are in turn trained and organized by agents from Social Affairs and/or Sanitation. (See Health and Social Analysis.) Peace Corps Volunteers usually function as counterparts to agents and Chef-Secteurs but were reluctant to be perceived as agent supervisors. Each Regional Project Coordinator has a Peace Corps counterpart who assists with the monitoring of agent activity, training and regional administrative duties. In the ministry hierarchy, the Regional Directors of Social Affairs and of Sanitation are equals. Each supervises a staff of agents. In the project organization, however, the Regional Director of Social Affairs is the highest ranking regional official. The Regional Director of Sanitation is a subordinate who also reports to the National Chief of Sanitation. With each Regional Director supervising some agents who work full-time on project activities and others who are part-time, it is often difficult for them to separate project from nonproject items for reporting purposes. Also "nonproject" directives by any superior usually impact on the project. Potential disharmony in project organization has been averted in both the Savannah and Plateau regions by exceptionally smooth working relationships between Regional Directors and members of both agent groups working closely together, usually in teams.

A more difficult problem is encountered as one reviews the "chain of command" from the Regional Directors of Social Affairs to national level project management. The National Coordinator was intended to be an autonomous, full-time project position reporting to a sub-minister level. The position was established in response to an OAR/Lome request to the Minister of Health in a letter dated October 22, 1982 (See Management Review Annex D). Reviewing the organization chart one notes that the Regional Directors are each directly responsible to three superiors: the Directors General of Condition Feminine and Social Affairs for "non-project" business and to the National Coordinator for all "project" related concerns. The Regional Directors each spend about 80 to 90 percent of their time on project related activities, although they emphasize that project and nonproject activities are often either nonseparable or interdependent. Given the Director Generals' direct line authority over the Regional Directors, the apparent "independence" of the project within the ministry is illusory.

The present National Coordinator was elevated from the Regional Director position in Kara in November, 1982 and enjoys a close professional and personal relationship with the Director General for Social Affairs. Such a close relationship can help to overcome the organizational contradiction described above and enhance project administration if both individuals are dedicated to attaining project objectives and are responsive to the administrative and logistical needs of regional and field staff. However, it appears that the National Coordinator only acts in coordination or with the permission of the Director General for Social Affairs. Thus, establishment of the former position to enhance project administration is not effective.

E. Personnel Transfers:

During the evaluation team's three weeks in Togo, several project employees were transferred from their positions. Agents from areas of the Plateau region already suffering from personnel shortages were reassigned to non-project positions both inside and outside the region. Other personnel were reassigned to positions within the project. As the evaluation team began its field work, the Plateau Regional Director for Social Affairs, the highest ranking project official in that province was reassigned as a chef de secteur with no explanation. There seems to be little justification for many of these transfers which were perceived as unfair to the individuals involved, some of whom were unexpectedly "promoted" to higher level positions outside the project despite their obvious dedication to the project. The effect of these sudden and frequent personnel transfers is disruptive and appears to be contrary to project progress.

In an interview with the team leader and team Social Scientist the Director General of Social Affairs stated that all personnel changes are carefully thought out by his office and calculated so as to be whenever possible in the best interests of the project. His perception of such changes is that they are not impeding project progress. The National Coordinator expressed a similar acceptance of these frequent project personnel changes. Given the disruption caused in the regional offices and the field by these personnel transfers and the devastating impact on project morale at all levels, the evaluation team concludes that national level project management is not sufficiently sensitive to the impact of personnel changes.

The evaluation team recommends that USAID and the Ministry of Health discuss means of alleviating this problem. The following possibilities should be considered: (1) an USAID/GOT agreement whereby all GOT project personnel are assigned to the project for a period of two or three years or remaining life of project duration, whichever is less. (2) An USAID concurrence system for all critical personnel changes. (3) Notification to USAID of all planned personnel moves well in advance, perhaps 90 days.

F. Other Issues:

The role of Peace Corps volunteers has primarily been to act as counterparts to agents and/or their immediate supervisors. After interviewing agents and other project personnel it is clear that the Peace Corps contribution has been invaluable. In the Plateau at least four PCV's will be terminating on schedule during the next three months. Given the progress made in training the field agents, all project personnel, including the Peace Corps volunteers themselves, agree that the Peace Corps component of the project

should evolve as the emphasis moves from well drilling and organizing village health committees to the commencement of micro-projects. Thus volunteers who can train agents and villagers in micro-project skills such as small construction and gardening will be needed. Also, two volunteers with management and accounting experience to work with regional managers would complement the role of the accounting firm and help lay the groundwork for adequate controls over micro-project financing.

As the level of project activity increases in the Savannah region, there will be a growing need for continuous assistance by a technical advisor. Presently trips are made to Dapango by the technical advisors who already have full-time responsibilities in Lome and Atakpame. The evaluation team found unanimous agreement among project staff that a third USAID technical advisor, based in Dapango, (perhaps with a background in construction and with public health experience) would strengthen the project's health component and complement the work of the other technical advisors. Given the large uncommitted USAID fund balance a third technical advisor can be financed from current funds.

Conclusion:

Based on extensive interviews with project personnel at all levels, the evaluation team is concerned about the impact of administrative inefficiencies (delays in expense reimbursement, per diem, gasoline, etc.) on regional and field staff. Even more disconcerting is the failure of national level project management to comprehend the magnitude of the problem and the necessity of addressing it immediately. The involvement of an accounting firm or other external inputs cannot in themselves resolve all the management difficulties described in this report. Unless project management addresses the administrative problems adversely impacting on project staff and performance, the future of the health component is in jeopardy. Therefore the evaluation team strongly recommends that the USAID Representative and high-level Ministry of Health officials discuss the management concerns presented in this document and jointly take whatever action is necessary to strengthen national level project management's responsiveness to regional and field staff needs.

HEALTH AND SOCIAL ANALYSIS

Introduction

Key components of USAID's participation in the rural water project are the health education and sanitation components. The original project document established goals in these areas and proposed methods for attaining them. As the project has evolved, several changes have occurred which should be recognized in a reconsideration of the project's health and social objectives.

The project document correctly recognized that the placing of wells is an environmental modification which can be related to improvements in health status. Yet in setting project objectives too little attention was given to the need to bring about behavioral changes. A restatement of project objectives should recognize that these, rather than measurable changes in health indicators, will be the major outputs of the health and sanitation component of the project. It is unrealistic, and would do an injustice to the project, to expect that even in the middle-term (10-15 years) health indicators such as infant/child mortality would be affected by the installation of wells. With the exception of perhaps Guinea worm, directly and solely water-related, few measurable health status changes can be expected. Thus, project objectives should be restated to reflect the hoped for, and quite likely to be attained behavioral changes: acquisition of organizational skills by agents and villagers, introduction and reinforcement of improved health and hygiene practices, acceptance of the notion of preventive medicine, and the like.

One other deviation from the original project document should be noted and taken into consideration in restating project goals. As originally conceived in this project, latrines constructed in all project villages were to have constituted the main health input. Appropriate health education was to have accompanied their construction. As a result of the insistence of Togolese sanitation authorities, the only latrine model acceptable is one in which the pit is completely lined and the slab is cement and the superstructure also in durable materials. The cost of this model is about \$400. At this cost, not more than one or two per village are possible. Public latrines at schools, dispensaries or in other locations among the populations represent consequently the only choice. This approach is of course totally unacceptable. Public latrines are relatively unknown to rural African populations and there are multiplied hundreds of examples of extremely poorly maintained pit latrines in schools, markets and health centers. Private latrines, one per household, preferably two or more for men, women, and small children, are much to be preferred.

Four hundred dollars exceeds of course the ability of the average householder to pay for a latrine. Besides, having a latrine is not the only answer to the control of environmentally related diseases. For

these reasons, a broader based health component has been adopted, with latrine construction still a viable part but with other approaches and techniques playing important roles.

This shift in emphasis is applauded by the evaluation team as more appropriate to the population's needs, perceptions and ability to absorb inputs than the imposition of a single expensive technology. Essentially, villages are asked to name their perceived health priorities and to analyze effective approaches to prevention and treatment. Latrine construction is still a part of the proposed programs of several villages. Less expensive and perhaps more culturally and technically appropriate models, however, need to be identified, tested, and adapted to local circumstances.

In the following sections the health and social aspects of the project are discussed in detail. These analyses focus on the two major levels at which health and social activities have taken place: the level of social promotion agents and the level of the villages. Conclusions and recommendations based on these findings appear at the end of this section.

A. Social Agent Level Analysis

In a sense, the social promotion and sanitation agents are the backbone of the project. They serve as the liaison between USAID and Togolese project personnel and the villagers, with whom they work through the village health committees. The agents, once trained by USAID health specialists and Togolese counterparts, are responsible for the mobilization of villages through establishing and training village health committees.

The social promotion agents represent the major Togolese contribution to the project. They include virtually all the field agents in the Savannah and Plateau regions from two divisions of the Ministry of Health: Social Affairs and Sanitation. Working on the project is the major activity of these personnel. All have been trained at the national school for social workers (agents de promotion sociale) before being assigned to the field. Since the beginning of the USAID project, approximately 100 social promotion agents have received special training for the project.

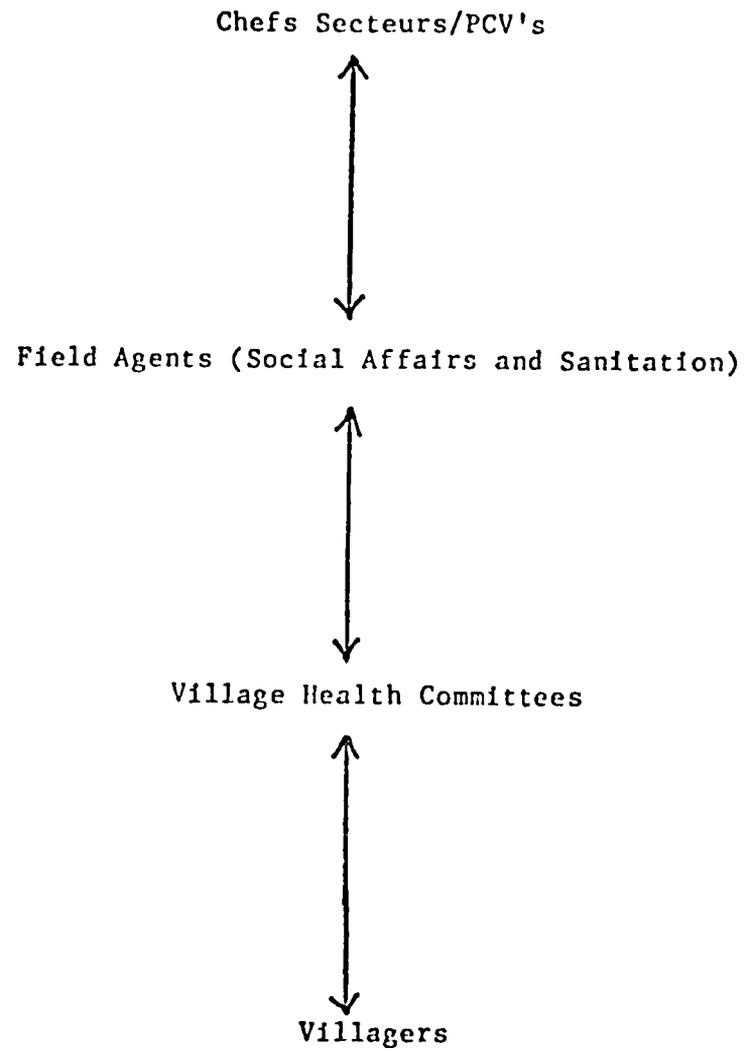
Figure 1 presents a partial organization chart of the project, indicating the position of the social agents. Several comments should be made regarding this figure. Arrows are double-headed to indicate that these relationships are more collaborative than hierarchical. Although chefs de secteurs (from Affaires Sociales) and sanitation agents (from Assainissement) are the supervisors of the social promotion (field) agents, in practice they also perform most of the functions of the latter, visiting the field and sharing responsibility for villages. Likewise, the team was struck by the close collaborative relationship between the Peace Corps Volunteers and the field agents. The PCV's assigned to the project are exceptionally dedicated and competent, and appear to have the complete confidence of the agents and villagers.

In the following pages, results of interviews conducted in the field with field agents and supervisors are reported. These focus on two main areas: training and work in the field. The latter includes a discussion of several management-related issues which have an impact on the work of the field agents. A copy of the protocol used for the interviews appears in Annex A.

1. Training. As mentioned above, all social promotion agents are graduates of the national school of social work. For their work on the project, they have received special on-going training on various aspects of project implementation. Initially, the two PSC health specialists on the USAID project trained the chef de secteurs and sanitation agents. This included teaching them how to train field agents, which they then did in turn. In general, training is in the form of periodic seminars of 3 to 5 days. Content varies depending on the stage of the project which has been attained. For example, earliest training was in how to organize village health committees. Now that these have been established,

Figure 1

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training is focusing on the development of micro-projects. In addition to this type of training which focuses on management and organizational skills, seminars have covered specific topics such as pump maintenance, health practices, village hygiene, and water-related diseases. In addition, seminars have been conducted on special topics when problems have arisen in the project. A particularly useful aspect of training has been that at the end of seminars the participants have been asked to evaluate the sessions. This has provided them with an opportunity to have input into the design of future training programs.

