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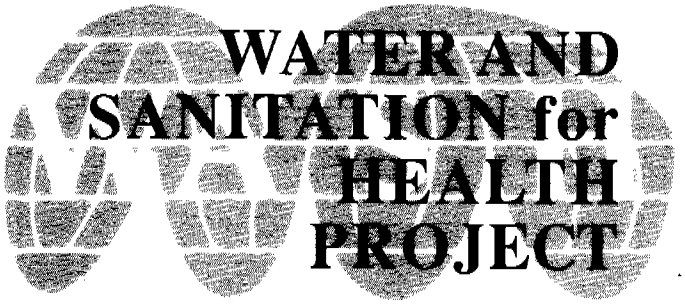
FINAL EVALUATION OF THE BENIN RURAL WATER SUPPLY AND SANITATION PROJECT

WASH Field Report No. 349
March 1992



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FINAL EVALUATION OF THE BENIN RURAL WATER SUPPLY AND SANITATION PROJECT

Prepared for the USAID Missions to Benin and Togo
under WASH Task No. 268

by
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with assistance from

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Related WASH Reports

Field Report No. 280. Benin Rural Water Supply and Sanitation Project Management and Supervision Workshop. November 1989.

Field Report No. 252. Benin Rural Water Supply and Sanitation Project Mid-term Evaluation. February 1989.

Field Report No. 241. Benin Rural Water and Sanitation Project Review Workshop. June 1988.

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ACRONYMS

CARDER	*Centre d'activité régional de développement rurale* (Regional Rural Development Activity Center)
CDSS	*Comité de développement socio-sanitaire* (Community Socio-health Development Committee)
CFA	West African franc ($1 = CFA 280)
CLCAM	*Caisse locale de credit agricole mutuelle* (Local Agricultural Credit Union)
DH	*Direction de l'hydraulique* (Hydraulic Services/Ministry of Energy, Mines, and Water Resources)
DILABM	Directorate of the Bio-Medical Analysis Laboratory
GRB	Government of the Republic of Benin (1991)
GPRB	Government of the People's Republic of Benin (prior to 1991)
LOP	Life of Project
MTEAS	*Ministère du travail, de l'emploi, et des affaires sociales* (Ministry of Labor and Social Affairs)
MET	*Ministère de l'équipement et des transports* (Ministry of Equipment and Transport, recently renamed the Ministry of Energy, Mines, and Water Resources)
MIS	Management information system
MSP	*Ministère de la santé publique* (Ministry of Public Health)
OCCGE	*Organisation de Coordination et de Cooperation pour la lutte contre les Grandes Endémies* (Organization for Coordination and Cooperation in the Control of Epidemic Diseases)
PACD	Project Activity Completion Date
PCV	Peace Corps Volunteer

PRAGMA/MCD	U.S.-Based Contractors
POL	Petrol, oil, and lubrication
PSC	Personal service contract
REDSO/WA	Regional Economic Development Services Office, Western Africa (a regional USAID office)
SEERT	Beninese pump distributer
SOW	Scope of work
TOT	Training of trainers
UPROMA	Togolese Pump Manufacturer
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
VIP	Ventilated improved pit (latrine)
WASH	Water and Sanitation for Health Project
WS&S	Water supply and sanitation

ACKNOWLEDGMENTS

The evaluation team would like to express its gratitude to the many individuals who agreed to be interviewed, and to those who helped the team achieve its mission. Of particular note are the contributions and assistance of the project's national coordinator, Mr. Julien Dossou-Yovo; the Pragma chief of party, Mrs. Evelyne Laurin; and the project team members. A note of special appreciation goes to the district field agents who accompanied the evaluation team to the villages, donating their time as interpreters and facilitators for the interviews. Last, but by no means least, the evaluators greatly appreciate the collaboration and cooperation extended by the members of the village health committees during the village surveys.