During the interviews, agents were questioned about their training. In general, their comments were extremely positive. They felt their training had been useful and had prepared them adequately for the work in the field. When asked which aspects of their training had been most useful, a majority of agents mentioned the skills they had acquired which enabled them to organize villagers into health committees. They felt they would not have been able to succeed at this without their project training. Many agents also stated that the practical training had been more useful to them than that which was more theoretical. Other "most useful" features of training mentioned by one or more agents include the following:

- . training of trainers,
- . conflict resolution in villages,
- . communication techniques,
- . group dynamics, and
- . project planning.

Agents were hard-pressed to respond to a question on which aspects of their training had been least useful. The most frequently mentioned (by about half those interviewed) was the technique of role-play. Although they had initially found role-play interesting, some agents found when employing it that villagers did not take the subject matter seriously, or thought it was a "game for children". Agents commented that group discussion "among adults" was a much more effective teaching technique in their villages. It should be noted that at least two agents felt role-play was their most useful technique. Apparently, it is up to agents to evaluate the appropriateness of this technique in their particular villages.

Agents were asked to provide suggestions for additional areas in which training was needed. Most frequently mentioned was practical training, for example in techniques such as spring-capping, pump maintenance, and latrine construction. Also mentioned was training in the planning of micro projects (this is planned for the near future, as the project is now entering this phase). Several suggested more training in the development of visual aids for use in the village education campaigns. Two agents suggested that village chiefs should be included in the training given to the health committee members.

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2. Agents' work in the field. During the interviews, agents were asked a series of questions about their work in the field. In general, they expressed strongly positive feelings concerning their relationships with their supervisors, Peace Corps Volunteers, and village health committees. Regarding their work with the latter, agents expressed pleasure that village participation goes beyond the committee members. A majority indicated that their meetings usually include many villagers in addition to those on the committee. In discussing their relationships with their supervisors and the PCV's, agents cited the collaborative nature of their work, with all performing similar activities. Agents saw this as a very positive factor.

Agents explained that the frequency of their visits to their villages depends upon the number which they cover (agents are responsible for between 3 and 20 villages) and the stage of the project, some stages requiring more intensive preparatory work. During each visit, the agents attempt to schedule the next visit. However, some agents reported difficulty in setting fixed times very far in advance, as circumstances often intervene to prevent meetings from being held as scheduled.

Agents felt they had won the confidence of the villagers. Some reported being called upon to assist in resolving problems unrelated to the project. They also often need to resolve conflicts among villages, particularly over water rights. They felt their training had prepared them well for this type of mediation.

Agents were questioned about ways in which their work with villages could be facilitated. Several mentioned that the guides they have been given to assist in planning village work are too complicated. They would like to work with USAID project personnel to develop simplified versions. About half the agents mentioned the need for first aid kits to take on their field visits.

A recurrent theme in this portion of the interview was management-related problems which they perceive as seriously impeding their work in the field. The primary problems, mentioned independently by a majority of those interviewed, are discussed in the Management Review section of this document.

B. Village Level Analysis

1. Savannah Region. In the northernmost region, the Savannah, the project has gotten underway 12-18 months later than in the South. Although social promotion agents operate in the region and have already helped to establish health committees in many villages, few health or sanitation activities have begun. Drilling of wells and installation of pumps are the major project activities being conducted in the Savannah region as of early 1983. To obtain an idea of how these installations are proceeding, the team visited three villages, accompanied by the drilling team.

In Cinkasse the team observed the installation of a pump. Word had not spread to the villagers that the installation would occur that day, so few were present. However, the two villagers selected for pump maintenance were at the site and the team observed their training by the drilling team. This training consisted primarily of a trial-and-error assemblage of the moveable pump parts. Use of simple visual aids, such as a diagram indicating the order of pistons and other parts, should be considered for more effective training.

In Nayeng the villagers were observed constructing the margelle (apron) of the recently installed pump. The team had the opportunity to speak with several villagers, all of whom expressed the hope that the village would now have sufficient water. One villager asked for advice in how to obtain water for the pigs and poultry which he raised for the market.

While visiting Mogou, the team watched the testing of a new well to assess its potential yield which would begin operating in several weeks. A visit to the former water source was made, approximately 1 1/2 kilometers from the pump site. This site consisted of a series of holes of several meters, dug by women of various villages (each for a particular village). These shallow holes produced a very limited amount of extremely muddy water. Each village jealously guarded its hole, some attaching fetishes to frighten off water-seekers from neighboring villages.

2. Plateau Region. Annex C presents basic data on villages visited in the Plateau region. Table 1 summarizes some of the main findings obtained by questioning the village health committees; other findings are more conveniently presented in narrative form. As noted in the table, six of the nine villages visited had functioning pumps. In the other three, all attempts at well-drilling had been negative. Most of the health committees had been functioning for about a year. There were two exceptions, one of which is notable: Kounyohou, where social promotion agents had hesitated to go for over six months because of embarrassment over the negative drillings. That committee has existed only since January 1983. All of the committees except one have women

TABLE 1
ESSENTIAL CHARACTERISTICS OF VILLAGES AND VILLAGE HEALTH COMMITTEES VISITED

Village	Prefecture	Population	Pump	Committee Since	No. Members	No. Women	Guinea Worm	Health Priority	Micro p Discus
Agadjame	Haho	350	Yes	26/8/82	11	5	Yes	Guinea worm	Ye
Tomtala	Haho	500	No	2/82	11	3	Yes	Guinea worm	No
Kounyohou	Ogou	364	No	23/1/83	10	No	No	Diarrhea	No
Avete	Ogou	800	Yes	20/2/82	12	3	No	Measles	Ye
Niantougou Kope	Ogou	470	Yes	?	7	0	No	Intestinal parasites	Ye
Imoussa	Wawa	1000	Yes	31/3/82	11	4	No	Malaria	Ye
Idao	Amou	250	Yes	12/5/82	9	1	No	Malaria	Ye
Ezime	Amou	2952	No	?	13	4	No	Malaria	Ye

members. In one, nearly half the members were women. Officers include the president, the secretary, the treasurer, the counselors, and usually two pump maintenance technicians. The secretary in nearly every case was a school teacher. The procedure for selecting committee members varied somewhat among the villages visited but usually involved a meeting of the entire population. The chief maintains a varying amount of control over the selection depending on the ethnic composition of the village. This factor depends further on the relative authority of the chief in such matters in villages with only one ethnic group, and on the number of different ethnic groups in those villages that have a heterogeneous composition.

Two villages, both in the Haho prefecture, were endemic for Guinea worm. For those villages, it is the priority health problem. Others named malaria, diarrhea, intestinal parasites and measles in that order of frequency. All but two villages had begun discussing their microproject. In only two had the discussions led to any planning and in no village had any activity begun.

With the foregoing as a general introduction to discussing the status of the village health committees, the next step is a more detailed presentation and discussion of the findings of the inquiry. The presentation of the findings will follow the order of the questions ~~not~~ summarized in ~~the table~~. For convenience in grouping the findings, the villages with pumps will be discussed first, followed by those without pumps, the so-called "dry villages".

Villages with pumps

In general the pump is located at a distance of several hundred meters from the edge of the village. All the pumps except two were observed or reported to have severe problems of queuing-up, resulting in long waits. Both these factors, distance and waiting-in-line, are discussed below, but more fully in the engineering analysis.

Functioning of the health committees

All the committees reported that they met more or less regularly, and even in the absence of the social promotion agent. The meetings are usually attended by other villagers.

In several cases, the president of the committee expressed great appreciation for the training given by the project. Some said they hadn't known how to organize themselves before the training since they were "simple villagers". In general, the greatest value placed upon the training was in fact the acquired ability to organize themselves to a concerted action. In one instance, this result was expressed more in

terms of "learning to live as a society". Other committees were a little more vague about what they had learned. One seemed to particularly appreciate learning where and how to ask for help.

The immediate result of the training received was in all cases a series of activities, usually a general village clean-up, a programme for keeping the area around the pump clean, and a plan for maintaining and repairing the pump, usually involving the creation of some kind of a fund. Variations on the activities were several. In fact, each village presented a rather unique history of response to the project. In four villages the fund is raised by collecting a fee per capita; in the others, a community money-making project, most often a communal field, has been planned. Among the villages collecting a fee, one has two systems: one for men, the other for women. The men pay 200 francs a month, the women 25 francs. They have already collected 20,000 francs, from which a spare piston and several spare rings have been bought in advance. In another village, all efforts to collect money have thus far been frustrated. A poor harvest and heavy family expenses were blamed. In still another village, the fund is contributed to by some of the residents of a neighboring village with borders right at the pump. In a fourth village, the fund, kept by the secretary, has already been used to buy spare parts for the pump. Because the money had already been collected, the delay in repairing the pump was minimal.

Not one of the communal projects has as yet netted any funds. Both villages have begun their fields but are awaiting the rains. In one of the villages recalcitrant citizens who refuse to work are made to pay 300 francs instead.

Other variations in the initial activities of the committees centered around the village clean-up programme and that for keeping the pump maintained and repaired and the pump surroundings clean.

One village had just received its pump the week before the visit so that no real programmes had begun beyond the initial installation. In all the others, the village clean-up was carried out with reportedly no problems. Those who refused or failed to participate are usually brought to the chief and made to pay a fine.

The clean-up of the area surrounding the pump is the exclusive responsibility of the women in one village and of a committee of primary school students in another. This task also appeared to proceed generally with little difficulty.

Activities of the Committees

Following the establishment of these basic activities, most villages have entered a second phase where the social promotion agent has worked closely with the committee to define local health priorities and to

design local means of combatting these health problems. This phase had progressed in a variable manner in those villages visited. In most, the activity had not progressed beyond the definition of the problem. Table 1 identifies the problem selected by each village. The procedure for arriving at this decision involves house-to-house visitation by committee members, followed by a general meeting with the population, with the committee making the final choice. In some villages, the meeting is attended by only a representative group from the population.

In one of the villages identifying malaria as the chief health problem, a village campaign to eliminate small collections of water had begun. In another, latrine construction had been conceived of as part of the malaria control program.

These activities are in fact supposed to be preparatory to the planning and execution of microprojects. In most cases, however, the response to the identified problem is not an activity requiring funds, so that in many villages other projects, not necessarily bearing a direct relationship to the identified problem, have been put forth by the committee. Table 2 summarizes these proposed projects.

Of note are the recurring projects: latrines, village pharmacies, and school projects. The first type is usually conceived of as a communal or public type latrine, in one case for a dispensary, in most cases for defined neighborhoods. When asked whether they expected any problems in maintaining the cleanliness of these public latrines, the members of one committee seemed unaware of any possible problem. This response is surprising in view of the miserable history of public latrines of any type in Africa.

Many of the proposed projects, of course, fall outside the area of water supply and sanitation, even when the definition is stretched to its utmost limit. But certainly there would be nothing to inhibit villages from using the organizational resources and expertise gained through the project as well as the local funds to launch these projects. The one exception would be the village pharmacies, since there is apparently a policy factor~~y~~ inhibiting their organization. Only one village had begun a vegetable garden at the pump site and it appeared to be well kept.

Most committees expressed great appreciation for the work of the social promotion agents in the areas of village health and hygiene and in fact several expressed a desire for more training in these areas. There was also expressed a general desire for more frequent visits by the agents.

Participation in decision-making on health priorities and on microproject selection appeared not to be a problem. There seems to be wide use of village meetings to deal with issues and problems.

TABLE 2
PROPOSED MICRO PROJECTS

Village	Projects Proposed	Projects begun
Agadjame	Village pharmacy Primary school Vegetable garden Livestock	None
Avete	Latrines Village pharmacy Livestock New school buildings Maternity	None
Niamtougou Kope	None mentioned	
Imoussa	Construction of a storage building Latrine for dispensary Latrines for each neighborhood	None
Idao	A school Latrines	None
Kuma-Tsame-Totsi	Dispensary Latrine	Latrines

Villages without Pumps

Although many of the same questions were posed to the committees in these so-called "dry villages", the responses were so colored by the absence of an adequate water supply that a separate discussion is merited. These villages may be considered typical of at least a proportion of the 44 project villages without pumps. A possible exception would be the dry villages of the Wava prefecture where the water supply situation (springs) is somewhat different. Unfortunately only one village, with a pump, was visited there.

Kounyohou

With 364 inhabitants, this is a village typical of the eastern section of the Ogou prefecture. In this village the formation and training of the health committee was completely inhibited for nine months by the failure to find water. The social promotion agents, in fact, could not bring themselves to return to the village since so much of the initial thrust of their work had centered on the probability of having a functioning well. Since the possibility of building cisterns for rainwater catchment has emerged, however, the agents have had new courage to come back, and the health committee has been formed.

There are several rainwater catchment efforts already in place in the village--jars set under a short gutter on the few houses with corrugated metal roofs. The chief is adamant about having a well, however, and the committee has organized the collection of 90,000 francs for the drilling. They hope to tap into a mineral prospection drilling operation in the area that is run by the Ministry of Mines. In this project, water wells are put in as a side benefit of the drilling operation in villages willing to pay. The project is funded by UNDP. The committee apparently intends to use its funds to pay for another drilling effort.

Because of the high probability of a negative drilling and thus a waste of village funds, it is recommended that the committee be influenced to invest its money plus microproject funds in the construction of a large public building (school, maternity, or simply a storage area) with a corrugated metal roof, from which rainwater could be collected into a large public cistern. There is likely to be resistance to this idea from villagers who already have corrugated roofs but the idea should be pursued until a clearly informed decision can be made.

Tomtala

With a population of 500, it is representative of the dry areas of the Haho prefecture, where the prevalence of Guinea worm infection is high. The committee was remarkable for its determination to carry on with the project despite a negative drilling and despite severe conflict with a nearby (2 km) village with a well over rights to use the well.

This conflict occurred despite the fact that Tomtala had contributed money to the fund in the other village. The social promotion agent had intervened to help resolve this conflict.

The committee expressed great appreciation for the particular agent, not only because of his efforts in resolving this conflict but also because of the training given to the committee and the help in the areas of village hygiene and the means for raising local funds (collective field). The committee is convinced that with the use of the well in the neighboring village and the increase in village cleanliness, the prevalence of Guinea worm infection has diminished.

Since only one attempt at well drilling was made, at least two more should be undertaken. In addition, a public rainwater catchment scheme should be pursued, and perhaps the maternity that the committee proposed as a microproject.

Ezime

Ezime (population 2952) convoked a large meeting for the visit, in fact the largest of all the villages. Four attempts have been made to drill for water, all without success. Despite this negative result, the committee has pursued a programme of activities including village clean-up and collection of funds.

A long list of potential microprojects was put forth including many suggested by the dispensary nurse who is a committee member. This list includes:

- . A cistern at the dispensary;
- . Latrines throughout the village in public places;
- . Housing for nurses, teachers and other personnel;
- . Structural improvements in the dispensary and the maternity;
- . Technical supplies for the same units; and
- . A kitchen for the maternity.

Although there is a cooperative in the village, the committee expressed a need for further training in management and organization. It was apparent from the discussion that there had been many problems in gaining the participation of the population.

Just beside the village is a perennial stream used for all purposes by the villagers. Questioning revealed that the stream originates on the mountain that rises just behind the village. Several persons, including the Peace Corps volunteer, agreed that the spring is about three kilometers from the village, and that there are no significant obstacles such as large boulders, valleys or gulches between the source and the village. Further investigation revealed that a French coffee and cacao

research organization owns land behind the village and through which the stream runs. Gaining access through their land and possible conflict over stream rights might present serious obstacles to exploiting the stream. The possibility of tapping the stream at its source for a gravity system to the village should, however, be pursued.

C. Conclusions and Recommendations

. In the original project document the project objectives focus on improving the health status of the rural population of Togo, thereby leading to their increased agricultural productivity. The project logframe states that "reduction of diseases in the project area" (to be verified by medical records) will be an objectively verifiable indicator of goal achievement. It is felt that, in order to do justice to the project's achievement, the focus of these objectives should be shifted to behavioral outputs. Given general health conditions, as well as the inability of the project to provide adequate water supply for all villagers in all villages touched by the project, it is unrealistic to expect (at least in the short to middle-term) a measurable reduction in the incidence of water-related diseases (with the possible exception of Guinea worm). Even less likely are reductions in infant/child mortality. The major strength of the project is the organization and mobilization of villages through village health committees. The primary impact which can result is the reinforcement of existing good health practices (e.g., village clean-up campaigns) and the introduction of new concepts (e.g., that of preventive medicine). Project goals should be restated to reflect these outputs, as well as the other major area, i.e., the teaching of organizational and managerial skills to villagers. These behavioral indicators will provide a more realistic assessment of the project's success at its conclusion.

. There is consensus among the social promotion agents that the major difficulties they encounter in their work are linked to the management issues discussed in detail in this section. These are clearly impeding the agents' movement and efficacy in the field and are having a negative impact on morale. Prompt rectification of these management problems is essential to the continued functioning and increased effectiveness of the project.

. Training of agents appears to be thorough and effective. A major advantage is that training is on-going, with periodic seminars being held. Agents have strong feelings about the training. Particularly those who have been in the field for some time have many constructive comments, and are eager to offer them. A formal study of agents' opinions and recommendations for training would provide extremely useful input for continued planning of the project's training program.

. A substantial amount of survey data has been collected to date, including baseline research on water utilization, health status, and sanitation. However, problems associated with the design, execution and analysis of the surveys have prevented the maximization of their utility. For example, the timing of the surveys in the project regions did not permit all of them to serve as true baseline measures. The project staff itself questions the reliability of the water utilization survey conducted in the Plateau region. A third problem is related to the village survey conducted under the direction of a Peace Corps Volunteer who has a Masters degree in Public Health.

The scope of this survey, and the hand tabulation of the data, are too ambitious for even this dedicated and competent volunteer. Data collection efforts in the Savannah region have profited from the lessons learned in the Plateau, and some of these problems can be avoided there. Nevertheless, it would be advisable to revise the system of data collection to reflect the restated (see recommendation above) project objectives. Revision should include establishment of indicators for measuring short and middle-term behavioral goals as well as a re-examination of the methods of collecting health data from dispensaries for eventual long-term evaluation. In addition, assistance should be provided in the analysis of the survey data. The REDSO/WCA computer system which may be in operation during the coming months, could be utilized for this.

. Most health committees appeared to be functioning well. In at least three, however, there are serious problems with organizing the population around activities, collecting money, and/or conflicts with neighboring villages over rights to a pump. Further training in general management and organization plus training in simple accounting and fiscal management procedures is in order.

. Although health priorities have been identified in most villages, the priority health problem seldom bears a direct relationship to the micro projects being proposed. A different approach to micro project planning, perhaps using a broader problem-solving approach based on issues beyond health, should be employed. Water supply after all has economic and social as well as health benefits.

. Further training of the committees in health and hygiene should not be neglected, however. Many expressed a desire for it, and there are many tasks that the committees can undertake at little or no cost to meet health priorities such as malaria control, diarrhea control, prevention of dehydration, and Guinea worm control.

. In both dry villages and in those with populations too large for one well, there has been a general neglect of alternative water sources; springs, gravity systems, rainwater catchment, infiltration galleries next to rivers and perennial marigots, etc. Several large villages complained that one well was insufficient. Most continue to use other sources to supply their needs, largely because of long waits at the well. It is strongly recommended that every village in these categories undertake a broad-based water resource survey and that project funds be used to apply appropriate technologies to source improvements.

. Participation of women in the project is not as high as might be desired, both at the agent and village levels. The number of women on village health committees varies, but rarely exceeds 25 percent in any of the villages visited. Agents should be reminded of the importance of insuring women's active participation in the village health committees and in their activities. This issue should be brought up by the agent

with the committees, as the latter do not always seek to include women among their members. Women play a key role in village life, and can be instrumental in introducing and reinforcing improved hygiene and health practices in the villages.

. Some villages have made an active effort to involve youth in the village health and sanitation activities. Like women, young people can play an important role, particularly vis-a-vis their younger siblings in the household. Agents should encourage villages either to organize youth committees at schools or, if it appears more practical, simply to solicit active cooperation of young people in such activities as village clean-up programs.

. Latrine construction in the Plateau region appears to be a top priority in many villages, but plans seem to be directed incorrectly toward public rather than private latrines. A complete reassessment of the latrine program, including the search for less costly models and the evaluation of various models based on soil characteristics, cost and local preferences, should be undertaken.

. The drains from the wells are generally poorly managed. In only one village had a garden been started. Drain management, preferably with attempts at vegetable gardening, should become a major health committee activity. Many committees expressed their satisfaction with the benefits brought by the presence of a well in the village - both health improvements, especially in the lowering of diarrhea incidence and Guinea worm prevalence, and the convenience to women who now have more time for household management, child care, and work in the fields. These benefits have not yet been realized by many project villages with no well (44 in all) and even in some villages with one well where women still find it easier to walk 3 kilometers, to a marigot than to wait for hours at the pump. As long as these needs remain unsatisfied, much of the progress of the health committees in related areas of village improvement will be hampered.

. Although some activities have already been conducted, the education campaign component of the project will become a major thrust during the coming year. This is a key project activity, particularly in light of the suggested restated project objectives discussed above. Before the campaign gets underway, it is recommended that careful study be done of the appropriate techniques to be used and a detailed plan be drawn up, using the skills of an expert in communications if necessary. There are many problems inherent in designing educational materials for non-literate populations, and in West Africa the language problem is particularly acute. It is essential that comprehensive research, including message-testing, be conducted at the outset and before educational materials are produced in quantity.

ECONOMIC ANALYSIS^{1/}

Benefits: Substantial But Difficult to Measure

A convenient village water source reduces hours spent fetching water from distant supply points. Part of that time and effort can be spent on alternative productive activities, i.e., tending a larger garden; more time on school work; handicrafts; increased field work--especially in peak planting and harvesting seasons when labor is scarce.

Safe water curtails disease, sickness and death. In Togo, specific diseases and health problems related to low quality and general lack of water include:

- . Diarrhea (incidence and prevalence insignificant in Togo),
- . Guinea Worm (a localized disease prevalent in many Togolese villages),
- . Nutritional Status,
- . Schistosomiasis, and
- . Intestinal Worms (i.e., ascaris and whip worm).

When women and children have to walk several kilometers for water, they generally fetch it only for drinking and cooking. Water for washing is less available resulting in contamination of food and prevalence of skin diseases. Few village families will bear the costs (in terms of time and fuel) of boiling water to disinfect. Storing boiled water as it cools also presents problems. Unsafe water for cooking utensils leads to risk of contamination since many major diseases survive long periods outside the body.

These very basic conveniences translate into solid economic benefits if the project is successful in providing villages with a more convenient source of potable water. The most important economic benefits are as follows:

^{1/} A brief macroeconomic overview for Togo is contained in the Economic Annex.

SAVING IN TIME.

Main beneficiaries are rural women and children who carry most of the water. Cost in time for fetching water from a previously inconvenient source is great. The costs rise in the dry season as women and children walk longer distances. In some cases women travel between 10 to 20 kilometers to fetch water. They can use up many calories and as much as 3 to 9 hours daily just to obtain water for drinking and cooking.

. HEALTH RELATED BENEFITS.

All villagers benefit from improved health. Given the high infant mortality rates, children are probably the greatest recipients of health related benefits. Health related benefits include:

. Maintenance until death:

Costs of maintaining the child or adult up to death is a major source of savings of this project (assuming cause of death can be traced to water supply).

Categories of expenditures include:

- . Food,
- . Housing,
- . Clothing,
- . Education,
- . Health and Hygiene, and
- . Transport.

. Lower Fertility.

Most studies indicate that lower infant mortality rates have a negative impact on fertility.

. Absenteeism.

Absenteeism due to illness and disease (caused by poor water) are very costly. Guinea worm, which can be completely eradicated with good hygiene and potable water, lowers productivity because of its prevalence during the planting season when workers are in short supply. In extreme cases, absenteeism may occur due to the enormous time needed to fetch water.

- . Reduced quantity and quality of work.

Illness and disease (caused by poor water) limits energy and effort of farmers, even when not absent from work.

- . Loss in human capital investment.

Diminished concentration of students (from illness related to poor quantity and quality water and loss of energy due to fetching water) can curtail future productivity in the villages. In some villages children's long hours fetching water precludes any chance of going to school.

- . Costs of treating illness (from poor water) include:

- . Purchasing drugs,
- . Payments to traditional healers, and
- . Costly curative medical treatment.

In the Savannah region alone in 1974, it has been estimated that there were over 62 thousand visits to medical facilities for water related diseases).

- . Costs of material losses due to enteric diseases that impair the intestinal nutrients (due to poor water).

- . SAVING IN URBAN INFRASTRUCTURE COSTS

Costs of maintaining families in urban areas is higher than in rural areas. Water shortages can be a major factor forcing urban migration. Higher social costs of maintaining urban families and agricultural production losses of farm families incurred when not engaged in productive rural activities (as opposed to being part of urban unemployed or under-employed) can represent a significant economic loss to Togo.

- . INCOME DISTRIBUTION

This program improves income distribution because the water is targeted to Togo's most disadvantaged group--the rural poor. For years, Togo's resources have been drawn from its rural interior to build up a basically urban infrastructure. The development of Lome has been paid for largely by increased taxes levied on rural areas. This project represents a transfer of resources back to where much of the urban development was financed--the rural

villages. The poor get a larger share of the countries resources than would otherwise be the case. This leads to a more equitable distribution of income in addition to reinvestment in Togo's main economic base—the agricultural sector.

. IMPROVED VILLAGE INSTITUTIONS

Leaders in many rural villages move on when a community lacks an organization capable of handling its problems. Installation of wells and the associated educational program develop not only village leadership but encourage "movers" to remain and have an impact at the village level.

. LIMITATIONS

Ideally, decisions for investing in rural water supply systems should be based on rigorous benefit/cost analyses in which both benefits and costs are quantified. After considerable research no completely satisfactory method has been developed for quantifying the benefits of improved water supply. World Health Organization (WHO) experts feel strongly however, that safe water is essential for good health and a prerequisite to the control of most frequent diseases affecting the rural areas.^{1/} The number of diseases is generally greater than in urban settings. While alternate water sources exist, they are polluted, inconvenient and/or unreliable.^{2/}

In no cases were there readily quantifiable direct benefits (i.e., agro-industries). As a result, it is difficult to present a quantifiably rigorous economic justification for the Togolese water project. However, examples are useful in illustrating the

^{1/} Possibly half of the deaths in less developing countries (LDCs) occur in children under five with diarrheal disease being the most common cause. Clean water is a significant factor in lowering the incidence and severity of diarrhea.