EXECUTIVE SUMMARY

As stated in the Project Paper Amendment (1985), the goal of the Benin Rural Water Supply and Sanitation Project is to "assist the Government of the People's Republic of Benin (GPRB) to qualitatively improve the health and living conditions of the rural population." More specifically, the project seeks to "assist the GPRB to improve the health practices of, and the adequacy and quality of water supply and sanitation facilities available to the rural poor in selected districts of central Benin." To achieve this aim, the original project planning document called for—

- Drilling of 225 positive boreholes equipped with handpumps
- Construction of 100 latrines
- Creation and training of village committees for self-management of the new water supply
- Organization of education campaigns related to health and to water and sanitation
- Reduction of guinea worm incidence by 30 percent in the heavily infested project zone

The project, a joint effort among the U.S. Agency for International Development (USAID), the Government of the Republic of Benin (GRB), the United Nations Children's Fund (UNICEF), and the Peace Corps, is implemented through three GRB ministries. However, the Ministry of Equipment and Transport (recently renamed the Ministry of Mines, Energy, and Water Resources) serves as the lead agency. Over the course of the project the construction targets changed, partly as a result of the recommendations from a mid-term project evaluation (late 1988) and partly based on the outcomes of a workshop the following year that examined progress. The Third Project Amendment Agreement (1990) increased the target figures from 225 wells equipped with handpumps to 275, from 100 latrines to 400 (of which 100 units would be constructed as public facilities and the remaining 300 as family units).

The original Project Activity Completion Date (PACD) was set at 30 September 1988, then revised in the Second Amendment Agreement (1985) to 30 March 1989. Due to events beyond the control of project management, however, actual start-up was delayed until well after the Project Agreement Amendment had been signed. The first training for extension personnel occurred in late 1987, and drilling did not begin until early 1988.

Through the Third Project Amendment Agreement, the PACD was revised again to 31 December 1990. A Fourth Project Amendment Agreement, extending the PACD to 30 September 1991 and providing a life of project (LOP) supplemental grant of $550,000, received approval by all parties in July 1991.

This evaluation was to accomplish four objectives:

- Determine whether the project had achieved its stated objectives
- Identify the factors that both limited and facilitated project adequacy and effectiveness
- Determine project response to the recommendations made by the mid-term evaluation
- Draw lessons from this experience for the purpose of planning future community development projects

Five expatriate and Beninese evaluators teamed up to conduct a three-week field study of the project, interviewing project management; technical and extension staff; central and provincial government officials; and village beneficiaries. The evaluators observed project activities in the six project districts and reviewed relevant documentation.

In terms of expected quantifiable outputs, the team concluded that the project achieved, and in several instances surpassed, the established targets. It also developed and implemented an innovative and practical approach for community development and for the introduction of health and hygiene education messages. While it is premature to expect a demonstrable change in all behavior related to water and sanitation, village surveys carried out during the evaluation indicate that villagers have taken in the health education messages and, in several instances, have put this knowledge into practice. The project's integrated, participatory community development approach has had a major impact, leading the GRB to state its intention to promote this approach as the model for future water supply and sanitation (WS&S) projects.

From the management perspective, project administration was generally carried out efficiently and effectively. The lack of a resident USAID counterpart to assist the project's national coordinator, the delays and last-minute decisions about the revised PACDs, and the parallel chains-of-command for project activities established under the structure of the USAID grant limited administrative effectiveness and efficiency to a degree. Nevertheless, the project did achieve a great deal despite the factors and despite Benin's economic and political situation during the project period. These achievements are a testiment to the dedication and commitment of everyone involved with the project.

Two principal recommendations apply directly to the project: (1) the GRB should continue to deploy and support the activities of the government personnel involved in project activities; (2) USAID should give serious consideration to approving a 12- to 18-month extension for the project to complete all activities and solidify its sustainability.

Finally, several "lessons learned" have been extracted from the project, which are designed to be of use to both USAID and the GRB for the purpose of planning future rural community development initiatives, with particular reference to the WS&S sector.