^{2/} The World Bank has recently pointed out that the main diseases in Togo are malaria and sicknesses caused or aggravated by unhygienic living conditions, or insufficient polluted water. (World Bank, 1982, Vol. II, p.2) and that a sufficient supply of clean water can substantially reduce the incidence of most diseases.

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potential economic ramifications of increased potable water for the Togolese rural poor.^{1/} In some cases conservative estimates for the benefit stream strongly support funding a project. This is the case for the Togo Rural Water and Sanitation Program.

^{1/} Unfortunately accurate prediction of the impact of water supply and sanitation projects together with its economic evaluation would provide investment planners with valuable information for making net economic benefits (on costs) explicit. This information together with social and political considerations could be factors in decisions to invest. While this analysis is useful, one must be aware of certain caveats such as 1) whether or not there is unemployment and 2) whether increased productivity or earnings should be valued net of consumption.

Benefit-Cost Analysis: A Positive Economic Impact

The original PP (p.20) cites an example of an AID economist's attempt to estimate the economic gains of a village well and sanitation program for Chad. The very conservative annual benefits resulting from installing a tube well in a village of 300 residents were as follows:

Savings in food from infants and children dying prematurely.....	(²)	\$ 590
Absenteeism from work.....		\$ 729
Cost of medicine		\$ 776
Time savings in fetching water		\$ <u>1,676</u>
	Total	\$ <u>3,771</u>

Many economic benefits of this project have been omitted including:

- . Substantial nonfood costs of maintaining children up to their deaths (i.e. education, housing, clothing, costs of obtaining water).
- . Loss in human capital investment due to diminished concentration on productive learning activities.
- . Reduced quantity and quality of work, when not absent from work.

Discounting at 10 percent, the \$75 annual depreciation costs represent a present value of \$750. Discounting at a 10 percent discount rate yields a \$37,710 present value of benefits over an infinite life span of the project. Thus a conservative estimate for costs and benefits leads to a high benefit-cost ratio approaching 2, when using the estimated \$19 thousand project costs and assuming conservatively a full disbursement of costs at the beginning of the project.¹ Under these

1/ Discounting costs at 10 percent discount rate over time would lower the present value of project costs and increase both the benefit-cost ratio and the rate of return on investment.

conservative estimates, present value of the benefit stream would justify the costs after only seven years. If the benefits could more adequately be measured, the length of time for recovering costs would decline substantially.

Justification for Public Health Education Program

The economic impact of water through improved health in Togo depends on the success of removing or lessening diseases. This ultimately depends on the way villages use water. Breaking the chain of transmission of certain diseases such as ~~Guinea Worm~~ ^{Ascaris Worm} requires improved excreta disposal methods. The combination of potable water and health education is the most effective means of control. Public health education is certainly needed to achieve full health benefits.

Revised Estimates Based on Actual Cost Declines

All revisions strengthen the original strong economic support for this project. Well construction costs have been enormously overestimated as of April 1983. Overestimation stems from:

- . Declining costs of technology,
- . Lower start-up costs, and
- . Strengthened dollar vis-a-vis the CFA

At the original project's dollar price, 600 to 700 operating wells will probably be constructed.^{1/} Relatively small additional costs for buying, installing and maintaining (i.e. during an initial grace period) the pumps will be paid by FED and FAC. Factor costs of each well have been reduced by more than a third. Thirteen thousand dollars replaces \$19 thousand as a conservative estimate for the present value of the costs of each well.

Women save at least two hours per day fetching water. Assume conservatively 60 women beneficiaries per well. This is probably a low estimate for women and certainly excludes the substantial effort of children in the villages. Each village saves daily 120 hours (i.e. 60 women times 2 hours per day) or 10 full 12-hour work days. If women's work is valued at \$0.50 per day and women carry water once a day for 300 days of the year, an estimate of annual savings from just fetching water is \$1,500. At a 10 percent discount rate, the present value of savings

^{1/} These estimates were given to the team by the USAID Project Manager. Exact figures can not be given because the rate of success in finding sites with adequate water pressure is not known.

from fetching water alone is \$15,000. This component of the benefit stream alone more than justifies the sum of the present value of installation costs, \$13,000, and the cost stream of maintenance and depreciation, \$750.

As illustrated in the earlier benefit/cost estimates, the economic savings from preventive health measures are probably more important in economic terms than the value of time saved in carrying water. Thus very conservative benefit estimates of the Togo Rural Water Project when compared to costs indicate economic justification for this project. Adding the value of the additional benefits would only strengthen the already strong economic support for this project.

Recommendations

This project was thoughtfully designed and implemented and is having a positive impact on thousands of Togo's rural poor. Recommendations aim not at substantially changing the construction or operation of the project, but at moving the project marginally toward a higher level of efficiency. Current momentum of this timely and excellent program should in no case be slowed down.

- Villages should pay all maintenance, operation and depreciation costs (after initial grace period). They should contribute a somewhat higher amount than present to the construction costs.

Increasing the availability of funds will extend the project to more villagers in other rural areas. It increases the probability that funds will be available to meet operating expenses and minor repairs. In addition to instilling responsibility on the part of the village for their pumps, it guarantees that the level of service provided is appropriate to village needs.

- Concentrate wells near regional growth points. 2

As the farmer's chances of engaging in profitable activities increases, economic benefits improve, other things being the same.

Growth points can be fertile regions or those with good potential for producing market surplus and export crops - cocoa, coffee, cotton, etc. Growth points may also be the areas surrounding rural market towns. In these regions, time and energy saved from a convenient potable water supply can be more efficiently and productively used.

This project initially concentrates on the Plateau and Savannah regions to economize the cost of well drillings and communication. Concentrating efforts on regional growth points within these two regions will allow further economics of scale to be realized in the construction and maintenance of the wells and the initial development of the labor intensive public health education program.

Place wells in villages where current water sources are very inconvenient and/or the quality of water is particularly low.

The economic gains in terms of improved health and time savings in fetching water is inversely related to the convenience and quality of alternative water supplies.

Contribute part of the costs of the micro projects.

Currently the micro projects are funded completely by the project funds (i.e., with the exception of local labor). If the project costs are borne by the villages, it will encourage an appropriate expenditure of funds.

Large villages with only one well but with an active social education program should be given a priority in well site selection.

Encourage Togo to increase agricultural market incentives.

Togo's neglect of agriculture by failing to provide adequate infrastructure and market incentives substantially curtails the potential benefits of this project. Lowering the market costs and raising the market incentives will encourage farmers to more profitably use the time and energy savings from this project.

ENGINEERING ANALYSIS

In general, the project was found technically to be very well designed and managed. Project objectives and methods of achieving these objectives were well thought out and documented in the project planning phase. Excellent technical advice and construction supervision by the consultant, BRGM, has played a key role in the success of the project.

Hydrogeologists use Stereo aerial photographs and geologic maps to locate points most likely to yield sufficient water. This information is coupled with factors such as logistics, village preference, etc., to make the final selection of drilling sites for each village.

BRGM also monitors well construction. Complete drilling logs are kept for determining payment to the contractor. Logs serve as regional hydrogeologic studies. Logs filed for future reference will provide information needed to upgrade wells with bigger pumps if need arises in the future. Included in the logs are complete pump tests on each well carried out after well completion.

The Vergnet foot pump has been standardized by the GOT for use in all government village well projects. The pump was found to be durable, easy to install and repair, and appropriate for most lift ranges and village situations encountered in Togo. Pump maintenance technicians assigned to Hydraulic Service are extremely well trained and conscientious, but substantially over-worked.

The project as it exists is based on small diameter wells equipped with manual pumps. There was evidence that the overall objectives could be better served by broadening the scope of the project to include alternative water supply systems such as stream fed gravity systems, shallow dug wells, infiltrations galleries, small reservoirs and roof catchment.

The primary objective of the original project was to provide 30 liters of water per person per day. It was found that this objective is not being met due to not providing enough pumps per capita or per village. The health and economic benefits stated in the project paper probably have not been fully met due to political pressure to distribute a fixed quantity of pumps and wells to a maximum number of people and villages.

Recommendations

1. An official list of criteria for selecting well sites should be prepared by BRGM and Social Affairs.
2. A village representative should always be present during drilling site selection to provide village input, and to obtain reasons behind the final choices.
3. Modify discharge measurements during pump testing to allow more precision.
4. Social Affairs should train village health committees in the techniques and importance of proper maintenance of drains from pump aprons.
5. BRGM and FAC should notify the manufacturers of the Vergnet pump that the design should be improved to provide a better sanitary seal between the pump and well apron, and that the well should be vented to the atmosphere.^{1/}
6. Selection of the low-lift or high-lift model pump should be based on adherence to the design lift ranges. In questionable cases, the high lift model (30 mm piston) should be used.
7. Social Affairs should train villagers in routine maintenance and repair of the pump piston assembly and prepare a document for their village signature giving them technical and financial responsibility for maintenance and repair before they are on a recipient list for a well.
8. Hydraulic Service pump maintenance programs should be expanded about four-fold. A fully equipped technician with transportation could be placed in each prefecture instead of each region.
9. The project scope should be expanded to include the capability of studying and implementing alternative, more cost effective, village water systems such as gravity fed from springs, infiltration galleries, roof catchment, etc.

^{1/} Details are presented in the Engineering Annex.

10. Any continued funding for the project must be based on one pump serving no more than 250 people, or 30 liters per person per day from suitable alternative systems. This criterion must be met in existing project villages as well as new ones, where it is technically feasible.

11. The maintenance program for Social Affairs project vehicles should be strengthened by providing an adequately equipped workshop with a staff of suitably trained mechanics.

Due to the level of technical engineering detail necessitated by a thorough review of the project, all elaboration on the above summary and recommendations is found in the Engineering Annex.

ANNEX I

Management Review

Annex A

Accounting firm involvement with USAID funding projects

A. Objectives

To assist the host Government in establishing an effective project monitoring system which includes design and maintenance of a financial control system and periodic audit of project expenditures.

B. Scope of Work

1. Project Management System

The Contractor will provide professional services by designing and implementing a comprehensive, simple, timely, and reasonably accurate PROJECT MANAGEMENT REPORTING AND MONITORING SYSTEM for project management staff.

(a) The system will provide:

- (i) An adequate internal control for cash receipts, disbursements, balances, payrolls, inventories, property and financial reporting,
- (ii) Quarterly, annual and life of project budgets,
- (iii) Ready identification of actual and potential problems - identify causes of variances from project plans (budget) including an analysis of the project contract or progress against scope of work stated in the contract, and
- (iv) Control over changes and modifications of the project and activities within the project by continuous monitoring.

(b) Participate in furthering financial management capabilities of project personnel to maintain the above system.

- (c) Submit one annual and three quarterly reports for the 12 month period starting January 1, 1983. The initial report will include a description of the system (a simple system) design. Progress on the status of installation of this system and training of personnel to run it will be included in each subsequent quarterly report.

2. Review of Management Capability

Review the Project Management Unit's administrative capability and submit quarterly reports beginning with the period January 1, 1983 to USAID and project management on the following aspects of project activities.

- (a) The first quarterly report will include a written critique of the mid-project Evaluation Report if applicable. This critique will discuss the feasibility of implementation of the report's recommendations made to the host country, USAID, contract staff and administration. In the subsequent quarterly reports, emphasis will be on follow-up on recommendations, briefly indicating areas of implementation or lack thereof. For areas of inaction specific corrective recommendations should be made.
- (b) Monitor and present the financial progress of the project. This is comprised of:
 - (i) The draw-down of funds from the host government contribution combined in order to analyse the arrival of inputs in accordance with the plan as put forth in the project document and as amended thus far (AID will report on dollar costs on a quarterly basis).
 - (ii) Review of financial statements issued by the Project Accounts Staff and in doing so, special consideration should be given to recommending interventions to be taken by management to meet proposed project inputs in a timely manner.
- (c) On a semi-annual basis provide a review of all dollar costs by input category. A short review will be made of the status of participants training and their subsequent project input upon training completion. Contractor should visit the USAID Controller to examine USAID project financial records.
- (d) Provide a projection of the next quarter's dollar and local currency costs by line item based on discussions with project management staff and SULSU personnel.

3. Annual Audit

- (a) Prepare a long form audit report for the 12 month period ending December 31, 1983. Special emphasis is to be given to the following areas:
- (i) Effectiveness of the project financial management including internal control procedures,
 - (ii) Implementation of recommendations made in previous reports by the accounting firm,
 - (iii) A thorough assessment of the annual financial statements, and
 - (iv) Verification that inputs have been used as outlined in the project documents and amendments.
- (b) Copies of this audit are to be submitted to USAID, Project Management and appropriate host government officials.

Management Review

Annex B

Togo Projects Status Report 12/31/82
Page 7 of 10

TCGO PROJECTS STATUS REPORT as of December 31, 1982

<u>PROJECT</u>	<u>OBLIGATION #</u>	<u>OBLIGATED</u>	<u>DISBURSED</u>	<u>ACCRUALS</u>	<u>PIPELINE</u>
<u>693-0210 Togo Rural Water Supply and Sanitation PACD 9/30/84</u>					
<u>CDAA-80-21693-CC15 \$1,500,000</u>					
PRO AG 8/31/80					
Agua Prins - Contract #1033-00	210-0-1-01	\$115,000.00	\$91,000.91	\$10,000.00	\$13,999.09
Jato B. Tcha-Tockey P/O/P 00003	2-01	4,221.46	4,221.46	-	-
Griffin Intrafor Contract #17-81-DHE	4-01	1,379,000.00	1,379,000.00	-	-
Porject Direct Cost	5-91	1,778.54	1,778.54	-	-
	TOTAL:	\$1,500,000.00	\$1,476,000.91	\$10,000.00	\$13,999.09
<u>CDAA-81-21693-CC18 \$3,248,000</u>					
Amendments 1, 2, 3		\$1,200,000			
		\$1,350,000			
		\$98,000			
Unearmarked:					
John Austin - TDY/Lome	Control	\$646,066.95	-	-	\$646,066.95
Agua Prins - TDY/Lome + Abidjan	210-1-1-01	2,105.05	2,105.05	-	-
Office Equip. and Vehicle Procurement	02	578.00	578.00	-	-
1 U.S. made IBM typewriter (P.O. #82 01)	3-01	215,000.00	208,021.39	-	-
Various Purchases (P.O. #82-02/03)	02	1,500.00	1,063.65	-	6,978.61
Griffin Intrafor - Drilling Contract	03	5,750.00	3,329.72	-	436.35
Griffin Intrafor - 25% Contingency	4-01	1,403,660.00	122,614.64	2,420.00	-
Vehicle Repairs and Maintenance	02	696,920.00	314,481.43	250,000.00	1,035,865.36
Virginia Slacum PSC/P.O. 82-48	5-01	30,000.00	15,626.79	-	382,438.57
Other Costs - Local	1-03A	21,400.00	15,496.14	3,000.00	11,373.14
Local Commodities	5-02	10,000.00	3,796.73	5,903.86	-
Local Operational Costs	03	40,000.00	15,094.97	2,000.00	4,203.27
Local Salaries	04	95,000.00	49,460.43	5,000.00	19,905.03
Local Training	05	40,000.00	36,705.31	10,000.00	35,539.57
William Hanson P.O. 693-32-47	06	17,500.00	10,270.83	3,294.69	-
V. Slacum Amendment to contract for travel	1-03B	10,000.00	3,101.96	3,000.00	4,229.17
		7,500.00	2,024.70	1,000.00	4,898.04
				1,000.00	4,475.30
	TOTAL:	\$3,248,000.00	\$603,971.61	\$267,618.55	\$2,156,409.36
<u>CDAA-82-21693-CC19 \$2,392,000</u>					
Amendment No. 4 8/05/82		\$1,500,000			
-					
No. 5 9/29/82		792,000			
Unearmarked					
S. Fry P/O/T 20003	210-2-101	\$2,199,000.00	-	-	\$2,199,000.00
A. Prins P/O/T 20002	210-2-102	80,000.00	6,875.98	-	73,124.02
		113,000.00	-	-	113,000.00
	TOTAL:	\$2,392,000.00	6,875.98	-	\$2,385,124.02

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Management Review

Annex C

Togo Rural Water Evaluation

A. Issues of primary concern to Project Staff

1. Two and 4 wheel usage, distribution, and control (especially bikes for agents working full time on the project).
2. Gas procurement, distribution, usage, control at all levels.
3. Two and 4 wheel vehicle maintenance (parts procurement, distribution, role of Project mechanics).
4. Pump maintenance and repair (effectiveness of village repairmen, parts procurement and availability, effectiveness of regional team from Hydraulique).
5. Pump usage (Is the supply enough for the population? Are they using other water sources? What for?).
6. Project resource distribution (centralized operational funds, distribution of office and building supplies, etc.).
7. Training for field agents and village health committees, especially in the Plateau Region: What has been most and least useful? What improvements would they suggest?
8. Per Diems for training and travel: review of entire system.
9. Recordkeeping at all levels of project activities.
10. Village Health Committees, especially for the Plateau Region: Do they still have the same numbers? Are they functional? Do they meet apart from sessions with agents? Do they consult the villagers about decisions and inform them of their activities?

B. Recommendations the Project Staff would like from the Evaluation Team:

1. Review top-level Project management.
2. More regional control over project resources.
3. Flexible but well-accounted for gas distribution for field agents.
4. Immediate bike distribution to agents based on need.

5. Role of national and regional committees to be consultive only.
6. Criteria for new wells should be:
 - (a) in villages already in the Project or on original list;
 - (b) with a demonstrated water need;
 - (c) in areas infested by Guinea work;
 - (d) in villages which have participated actively in project (keeping caisse supplied, holding meetings, starting projects, etc.).
7. Pump parts procurement and distribution should be done outside of the SGGG stores system.
8. Project personnel (field agents and regional staff) should not be reassigned out of Project zone and replaced by new people, but can be reassigned within Project area based on staff needs).



EMBASSY OF THE
UNITED STATES OF AMERICA
Agence Américaine pour le Développement International
Lomé, Togo

le 22 Octobre 1982

N/Réf: USAID/Togo/82/174

Monsieur le Ministre,

Il m'était un grand plaisir de discuter avec vous le 7 Octobre sur la future direction du projet commun socio-sanitaire du Gouvernement Togolais/USAID, précédemment sous la direction du Ministère des Affaires Sociales et de la Condition Féminine.

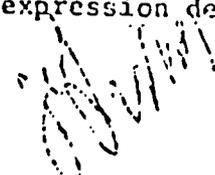
Je suis très satisfait que nous étions d'accord sur la nécessité d'une gestion saine du projet, spécialement le besoin d'une direction forte et responsable dans la personne d'un homologue togolais.

J'ai appris que nous sommes tombés d'accord que le nouveau coordinateur du projet devrait :

- rendre compte directement à votre cabinet au lieu d'être subordonné à un service quelconque dans le Ministère;
- avoir une classe personnelle assez élevée pour obtenir une coopération effective des différents services du Ministère de la Santé Publique et d'autres Ministères concernés dans l'exécution du projet;
- être affecté au projet à plein temps, libre des responsabilités de surveillance dans aucun service du Ministère; et
- avoir assez de capacité personnelle soutenue par une assistance adéquate pour assurer effectivement la gestion financière et la comptabilité pour les fonds du projet déboursés directement par le Gouvernement Togolais.

Je sais bien que l'identification et l'affectation d'une personne appropriée prendra certain temps. Néanmoins je suis sûr que vous choisirez le plus vite possible un (ou des) candidate(s) qui conviendra le meilleur à tous les critères indiqués ci-dessus.

Veillez agréer, Monsieur le Ministre, l'expression de ma très haute considération.


John A. Lundgren
Représentant de l'USAID

Son Excellence
Monsieur Hodabalo Bodjona
Ministre de la Santé Publique et
des Affaires Sociales
Lomé

Health and Social Analysis

Annex A

Questions posed to social promotion agents

I. On their responsibilities

- a. For how many villages are you responsible?
- b. How long have you been assigned to this region?

II. On their training

- a. What was your general educational background?
- b. What specific training did you receive for the project?
(for how long and by whom?)
- c. What were the most useful aspects of your training for the project?
- d. What were the least useful aspects of the training?
- e. What modifications would you suggest in the training of social promotion agents?

III. On their work in the field

- a. What is the nature of your relationship with your chef de secteur (supervisor)?
- b. How often do you visit each of your villages?
- c. Who participates in your meetings in the villages
(committees and/or villagers)?
- d. What methods do you use to solicit the opinions of the committee members? of the villagers?
- e. What is the major problem which you encounter in your work in the villages?
- f. What types of education/communication materials do you think would be most useful for work in the villages?

Health and Social Analysis

Annex B

Questions posed to village health committees

I. On the structure of the committee

- a. How many members are there?
- b. How many women are members?
- c. When was the committee started?
- d. Have there been changes in membership since then?
- e. How were members selected?
- f. Who are the officers?

II. On the functioning of the committee

- a. How often does the committee meet?
- b. Who participates in these meetings besides committee members?
- c. Do you remember the training given to presidents, secretaries, and treasurers?
- d. What did you learn from that training?
- e. How have you applied what you learned?
- f. What further training do you need?

III. On the activities of the committee

- a. What have been the major activities of the committee up to this point?
- b. How has the social promotion agent worked with you?
- c. How have you gone about obtaining the participation of the rest of the population?

- d. Have you had any difficulties in gaining their participation?
- e. Is there a village fund?
- f. How is it supplied?
- g. How have you used it thus far?
- h. Have there been any pump breakdowns?
- i. What was the delay in making repairs if any?
- j. Have you had any difficulty in collecting money for the fund? Any difficulty in finding spare parts for the pump?
- k. Have you selected your microprojects?
- l. How did you decide on those projects? Who participated in the decision?
- m. Did you have any difficulty in making a decision? If so, what were those difficulties?

Health and Social Analysis

Annex C

List of Villages Visited in Plateau Region

<u>Name of Village</u>	<u>Population</u>	<u>Prefecture</u>	<u>Date of Visit</u>	<u>Functioning Well?</u>
Agadjame	350	Haho	22/3/83	Yes
Tomtala	500	Haho	22/3/83	No
Kounyohou	364	Ogou	22/3/83	No
Avete	800	Ogou	22/3/82	Yes
Niantogou Kope	470	Ogou	23/3/83	Yes
Imoussa	1000	Wawa	23/3/83	Yes
Idao	250	Amou	24/3/83	Yes
Ezime	2952	Amou	24/3/83	No
Kuma Tsame-Totsi	1000	Kloto	24/3/83	Yes

ANNEX III
Economic Annex

Economic Overview

Togo is a small, poor country with an area of 57 thousand square kilometers and a population estimated at 2.5 million in 1980. Eighty percent of the population live in the rural areas. Per capita income was approximately \$380 in 1980 and only \$180 in the rural areas. Agriculture accounts for approximately 80 percent of employment and 30 percent of GDP. Smallholder food crops account for 70 percent of total production. Cash crops of cocoa, coffee, cotton and palm kernels generate 30 percent of Togo's foreign exchange earnings.

Togo's major foreign exchange earner is phosphates. A modern phosphate mine employs 1,600 persons but accounts for 6 percent of the GDP, 40 percent of export earnings and 30 percent of government revenues. The tertiary sector (i.e., commerce, transport, public administration, etc.) provides 50 percent of GDP and employs 15 percent of the labor force.

Togo has a relatively rich and varied resource base. With sound economic policies, Togo could sustain a more rapid and widely spread growth without deteriorating its external financial position. Phosphate revenues quadrupled in price in 1974, but declined dramatically in 1975 and Togo was unable to honor its financial obligations. Since 1975, public policy has exacerbated the inefficient allocation of resources and led to foreign indebtedness and slow growth. Togo entered the International Monetary Fund (IMF) standby arrangements in 1979 and 1981, and rescheduled its debts. This required decreased government expenditures and limits on domestic credit and external borrowing.

Togo's Gross National Product (GNP) increased 0.2 percent in 1980 and declined by 5.9 percent in 1981. Falling international prices for cocoa and coffee have aggravated the situation. Unfortunately, agriculture has been neglected in favor of unsound government enterprises. These projects, such as luxury hotel "2 Fevrier", continue to drain Togo's investment funds.^{1/} Togo's longtime objective should be diversifying the economy, encouraging the private sector, and allocating resources to more fully tap Togo's agricultural potential.

^{1/} Most of Togo's larger industry is fully or partly owned by the State. Most of the new facilities, including an oil refinery, a steel mill, a textile factory, two cotton mills, luxury hotels, are utilized below profitable capacity. The government is actively considering closing some of these enterprises.

Considerable potential remains for increasing both production and income (i.e., more use of fertilizers, insecticides and selected seeds; improved marketing and storage; and most importantly more production incentives for small farmers - particularly higher farmgate prices). At present, fertilizer subsidies to encourage small farm production are more than offset by low producer prices for coffee and cocoa. Forced farm sales have led to significant financial surplus. But low producer prices have discouraged harvesting of existing trees and replanting.

Implicit taxation of agriculture is justified if directed into socially productive government investments including projects that facilitate agricultural production and marketing. However, the major investments have been state enterprises which, with few exceptions, are incurring large losses - even when servicing of foreign debt, which is assumed by the Treasury, is excluded from their costs.

The government needs to return to its former positive support of the private sector and particularly the small farmer.

ENGINEERING ANALYSIS ANNEX

Methodology

Project documents were reviewed prior to arrival in Togo, and additional project material was provided for review upon arrival in Lome.

March 14 and 15 were spent meeting project officials and advisors from the Hydraulic Service of the Ministry of Public Works, Mines, Energy and Water; the divisions of Environmental Health and Social Affairs of the Ministry of Health; Bureau for Minerals and Geologic Research (BRGM) and the USAID contract technical advisors to the project.

March 16 through 25 was spent in the field collecting data and observing all facets of project implementation and operation. The field work was greatly facilitated and streamlined by prior planning and organization by the USAID mission in Lome and participation and cooperation by all concerned parties in the field, including Hydraulic Service, BRGM, Social Affairs, Peace Corps and USAID contract advisors.