Chapter 1

INTRODUCTION

1.1 Purpose of the Evaluation

This final evaluation of the Benin Rural Water Supply and Sanitation Project was carried out 1-21 September 1991 at the request of USAID/Togo-Benin, the mission responsible for the project's inception and implementation. USAID/Benin (currently being reestablished after a hiatus of several years) coordinated the evaluation, whose purpose was four-fold:

- To assess project achievements
- To identify the factors that facilitated and inhibited the achievement of project objects
- To determine how well the project addressed the recommendations made by the mid-term evaluation
- To identify lessons that could be drawn from the project for application to rural water supply and sanitation (WS&S) projects elsewhere, as well as to development projects in other sectors

The evaluation addresses the issues called for in the Scope of Work (SOW) and analyzes the inputs, results, and effectiveness of the project's major components. This report also discusses sustainability issues (continuity, expansion, and replicability) relating to project activities, in light of the termination of USAID financial support and the involvement of PRAGMA as the project manager. To encourage and facilitate a comparative analysis, the report's format resembles that of the mid-term evaluation. Its organization is as follows:

- Socio-Health Program
- Borehole Construction
- Latrine Construction
- Construction of Project Headquarters
- Water Quality Analysis
- Epidemiological Surveillance

- Pump Maintenance
- Economic Aspects
- Management and Administration

1.2 The Evaluation Team

The evaluation team, combining expatriate and Beninese specialists in several disciplines, included the following:

James Chauvin	Team Leader, Management and Administration WASH Project Consultant
Suzanne Plopper	Community Health Education and Training WASH Project Consultant
Alan Malina	Water Supply and Sanitation Technology WASH Project Consultant
Regina Koffi	Department of Information, Education and Communication/Ministry of Public Health, Government of Benin
Sylvain Sossou	Department of the Coordination of External Assistance, Ministry of Planning and Economic Reconstruction, Government of Benin

1.3 Evaluation Methodology

The evaluation consisted of several elements:

(a) A review of project documents (see Bibliography, Appendix A)

(b) Interviews with project authorities and project team members at the national, provincial, and district levels (see Persons Contacted, Appendix B)

(c) Surveys carried out with 26 community socio-health development committees (CDSS) in 14 project villages (see Villages Visited, Appendix C). Observation and direct interview techniques were used

in these surveys. The research team developed a survey instrument to collect information about the status of WS&S facilities, to discover villagers' perceptions about the project and its intended benefits, and to reveal water- and sanitation-related knowledge, attitudes, and behaviors (see Appendix D).

A summary of the critical dates and activities for the project's management and administration, its technical assistance activities, and its achievements appears in Appendix E.

Over the course of the project, several key project team members left Benin or were reassigned by the government elsewhere. Consequently, they were unavailable at the time of the final evaluation. Nevertheless, the evaluators feel confident that the large number of people contacted and the totality of their experience with project activities are sufficient to present a complete picture of the project.

The 26 villages to be interviewed were selected according to location, time elapsed since their involvement with project activities, and mix of project interventions. The evaluation team recognizes that survey conditions were not ideal: its sample of 26 CDSS's (out of over 500) was not statistically representative, and the team had no baseline data against which to compare the survey results. Despite these shortcomings, the team is confident that the survey results are valid and reliable and that they represent an accurate assessment of project achievements. The results obtained are consistent with those of the mid-term evaluation.

Although the Beninese team members joined the team in the second week, they participated fully and were able to prepare a French résumé of the mission's conclusions, recommendations, and lessons learned. This material was presented at an evaluation debriefing meeting for representatives of the GRB ministries involved in the project. This report appears in its entirety in Appendix F.

Chapter 2

PROJECT BACKGROUND[1]

2.1 Country Context

The Republic of Benin is a francophone West African country with a population of approximately 5 million people, the majority of whom live in the rural areas. The country's main crops are corn, sorghum, millet, and cotton, and some palm oil is also harvested and exported. The country is roughly divided into two climatic zones: the southern half, which is humid and tropical with two rainy seasons, and the northern half, which is Sahelian with a long dry season and one rainy period.