Activities in the field included observing site selection, well drilling and completion, pump testing of completed wells, construction of well apron and drain, pump installation and commissioning, and training of villagers in pump maintenance and water use. Fifteen operational project wells were visited and records were made of discharge, maintenance problems and water collection habits. One morning was spent with a maintenance technician in the field. Franchized spare parts dealers were visited to record inventories and prices. Two villages were visited where well drilling had been unsuccessful and alternative sources of water were sought. A cursory water use survey was conducted in one village with a project pump. March 28 through April 1 was spent in Lome meeting with various officials and parties to discuss different findings and implications of the evaluation and seeking the most rational recommendations for continuing to meet the project's stated goals and objectives in the most expedient way. It is noteworthy that Togo was experiencing its worst drought in five years during the evaluation.

The following technical evaluation will discuss various technical components and issues of the project, with comments on future implementation. Three terms will be applied in the comments which are defined below for clarification:

1. Suggestion: An item which project management may want to consider. The evaluation team is not in a position to make a firm recommendation from the outside.

2. Recommendation: The evaluation team strongly urges the project staff to take action on the point in question.

3. Condition Precedent: These comments must be implemented before securing further funding and approval of a possible second project phase.

Location of Drilling Sites:

After a village is selected to receive a well or wells, a hydrogeologist from BRGM goes to the village to select the exact locations for drilling. 1:30,000 scale stereo aerial photos are used to identify geologic indications of water-bearing strata such as fractures, rock outcroppings, vegetative cover, etc. Geologic maps have been used with some success in certain areas with extensive geologic stratification. Electric resistivity and seismic studies have been used to a limited extent but generally found to be of questionable value and not cost effective.

For each site a map is made showing geologic features, village locations, roads, streams, etc. Selection of drilling sites is based on judgment using factors including hydrogeology, logistics, social acceptability, etc.

There is evidence that during the early phases of the project there was a lack of coordination between BRGM technicians, village representatives and Social Affairs officials in site selection. However, this communication and coordination has become stronger as the project has advanced.

It is recommended that BRGM and Social Affairs work together to make a list of criteria which should be considered during site selection. The list should indicate and quantify, if possible, any criteria which must be met - such as minimum flows, distances or social acceptability factors.

It is further recommended that an official village representative always be present during site selection. Social affairs officials should be involved in coordination. Factors considered in selection should be fully explained to the village representative. In case agreement in site selection cannot be made, Social Affairs will arbitrate and decide the drilling site. But in no circumstance should drilling be held up or delayed due to indecision of site selection. If agreement cannot be made, the drill team should leave the area and the village be taken from the project list.

well Construction and Construction Monitoring:

Wells are drilled using the air-rotary method through unconsolidated material and a down-the-hole air hammer through rock strata. This method and equipment is eminently appropriate for the geologic conditions and the type of wells needed for village water supply. Drilling is very fast, and well yield estimates can be made during the drilling process. Bore holes are about 200 mm in diameter. The wells are cased with 100 mm PVC (plastic) pipe with slotted screen. Wells are gravel-packed if screens are in unconsolidated strata, and grouted above the screen to the ground surface. A standard packer is used to retain the grout where gravel-pack is not needed. The 100 mm casing is the minimum diameter which can accept standard hand pump elements, but does not limit discharge if a larger power pump is installed in the future.

Complete well logs are kept both by the driller and BRGM inspector, including penetration rate, geologic characteristics of penetrated strata, depth and discharge. Cutting samples are collected and retained in each strata. The drill logs are later compared and used as a basis for payment to the drilling contractor.

The drill logs are retained by the Director of Energy and Mines for future reference. The logs were judged to be well prepared, complete and professional. They not only assure quality construction of project wells, but serve as a hydrogeologic survey which will be invaluable in future activities involving water supply in the area as well as possibly upgrading existing wells with power pumps as villages expand and develop.

Pump Testing of Wells:

Rough estimates of well discharge are made during drilling. These data are used to design a detailed pumping test to be carried out by BRGM and Service Hydraulique after well completion. The well is pumped at three different rates based on discharge estimates during drilling. Each rate is pumped for one hour, recording simultaneous measurements of time, water level in the well, and discharge. Pumping is done with a submersible electric pump, controlling discharge with a gate valve. Discharge is measured with a bucket and stop-watch. Water level is measured with a standard reel tape and water level sensor. Pump test results are analyzed and recorded with the well drilling logs at Service Hydraulique.

The primary purpose of pump testing is to assure that wells will yield adequate water for the manual pump to be installed, and to assess the potential of the well for possible use of a higher capacity power pump at a later date. The problem of deciding to commission or cover a marginal well is extremely difficult and worth some discussion.

It is impossible to assess accurately the extent and volume of an aquifer without pump-testing over a very long period of time, and simultaneously measuring drawdown in multiple test wells located different distances and directions from the pumped well. Such a detailed test would cost much more than the well itself and cannot be justified. If wells are dry or produce substantially beyond the capacity of a manual pump, there is no problem deciding to commission or cover it up. However, in many cases pump testing shows wells that yield about the same or somewhat less than the manual pump capacity. For these cases there is some risk of the well becoming de-watered during periods of maximum use and prolonged drought. However, once villagers have seen water being pumped from the well, it is extremely difficult to convince them, and perhaps those making the decision, to cover the well when their alternative source may be a dirty water hole many kilometers away. BRGM has received some criticism because of a few wells which have de-watered during prolonged use in the dry season. This criticism is in no way justifiable. In fact, of the 157 pumps installed during the evaluation, there have been only six alleged cases of de-watering and this was at the end of the worst drought that Togo has experienced in five years. BRGM and Service Hydraulique are to be commended for their control which is reflected by this record.

It should be noted that the above problem of de-watering is a function of the aquifer's ability to store and transmit water, and is not related to long-term lowering of water tables or mining of groundwater. The small quantities of water used in village wells will have no long term or wide spread adverse effects on groundwater quantity.

The only improvement that can be envisioned in pump testing is to improve the precision of discharge measurements. It was observed that measurements were made into a plastic bucket with a volume of about ten liters, and timed with a stop watch. The observed pump-test had a maximum discharge of $6.1 \text{ m}^3/\text{hr}$, or 1.69 L/sec . It is doubtful if precision beyond one decimal place can be obtained with the equipment used; however, three decimals are claimed in the pump test documents. It is recommended that discharge measurements be made using calibrated containers which have a minimum volume of the quantity of water pumped in one minute.

Well Aprons:

Concrete aprons about 3.5×3.5 meters are constructed around the wells to provide a clean area for water collection and prevent surface runoff and drainage from entering the well. A small collector drain is built into the concrete in a 1.5 m square around the pump, and drained from the apron by a small channel. The apron is sloped to the collector drain to remove spilled water and facilitate keeping the apron clean. A small masonry protection wall (30 cm high) is built around the apron to protect it from animals and dirt. Spilled water is drained away from the apron in a small

earth channel leading down-slope from the well. Apron design and construction are excellent, and no improvements can be envisioned. However, many drain ditches were observed to be poorly maintained, dirty, and holding stagnant water. The original construction of the drain ditch is done by Service Hydraulique and considered adequate. But in some cases, in what was probably villagers' attempts to clean the drains, they have been excavated too deep near the apron, causing adverse grade or slope and resulting in ponded water. This can have serious effects on health, particularly with malaria as a mosquito breeding site. It was observed that at one well a pit had been dug at the apron edge in order to make earth bricks. It is recommended that Social Affaires, through its agents, train villagers in the importance of drain maintenance and teach proper grading techniques. The key is to maintain a small and shallow ditch or furrow with a continuous grade or slope; not to attempt to dig a deep ditch or drain pit.

Some interest was expressed regarding the possibility of using the pumps and wells for village gardens. Due to the priority of domestic water, the observed huge demand, and the high cost of the pumps, villagers should not be encouraged to use the pumps for gardening. However, if a community wash area could be constructed near a well, the rinse and drain water could be used for a garden. A pump serving 200 people could be used to irrigate a garden between 100 and 400 square meters, depending upon the quantity of wash water used and efficiency of water distribution. Many problems must be addressed before implementing a village garden scheme based on wash water, such as the social acceptability of communal washing, financing designs and construction of a suitable wash area, design of a suitable water distribution system, and organization of the village for division of labor and spoils from the garden. It may be a suitable micro-project for consideration in some villages. However, it is suggested that some preliminary thought go into general design of a suitable wash area and a pilot system be tested before attempts are made at wide-spread dissemination of the idea.

The Vergnet Pump:

This pump, of French design and manufacture, has been selected by the Togolese government for use on all public wells in government village water programs. The Vergnet pump was selected for its reputed durability, ease of installation and maintenance, appropriateness for the range of lifts encountered, and for standardization of spare parts. Its unique design is worth describing for those unfamiliar with the Vergnet pump.

The pumping element is lowered into the well below the water level, so the lift is not limited by atmospheric pressure. The pumping element consists of a cylindrical elastic rubber bladder inside of a stainless steel tube. The bladder fits loosely inside the tube so water can pass by it freely. The steel cylinder is

fitted with ball-type check valves in the top and bottom which allow flow into the bottom and out the top. The bladder is connected to a foot pedal activated piston and cylinder with a heavy ABS tube. The piston and cylinder unit are attached to the pump stand and well apron at the ground surface. The bladder, cylinder and connecting tube are filled with water and serve to transmit power from the foot-driven piston to the bladder. When the piston is pushed down with the foot, water is forced into the bladder, causing it to expand in length and diameter. This forces water out of the steel tube containing the bladder. The water is forced out the top check valve, which is connected to the pump spout with a separate parallel heavy ABS tube. When the foot pedal is released, the elastic force in the bladder causes it to contract, pushing the piston and foot pedal up again. During contraction of the bladder, water from the well is pushed into the steel tube through the bottom check valve by hydrostatic pressure - thus completing the pump cycle. There is a small passage between the discharge outlet and the bladder inlet fitted with a check valve which permits a small volume of water to enter the bladder-piston unit at the end of each stroke to assure it stays full. The excess of this bladder feed water is jetisoned out the top of the foot piston at the end of each stroke. Two models of pumps are being used in the project; pumps with a 40 mm piston and 46 cm stroke for small lifts, and pumps with a 30 mm piston and 32 cm stroke for higher lifts.

There are two advantages intrinsic in the Vergnet design: The first is that power transmission between the person pumping and the pumping element down the well is hydraulic as opposed to mechanical pump rods or shafts. This greatly simplifies installation and removal of the pump for maintenance and eliminates the many maintenance problems associated with mechanical drives. The second advantage is that parts subject to wear and frequent replacement (pistons and seals) are at the ground level and easily accessible. In fact, the piston unit can be taken out by removing one retaining nut and easily serviced or replaced by a trained village mechanic. A schematic diagram of pump and piston assembly are shown in Figures 2 and 3.

Fifteen project pumps were visited. Users were questioned about frequency and nature of pump failure, how it was fixed, and who paid for spare parts. Discharge measurements were made by timing how long it took to fill a 20 liter bucket with vigorous pumping. Pumping for all measurements was done by the same team member. Some discharge measurements were made with villagers (mostly women and children) using the same pump in order to see how their rates compared with trials by the evaluation team. Finally, some net pumping rates were measured by observing the quantity of water pumped by users over a 30 minute period in order to estimate the effect of down-time removing and replacing vessels and changing of pumpers. It should be noted that with few exceptions all pumps visited had queues waiting to receive water regardless of the time of our visit, and that net pumping rates were not affected by periods with nobody waiting to use the pump.

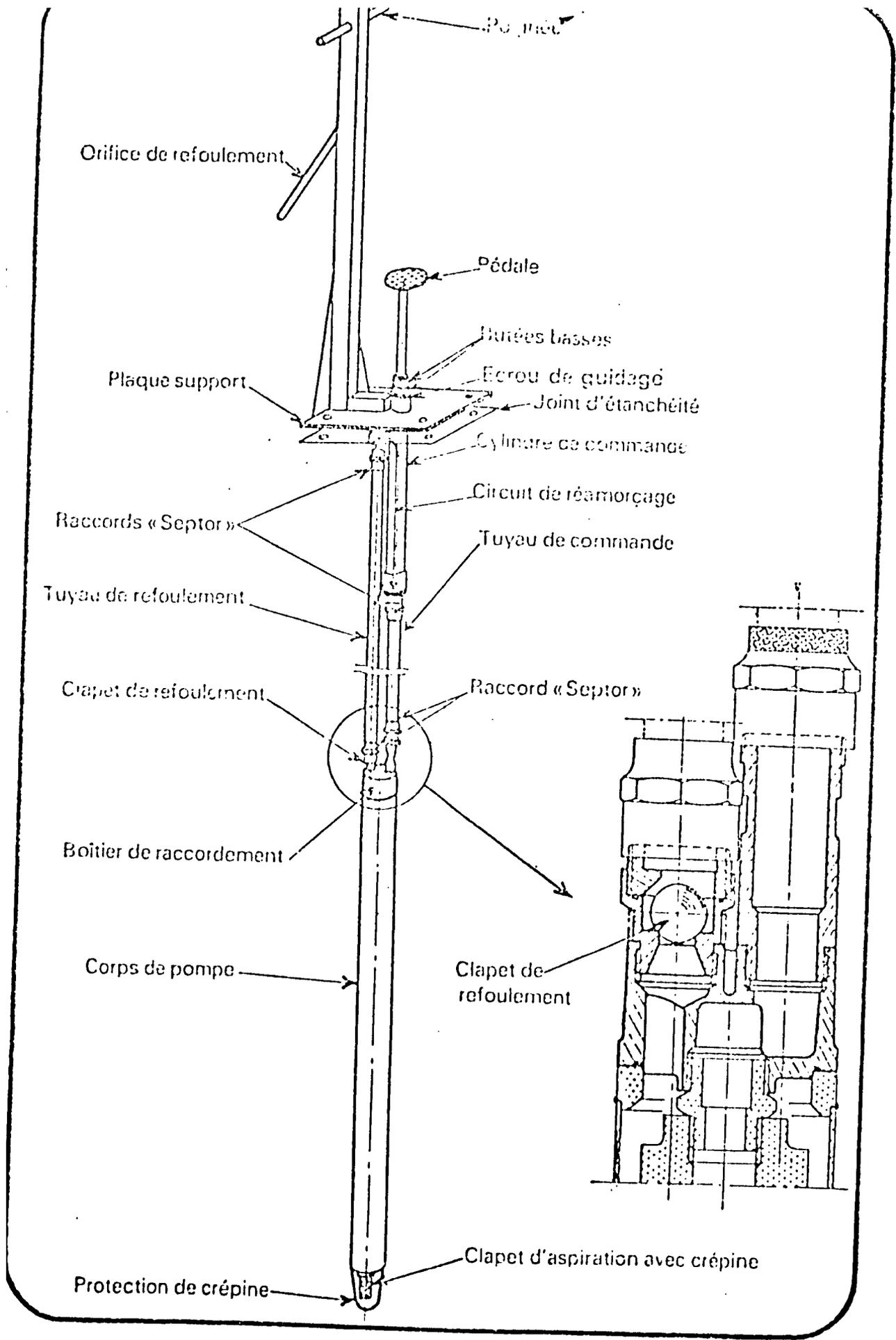
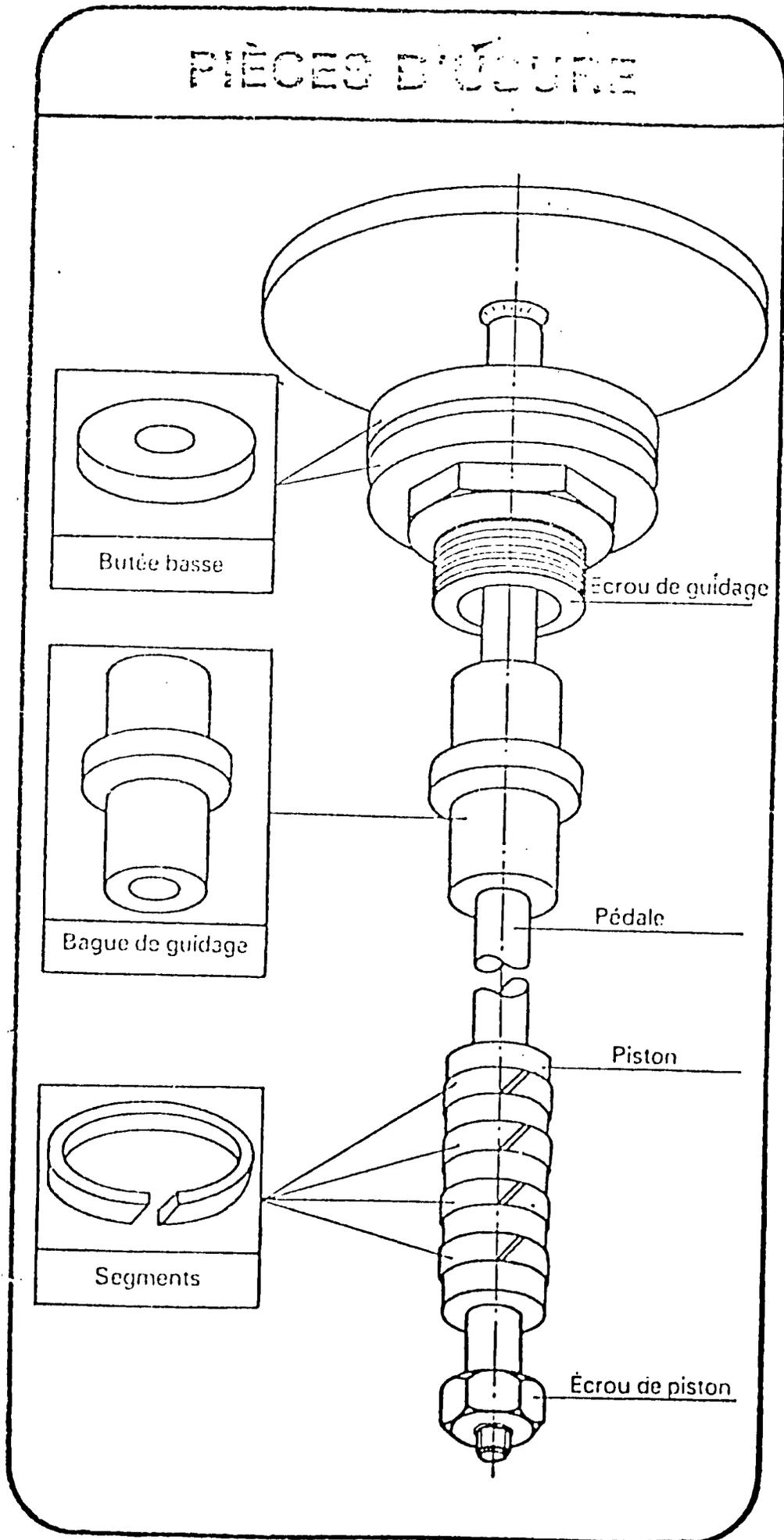


Figure 3



Attempts were made in data compilation to estimate lifts and water-work during discharge measurements by using the well pump-test drawdown curves. In most cases these estimates were unreliable due to the extreme slopes of the drawdown curves and natural fluctuations of the static water level since the pump testing date.

Volumetric efficiency was measured on many wells, yielding some interesting findings from which some generalizations can be made. The Vergnet pump is essentially positive displacement and unsteady flow. Volumetric efficiency was measured by counting the strokes per twenty liters and calculating the swept volume of the piston per stroke. The volumetric efficiency is calculated by dividing the pumped volume per stroke by the volume swept by the piston. The volumetric efficiency of the 30 mm model pumps ranged from 135% to 180% during pump tests with vigorous pumping. The same measurements yielded volumetric efficiencies ranging from 75% to 105% for the 40 mm piston models. Volumetric efficiencies greater than 100% occur because the momentum of the water column in the pump discharge pipe yields some flow after the piston reaches the end of its stroke. It was noted that volumetric efficiency is greatly influenced by the pumping rate and the condition of the piston segments. This is to be expected, as the velocity of flow and momentum are less at the end of the pump stroke when pumping is slow, and there is more time during the stroke for water to leak past the piston and segments. It is believed that the low volumetric efficiency of the 40 mm pump is due to the fact that they are installed on wells with lifts beyond their design capacity.

Data from the observation of these 15 wells is compiled in Table 3 with explanatory notes.

Observations at many wells indicated that most water is pumped by women (many with babies on their backs) and children. The gross pumping rates for most of these users varied between 50% and 75% of the gross pump rates of the evaluation team engineer in Table 3. Net pumping rates measured over periods of 30 minutes indicate net flows of about 1/2 the gross pump rates in Table 3. These net pump rates were observed when demand was constant and reflect an average pumping rate, allowing for changes of users and vessels, but do not reflect average daily consumption unless the hours per day of pumping are known.

In general, the Vergnet pump is found to be very appropriate for the project, and its continued use is endorsed by this evaluation. There was one design feature of the pump that can be improved: The pump support plate is bolted to the concrete apron on top of the well with four bolts embedded in the apron. A rubber gasket about 2mm thick is between the plate and the apron. It is difficult or impossible to assure a good seal between the plate and apron with this design due to macro and micro surface irregularities (they aren't flat and smooth). When pumping commences or the rate

Table 3

Name of Village	Well #	TOSO PUMP SURVEY DATA										Comments
		Well Depth	Static Water Level	Well Yield	Piston Dia.	Gross Discharge	Estimated Lift	Water Work	Reliability	Months of Service	Breakdown	
Agadjare	P540F3	59m	13m	17 L/m	30mm	13 L/m	17m	35w	fair	9	none	Piston segments changed once and are now worn out.
Niamtougouko	P022F2	55	-	-	30	22	-	-	-	0.2	none	Seal between pump and apron leaks.
Moussa	P437F1	35	8	180	30	26	9	35	good	3	none	
Avete	P356F1	41	5	23	30	20	9	27	good	4	none	Segments changed once.
Dadja Chogli	P582F1	39	2	100	30	24	9	33	good	4	none	Segments changed once.
Dadja	P582F1	41	6	50	30	25	17	70	fair	4	none	Segments changed 3 times.
Kotoko	P582F2	53	7	25	30	3	50	-	good	9	none	Well is dewatered.
Carrefour Nikerba	P537F1	60	9	67	30	19	10	32	good	9	none	Three villages alternate days of use
Wahala	P114F3	39	4	80	30	22	6	22	good	9	one	Pedal broken and welded.
Wahala	P114F2	47	7	8	30	16	45	120	poor	9	none	Well appears to yield better than pump test indicates.
Elavagnon	P441F1	75	4	13	40	20	11	33	good	14	one	Pedal broken and welded.
Ebeva	P232F1	51	3	50	40	20	9	30	good	14	none	Segments changed twice.
Adiva	P223F1	60	6	17	40	16	12	32	good	14	-	Segments are worn.
Evou-Detel	P223F1	73	2	10	40	16	20	52	poor	13	none	Lift is too great for large piston. Children cannot depress piston. Segments replaced once.
Lonnava	P494F1	51	7	20	40	20	13	41	fair	13	none	

Explanatory Notes:

- Well Number: The first letter indicates the region ("P" for Plateau, "S" for Savanna, etc). The following three digit number is the official village number. The "F" stands for Forrage (well) and the last number is the order of successful wells drilled for the village in question.
- Well Depth: The depth from ground surface to the bottom of the well in meters.
- Static Water Level: The distance from the ground surface to the water level in the well at the time of pump testing before pumping commences in meters.
- Well Yield: The estimated maximum long term yield of the well derived from the pump test in liters per minutes.
- Piston Diameter: The 40 millimeter models are designed for low lifts and the 30 millimeter models are designed for higher lifts.
- Gross Discharge: The discharge based on the time it takes the author to fill a 20 liter bucket pumping vigorously, in liters per minute.
- Estimated Lift: Elevation difference between the pump outlet point and water level in the well during gross discharge measurement. The lift was estimated using drawdown curves constructed based on pump test data.
- Water Work: The net power required to lift 20 liters of water over the estimated lift in the measured time during the gross discharge measurement, in watts. The water work is calculated by $W = (9.8 \text{ m/sec} \times \text{sec})(20 \text{ liters})(\text{estimated lift})/(\text{seconds to fill bucket})$.
- Reliability: The estimated reliability of the lift and water work estimates. "Good" indicates probable precision within 25%. "Fair" indicates probable precision within 50%. "Poor" indicates precision less than 50%.
- Months of Service: The time interval between the installation of the pump and the evaluation interviews.
- Breakdowns: The number of times a pump has been out of service due to parts failure.
- Comments:

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increases, water level in the well decreases, with a resulting decrease in air pressure inside the well. This phenomena causes dirty water which has collected around the pump support plate to be aspirated into the well. The potential for pollution is exacerbated by the hundreds of feet that step on or near the support plate each day. It is recommended that BRGM or the mission notify the Vergnet company of this design characteristic and possibly suggest some solutions. One possible solution would be to use a soft plastic wax seal between the support plate and apron which would conform to surface irregularities when the plate bolts are tightened. This type of seal is commonly used between a toilet and its junction to the sewer pipe on a concrete floor. If this design was used, it would be advisable to provide a pressure relief vent between the well and atmosphere to equalize pressure inside the well. Such a vent would have to be designed and built into the pump at the factory.

It was also noted that the 40 mm piston low-lift pump models seem to be used without close regard to the lift conditions of the wells. It is recommended that the design lift criteria for the different pump models be strictly adhered to, or that the low-lift models be discontinued from the program.

The time delay between well drilling, apron construction and pump installation was many months in some cases and perhaps two months on the average. Many of these delays were reported to be due to delayed pump shipments. It can be demoralizing for villagers to see their well being pumped during testing and then waiting indeterminate periods to receive a pump. It is recommended that measures be taken to reduce the time period between well drilling, apron construction and pump installation to a reasonable minimum.

Pump Maintenance and Spare Parts:

In addition to interviews with villagers regarding pump maintenance problems, half a day was spent with the Hydraulic Service maintenance technician responsible for the entire plateau region. This man has the full responsibility for maintaining 328 pumps scattered in a region that requires the better part of a day to traverse. He schedules a routine visit to each pump every two months. Each pump is also provided with a sturdy card left with the village which gives pertinent well and pump data. If the pump requires service, the card is sent or taken to the one of four centers in the region and left to notify the service technician that service is needed. The tight maintenance schedule only allows the technician to visit each center about every two weeks. He receives an average of about five requests per day.