The past decade has been a difficult one for Benin, which suffered greatly from the drought of the early 1980s and from the harmful economic policies of the former regime. The loss of markets for its primary exports sent Benin's economy into a deep decline. As well, the country is only now emerging from a major political transition period, with the installation in June 1991 of the country's first democratically elected government in almost 20 years. Benin is now considered one of the poorest countries in Africa; its rural population endures high infant-mortality rates, low life expectancy, and high prevalence of infectious diseases.

2.2 Project History

In response to the poor health conditions and dire water needs of Benin's rural population, USAID designed the Benin Rural Water Supply and Sanitation Project (680-0201) in 1978. The original project design called for 225 boreholes equipped with Moyno pumps to be installed in Borgou province of northern Benin, and for springs to be capped in Atacora Province. These water-development activities were to be combined with a community health education and sanitation program. Although fully funded and operational by 1981, the project was suspended by the Department of State later that year for political reasons. The suspension was lifted in October 1984, and USAID conducted a water and health sector assessment shortly thereafter. Based on that assessment the project was redesigned and a Project Paper Amendment elaborated in 1985.

Due to the presence of several well-drilling projects in the Borgou Province, the Government of the People's Republic of Benin (GPRB) asked USAID to consider transferring the project to the underserved northern districts of the Zou Province. This zone also suffers from heavy guinea worm infestation, a debilitating disease transmitted by drinking contaminated pond

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[1] This section is a revision of the Project Background, Mid-term Evaluation (1988). See WASH Field Report No. 252.

water. The new project design called for reducing water- and sanitation-related diseases, specifically guinea worm, by 30 percent. The project was to attain this goal in three ways: by providing 225 boreholes equipped with India Mark II pumps to northern Zou villages (coordinated with sanitation and health education campaigns), by building latrines, and by constructing cisterns in those villages where drilling proved unproductive.

The redesigned project is a collaborative effort among USAID, three Benin government ministries, the United Nations Children's Fund (UNICEF), and the Peace Corps. Through a contract with USAID, UNICEF provides technical assistance for well-drilling and pump maintenance and also participates in the village sanitation program. The implementing governmental agencies are Hydraulic Services (Ministry of Equipment and Transportation), the Divisions of Sanitary Engineering and of Health Education (both part of the Ministry of Health), and the Division of Social Affairs of the Ministry of Labor and Social Affairs. The USAID technical assistance for public health, civil engineering, and project financial management is contracted to a U.S.-based firm, PRAGMA, which in turn subcontracted several project responsibilities to two other U.S. firms—MCD International and Bryler Corporation. The U.S. Peace Corps provided several volunteers to work in community health education, latrine construction, and pump maintenance.

By early 1986, the Project Amendment Agreement had been negotiated and signed by all parties, and the GPRB had nominated and installed a national project coordinator. However, project start-up was blocked by Benin's arrears in paying its foreign debts, a factor preventing USAID from disbursing funds and delaying the technical assistance contract with PRAGMA/MCD. Despite this slowdown, the PRAGMA chief of party arrived toward the end of 1986, Peace Corps volunteers (PCVs) were posted to project sites, and the GPRB assigned field staff from health centers and social affairs to the project.

Nearly a year went by before all project components could begin. WASH organized a project start-up workshop in April 1987, and the remaining technical assistance for public health and sanitation arrived in July 1987. During the interim, field personnel had conducted surveys of water and health needs, including an initial guinea worm prevalence survey, in the project zone to identify participating villages. The first formal training for field agents to initiate the community organization and health education activities began in late 1987. Well drilling got underway still later, in early 1988.

Because of the difficulties experienced during the project's initial months and the frustration felt by staff, WASH organized another workshop in May 1988 to review progress to date, define obstacles, and propose practical solutions. The outcomes included a clearer understanding and definition of project working norms and direction. Several more training workshops have taken place since, including sessions for the district agents on the various health education themes.

Latrine construction began in late 1988, to coincide with the commencement of a health education program on personal and domestic hygiene practices and the construction and correct use of latrines. As the number of villages participating in the project increased, follow-up guinea worm surveys were conducted, and community development/health and hygiene education activities expanded.