Maintenance problems can be divided into minor and major. Minor problems are replacement of the piston assembly parts, and, in

theory, can be done by villagers. Major problems require removal of the pump stand and pulling the pumping elements from the well. This must be done by trained experts with proper equipment. By far the majority of maintenance requirements involve replacement of piston assembly parts. The piston segments need changing at least every few months for heavily used pumps. The most frequent major failure is the bladder. It ruptures or splits off from the metal end seals. Normal bladder life appears to be several years, but failure is sudden and can cause an immediate water crisis. Of the 328 pumps in the Plateau region the service technician estimated twenty to thirty bladder failures per year. The replacement part costs in excess of \$100. There have been some failures of check valves, but this occurs less frequently and usually does not happen suddenly.

One initial objective of the subject project was to train village mechanics in routine pump maintenance and shift financial and technical responsibility to the village for maintenance of the piston unit. In effect, this has not taken place. Villagers still rely heavily on Hydraulic Service for minor repairs and replacement of piston segments. The result is that Hydraulic Service technicians spend most of their time with routine maintenance and minor repair while some pumps are inoperative due to major failure.

Societe General du Golfe de Guinee is designated as the official franchised dealer for pump spares. Centers can be found in regional headquarters and some prefectures. Parts in stock were inventoried in Dapaong and Atakpame. Most minor parts were found to be in stock, but very few spares. There was also a marked increase in the price of all parts in Atakpame over Dapaong. Project personnel reported problems in the past in obtaining spare parts.

It is recommended that full financial and technical responsibility for maintenance of pump piston units be transferred to villagers. This responsibility should be spelled out in a document and signed by the villagers as a contract and elaborated in detail to avoid miscommunication. Social Affairs should be responsible for training piston assembly maintenance after the initial lesson given by Hydraulic Service during pump installation. At present Social Affaires encourages villagers to retain a fund for purchase of spare parts. They should encourage the villagers to use part of the fund to purchase frequently failing parts in advance, such as piston segments and pistons, instead of waiting until the parts fail.

It is further recommended that Hydraulic Service personnel, transport and equipment be increased four-fold, and a technician be placed in each prefecture as opposed to each region. The responsibility of piston assembly maintenance should be completely taken out of the hands of Hydraulic Service on all existing and future USAID project pumps. It should be noted that the current staff of technicians are impeccably trained in pump maintenance at

the factory in France. They are extremely conscientious and dedicated and equally overworked. A strong case could be made that each pump mechanic is the best known and revered man in their respective regions.

Water Supply and Demand: Delivery Effectiveness:

A primary objective stated in the Project Paper is to provide about 30 liters of water per day per person. This quantity is widely accepted by experts around the world as a minimum quantity of water needed to maintain sanitary conditions. Studies have also shown that when available water drops below this range that quantity has a much larger influence on health than quality.

It was clearly evident that the objective of 30 liters/day/person was not being met in the vast majority of project villages. Based on the observed net pump discharges in the range of 10 liters per minute, a 12 hour pumping day, and 30 liters per person per day, one pump could theoretically serve about 250 people. However, this simplistic approach assumes an even distribution of water between users and that users have total freedom of time when they can draw water. In fact, villagers have multiple responsibilities which preclude drawing water during large parts of the day, such as working in distant fields, going to market, etc. The populations served per project pump ranged from a minimum of about 300 to well over 1000. Of the 25 or 30 pumps that were seen during all daylight hours, only three did not have a queue of water drawers, and it was noted that in these three cases there was either a general village meeting in session or it was market day. It was not uncommon to see queues of forty to fifty vessels of about 25 liters each during any time of the day. If one entered the end of this queue, he or she would wait approximately two hours to gain access to the pump. Water is carried in basins of about 25 liters from the pump to the house. For an extended family of 25 people, about 30 trips must be made to carry water based on 30 L/person/day. If this household owned six basins, they would have to queue up five times and wait about ten hours per day to draw their water. Obviously, they are forced to go short or seek an alternative source which is sure to be polluted and probably many kilometers away.

A cursory village water use survey in Avete corroborated the need to increase the number of pumps per capita served. Avete has a population of about 800 and has one project pump located on the edge of the village. Two extended families or concessions were interviewed. The first family had 51 members living in the compound and lived on the opposite side of the village from the pump at a distance of about 400 meters. This family brings about 50 liters (two basins) per day from the pump, and they arrive at dawn to avoid the queue. This provides an average of about 2 liter per day per person. In addition, about 1250 liters are carried from an open pit in a dry stream bed about 1.5 km away. Ten girls make five trips per day, providing about 25 liters per person. Many times

they are forced to use this water for drinking when they do not obtain water from the pump. The riverbed source is used by most families in the village. Each drawer wades into the pit and scoops the turbid water with a calabash to fill the basins.

The second family interviewed lives about 50 meters from, and in sight of, the pump. This family of 18 people takes about 300 liters of water per day from the pump - or 15 liters per person. Another 200 liters per day are carried from the above mentioned source to supply a total of about 28 liters per person per day.

These two cases cannot be used to represent a detailed or broad water use survey, but the figures are felt to be reliable and fairly typical of villages in this region. Water consumption figures may be somewhat higher than average due to the close proximity of the water hole to Avete. It is not uncommon for villagers to walk ten kilometers to obtain water from a much less adequate source.

Based on the above, a condition precedent set by the evaluation team for any and all following pump installations is to provide a minimum of one pump for 250 users. It is further required that project villages which do not meet the above standard be upgraded to meet it before new villages are added to the project list. It should be noted that the actual criteria is 30 liters of clean water per person per day, which can be met with pumps and/or any other satisfactory supplies. Alternative supplies are discussed in the following section.

A question which arises is - must two pumps be provided for a village of 251 people? The answer is, "yes" - and is easily justifiable for at least two reasons: First, the 250 person minimum is based on an absolute upper limit under theoretical and idealized conditions and does not provide for any growth in village population. A second justification is that a second pump serves as a spare or "fail safe" when one pump has a major breakdown. This last reason is extremely important when one considers the crisis faced by a village which perhaps lives many kilometers from an alternative source, or an old source has been abandoned and a major breakdown occurs. When evaluating the effectiveness of a village water supply project it is probably more realistic to judge it from the perspective of contingencies and the worst days faced during a year than from the perspective of average performance.

A suggestion was made to the evaluation team by the representative of FAC and FED which could greatly reduce the cost per person served by each pump and increase the effectiveness of the program. If the well casing diameters are increased from 100 to 150 millimeters (at a marginal cost per well), two pumps can be mounted per well. For the wells producing sufficient yield this could double the number of people served per well at perhaps a 20 percent increase in cost, as well as provide the safety of a back-up pump.

It is recommended that BRGM, Hydraulic Service and FAC pursue the economic and technical feasibility of this idea, produce an appropriate design, and incorporate it into the USAID program.

As a final note on this most important section of the engineering analysis, it is stressed that if the health and economic benefits which are the objectives of this project are to be realized, a drastic reduction in the people served per pump must be achieved.

Alternate Sources:

The project under evaluation is based on drilling small-bore wells equipped with manual pumps.

The technical effectiveness and cost effectiveness would be greatly benefitted if the project scope broadened into a "village water supply" approach as opposed to a "village wells" approach. Numerous cases were seen during the evaluation where alternative sources could be exploited in place of or supplemental to wells. Many times these alternatives would provide a more technically sound water system and perhaps at a greatly reduced cost. Sixteen spring-fed perennial streams were crossed on the road between Atakpame and Palime, all flowing through or near villages with project pumps. Notable among these was the stream in Ezime. Four wells were drilled in this town of 3,000 - all of them unsuccessful. The stream flowing adjacent to this village was observed to have a flow over 100 liters per minute of clear water during the worst drought in five years. Villagers report that the stream originates in springs within a few kilometers of the village on steep mountain slopes. This situation is ideal for using a gravity water supply system with multiple outlets spaced logistically throughout the village with a central storage reservoir. Based on other projects in Togo, this type of system on this scale would cost on the order of \$50,000 depending on the local situation. Economics of scale become very significant in these systems, but are small or negligible with village wells. Even if wells could be drilled in this village a properly built gravity system is much more satisfactory from the standpoint of reliability, village participation and operation. This type of system can be installed in numerous villages in the Plateau region. It should be noted that watershed management is a very important component of these systems if they are to function well.

The old water source in Avete was pits dug in coarse sand strata in a dry stream bed. Pits dug less than one meter below the static water level yielded more water than the village of 800 can carry (perhaps 50-100 liters per minute during peak demand). This source could be greatly improved in quality and quantity by constructing a few properly designed shallow dug wells several meters deep in the

coarse sand strata adjacent to the stream bed. With properly designed aprons, protection from surface water, and permanently attached communal buckets for drawing water and ropes protected from the ground, these wells could provide water of acceptable quality with much greater reliability than drilled wells with hand pumps and at a fraction of the cost.

Many places were seen where shallow dug wells or infiltration galleries could be used as alternative or supplemental sources to village wells, or possible sources where well drilling was unsuccessful.

In some cases roof catchments with properly designed cisterns might prove useful for supplemental sources. For example, a roof of a school or community center with a surface area of 500 square meters (10m x 50m) could supply about 600 to 800 cubic meters of water per year in the Plateau region. A cistern with a storage capacity of 300 to 400 cubic meters would be required and the water would meet the total needs of only perhaps 50 or 60 people.

There may be villages where it is feasible to build small water supply reservoirs with small earth-fill dams using infiltration galleries to filter the water. The infiltration gallery can be constructed in the reservoir bed and connected to a collection sump adjacent to the reservoir or at the downstream toe of the dam for a gravity feed.

It is recommended that the project broaden its scope in the future to incorporate any and all potential and feasible water sources in community water supply systems. This capability should be added at the earliest point in time that is administratively feasible, but not at the cost of reducing the rate of the currently very successful wells program. In other words, the present program should not be held up to wait for the broader scope capabilities.

It is recommended that technical assistance be used to provide necessary training and materials to Hydraulic Service or Rural Works to build the capability to assess village water needs and potential supplies, choose the most appropriate alternatives, and design, construct and maintain adequate village water supply systems. It is believed that the most expedient method of building this capability is to use technical advisors working with qualified Togolese counterparts in design and construction of various typical representative water supply systems mentioned above. Each system would be chosen based on and used as a learning and training example. Each design should be treated as an example problem and a design manual containing all the necessary steps, procedures and design data should be prepared for future reference. It is estimated that this effort will require about three years of full time technical assistance.

If such a program cannot be implemented in the near future, it is recommended that the project technical consultant (BRGM) extend their capabilities and service to include assessment of village water needs and potential sources as a prerequisite to design and construction, and to recommend alternative sources or solutions for villages where wells are negative.

Vehicle Maintenance; Social Affairs:

The health education component of the project under the Ministry of Health (Social Affairs) has about 70 project motorcycles and 7 automobiles for village agents and ministry officials.

These vehicles are being maintained and repaired in the ministry parking lot with a modest set of tools in a portable box, or by private mechanics. This has worked to date because of the newness of the vehicles, the good fortune of having a Peace Corps Volunteer who is a professionally trained and experienced motorcycle mechanic, and lack of a better alternative. It is doubtful if the Peace Corps mechanic can be replaced, and maintenance requirements will greatly increase as project vehicles grow older.

It is recommended that the project be provided with an adequately equipped workshop and an adequate staff of mechanics to maintain the project fleet.

ANNEX V A

Villages Visited

Agadjame
Adiva
Avete
Cinkasse
Dadja Chogli
Dadja
Ebera
Elavagnon
Evou-betel
Ezime
Idao
Imoussa
Kotokope
Kunyohou
Lomnara
Mogou
Moussa
Nayeng
Niantougou-Kope
Tomtala
Wahala

Annex V B

Persons Contacted

USAID

Mr. John Lundgren, AAO
Mr. Paul Guild, Project Manager
Ms. Agma Prins, Project Public Health Specialist
Ms. Sarah Fry, Project Health Education Specialist

Peace Corps

Keith Cofi
Mona Ellerbrock
Phebe Prescott
Deborah Riddle
Diane Laughter
Barbara Weis
Gail Guttenplan
Jace Rizner

Government of Togo (GOT)

Mr. Ouro Tchatombi, Co-ordinateur National du Programm
Socio-Sanitaire
Mr. Nenonene Komi, Directeur du Service National
d'Assainissement
Mr. Osseni Gafarou, Directeur de l'Energie et de
l'Hydraulique
Mr. Mindamou, Project Accountant in Lome

Project Regional Directors

Mr. Agba
Mrs. Zamoura
Mr. Edohr
Mr. Mustafa

Project Regional Co-ordinators

Mr. Madjone
Mr. Dandou

Mr. Dagbenyo, Affaires Sociales, Atapame
Mr. Bouili Takouda, Directeur General, Affaires Sociales

OTHERS

Dr. Michel le Joncour, Bureau des Recherches Geologiques et
Minieres
Mr. Serge De Gallaia, Chef de la mission d'Aide et de
Cooperation
Mr. C. Campens, Conseiller, FAC
Mr. Yao Amefia, Directeur de Cabinet, Ministry of
Public Works, Mines, Energy and Hydraulic Resources
Mr. Barrigah, Service hydraulique
Mr. Scott Ballard, Economic Officer, American Embassy, Lome

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Tarkpessou Kossi	M. Ihou
M. Nabango	Mme. Souleymane
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M. Degbedi	

Prefets, Prefectures of:

Amou
Haho
Kloto
Ogou
Wawa