By the beginning of 1989, the project had created or reactivated 426 socio-health committees in 312 villages; 130 handpumps had been installed; and 82 public latrines had been constructed. Additional health and hygiene education modules were introduced, such as village environmental issues, and project staff invested much effort and time promoting the collection of additional funds (to be deposited in the *caisses villageoises*) for handpump repair and maintenance. As the Project Activity Completion Date (PACD) approached, it became evident that without a time extension and supplemental grant, the project could not achieve its original objectives.

In March 1990, USAID approved the Third Project Agreement Amendment, extending the Project Activity Completion Date (PACD) to 31 December 1990 and providing a supplemental contribution of $875,000. Due to the momentum and demand for improved WS&S facilities that the project had generated, the Agreement also modified the project objectives: the number of boreholes to be drilled and fitted with handpumps increased to 275 and the number of latrines to be constructed expanded to 400 units, of which 300 were to be family latrines.

With the approach of the revised PACD, it again became evident that the project would be unable to achieve the targets set under the most recent Project Amendment Agreement. PRAGMA then prepared a budget to extend the PACD to 30 September 1991 and provide an additional $492,095; the budget was submitted to USAID/Lomé in December 1990. A no-cost time extension was approved, revising the PACD to 30 March 1991. Unfortunately, the project team received confirmation of the decision just prior to the December 31 deadline, and several project staff members had left or been reassigned by the government elsewhere, due to the anticipated project termination.

Project activities continued past the March PACD, and by the end of June 1991, over 500 village socio-health committees had been created or reactivated, 417 boreholes drilled, 309 handpumps installed, and 109 public and 261 family latrines constructed. However, health education activities remain to be implemented in several villages, and the project team has not had an opportunity to measure the impact of project interventions on village attitudes and behavior. In July, USAID and the GRB approved the extension and supplemental budget request, but at the time of the evaluation team's review, only two weeks remained until the proposed PACD and the project team again awaited confirmation about the status of the project.

Chapter 3

ANALYSIS OF PROJECT COMPONENTS

3.1 Socio-Health Component

3.1.1 Overview

The aim of the socio-health component was to help project villages accomplish two objectives:

- Acquire the organizational and financial management skills needed to own and maintain a handpump
- Adopt behaviors that enhance the health benefits of a clean water supply

To achieve these ends, the project developed and carried out a series of training and education activities at the provincial, district, and village levels. At the provincial level, two USAID-funded technical assistants (a health education advisor and a sanitary engineer) and three Beninese health, social affairs, and sanitation technicians named by the GRB carried out these activities. They planned and developed training materials and visual aids, and then trained, supervised, and provided technical assistance to district-level personnel.

At the district level, the government seconded civil service personnel to the project, including two nurses, two social affairs agents, and two sanitation agents per district. These individuals provided an initial project orientation to selected villages, (touching upon conditions and benefits of project participation), facilitated CDSS creation in the villages, trained committee members in their health education roles and responsibilities concerning water and sanitation, facilitated latrine construction, and provided follow-up supervision of CDSS activities. The nurses and social affairs agents were expected to devote 60 percent of their time to the project, the sanitation agents 100 percent. Peace Corps volunteers contributed to training and supervisory activities at this level. District-level personnel are supervised by the district medical officers *(médecins-chef)*.

At the village level, the CDSS's are primarily responsible for ensuring proper pump use and maintenance and for educating the population in proper water handling and environmental sanitation.

Inputs

Resources for the socio-health component were drawn from PRAGMA/USAID, from the GRB, and from the project communities.,

PRAGMA/USAID

Personnel

- Health education specialist
- Environmental sanitation specialist
- Short-term consultation for specific activities

Material and equipment

- Motorcycles for department- and district-level personnel engaged in the project
- Gasoline
- Materials for latrine construction

Finances

- Per diem for department- and district-level personnel engaged in project activities and for villagers attending certain meetings conducted outside their villages
- Production of audio-visual aids
  - flipcharts
  - training manuals
  - tee shirts
  - placards

GRB

Personnel

- Department-level personnel
  - health education specialist
  - social affairs specialist
  - sanitation specialist
- District-level personnel
  - nurses (two per district): 60 percent
  - social affairs agents (two per district): 60 percent
  - sanitation agents (two per district): full time

Material and Equipment

- Office space at district level

Communities

Labor

- CDSS
  - well-site preparation

- pump maintenance
- community education
- latrine construction

Field staff were remunerated according to the following guidelines:

- Project supervisors received a fixed amount of CFA 50,000 per month, calculated on a minimum number of days per month in the field to ensure proper project implementation.

- District personnel were paid on the basis of campaigns completed. A campaign comprises a number of visits for specific activities (e.g. committee installed; contract signed; health promotion). An agent receives CFA 3,000 for each campaign completed.

- Socio-health development committee members were paid CFA 500 for attending meetings/training sessions to encourage attendance and for those who travelled to other villages. This practice was phased out, as it was felt that the project should not be providing per diem to CDSS members for attending activities which were for their benefit.

Implementation

Since the project's commencement, the following socio-health-related activities have been carried out:

- Survey of villages in the project region to identify potential project villages (May 1987)

- Training of trainers (TOT) workshop for project supervisors and 22 district personnel (September 1987)

- Creation of initial CDSS's (September-November 1987)

- Training of initial CDSS's in the roles and responsibilities of their members (March-April 1988)

- Health education campaigns (June 1988)

  - prevention of guinea worm (June-July 1988)
  - potable water (October-November 1988)
  - sanitary excreta disposal (May 1989)
  - environmental hygiene (September-November 1989)

- use and maintenance of latrines (for representatives of families benefiting from project-funded latrines)

- TOT workshop for project supervisors and 30 district personnel (including district medical officers and Peace Corps volunteers) (March 1989)

- Supervisory training for project supervisors and district personnel (October 1989)

Village Surveys

Socio-health activities began with preliminary village surveys, which district personnel carried out in their respective districts to identify potential project villages. The surveys collected data corresponding to the criteria for village selection:

- Existence of guinea worm infection in the village

- Minimum village population of 500 (changed to 250 in late 1988)

- Lack of a potable water source (or inadequate source in the case of larger villages with too few pumps)

- Accessibility of potential well sites to well-drilling equipment

- No more than two major ethnic groups in the village

Organization of Socio-Health Activities

Socio-health activities were decentralized in the following manner. Technical assistants and project supervisors identified priorities for socio-health interventions, defined community development strategies and health messages, trained district personnel in identified subject areas, and provided training guidelines for district personnel to use in training CDSS's. District personnel trained CDSS's in the identified community development strategies and health messages. CDSS's, in turn, educated the village population concerning the various health messages. The approach used for all training activities and village interventions was based on principles of adult learning. Informal teaching methods included stories, role plays, songs, and discussions focusing on specific behaviors and actions that villagers may adopt to care for drinking water properly and maintain a clean environment.

CDSS Creation

The first village intervention was the creation of a socio-health development committee, one of three primary conditions to be met by villages interested in receiving a project well and pump. Each committee was asked to name a president, vice president, secretary, treasurer, pump caretaker, and two health animators (a man and a woman), plus several members-at-large (to include other community leaders, e.g., teachers, agricultural extension agents, and representatives of women's groups and youth groups, etc.). At least three committee members were to be women. The primary purpose of these committees was to assure proper pump use, maintenance, and repair and the promotion of proper water and sanitation practices in the village. Longer-term purposes included service by the committee as a contact and/or catalyst for other development projects within the village. CDSS creation has continued throughout the life of the project as additional villages have been invited to participate in project activities.

Collection of Pump Maintenance/Repair Fund

A second condition of well/pump installation was the collection and deposit in a bank account of CFA 60,000 for future pump maintenance and repair. Then villagers were asked to sign a contract with the project agreeing to assume responsibility for pump maintenance and repair and to participate in other water and sanitation activities planned for project villages.

In order to standardize the GRB policy of village responsibility for pump maintenance and repair, eliminate conflict concerning the responsibility for pumps in the project region, and promote proper water and hygiene practices in all villages with a potable water supply, the project also worked with villages that had previously received wells/pumps from a UNICEF project (between 1981 and the beginning of project activity in 1987). These villages were asked to organize CDSS's, collect and deposit in a bank the CFA 60,000 for pump repair, and sign the same contract acknowledging their responsibility for pump maintenance. The villages were included in all other socio-health activities in the same manner as villages with project pumps only. Additional project wells/pumps were installed in some of these villages according to project criteria (need, as determined by the number of wells per population, and village commitment to pump maintenance, as expressed by their organizing a CDSS and depositing the CFA 60,000 per well/pump).

An average of four to six meetings per village were necessary: (1) for district personnel to explain the project, its conditions, and its benefits (first to village leaders then to the village as a whole); (2) for the villagers to select and install their committees and to decide on a method to collect the required CFA 60,000, then to collect and deposit it; and (3) for district personnel to sign a contract of commitment with the village-named CDSS.

Training: CDSS

Socio-health development committee members received a day of training in their respective roles. They were divided into groups according to their functions: presidents, vice presidents, secretaries and treasurers; pump caretakers; and health animators. Often CDSS members of up to three villages were grouped together for these training sessions. In addition, health animators received one day of "classroom" training for each health campaign plus two days of "practical" training within two weeks of the initial session. During their practical training the district agent accompanied the animators as they conducted their health education sessions (house-to-house or in larger groups). All health campaign training was accompanied by flipcharts designed in Benin to complement the health messages given. Animators were trained in how to use the flipcharts in their villages, and each animator was given a flipchart corresponding to the topic covered. District agents did follow-up visits to health animators approximately one month after the end of each practical training session in order to evaluate the immediate effectiveness of their efforts.

Latrine Construction

Following the health campaign on sanitary excreta disposal, latrine construction was introduced as a project component in project villages with a primary school. Eligible primary schools of project villages received double ventilated improved pit (VIP) latrines. Three criteria governed the choice of primary schools to benefit from project latrines: (1) the school had no latrine, (2) the village in which the school was located had a well with pump, and (3) the village appeared willing to provide the manual labor necessary to dig the latrine (the latter was assessed in part by the strength of the village's earlier commitment to collecting the initial pump-repair fund).

School directors and teachers were to ensure that the latrines were properly used and kept clean. They were also encouraged to use the existence of latrines in the schools to promote the adoption of proper hygiene practices. For example, water and soap were to be kept outside the latrines for hand-washing. Each village benefiting from a school latrine was also to benefit from family latrines: five VIP latrines or eight improved traditional latrines (without ventilation) per project pump in the village. The choice of latrine model was done by district, with four districts receiving materials for VIP latrines and two districts receiving materials for the improved traditional model. The idea of making two models available was to test the acceptability and affordability of each.

A questionnaire helped determine which villages would be most likely to properly use and care for a latrine. Criteria included current hygiene practices, ability and commitment to contribute to the latrine construction, and projected use and maintenance of a family latrine. District personnel interviewed interested families, compiled the results, and shared them with villagers at a later meeting, thereby facilitating community participation and objective choices of families to receive project latrines.

For school latrines and VIP latrines, the project furnished the cement and reinforcement iron for the slab, piping for ventilation, cement for lining the pit, and the money to pay local masons to do the cement work. (The soil in much of the project area is too unstable to support the 100 kg slabs without reinforced pit walls.) The project also furnished the superstructure for the school latrines. For VIP family latrines, the project furnished cement and reinforcement iron for the slab and pit lining, and for the improved traditional latrines, cement and reinforcement iron for the slab. In both cases, the families had to furnish the superstructure. In all cases, the local population (in the case of school latrines) or beneficiaries (of family latrines) dug the pits and provided sand and gravel. Following latrine construction in each village, families receiving latrines were instructed in proper latrine use and maintenance, including keeping water and soap outside the latrine for hand-washing. (For further discussion on latrine construction, see Section 3.3.)

Collaboration with Other Community Agents

District personnel collaborated with other health, education, and community development agents in their districts; these agents included primary teachers, other health personnel at the district level, agents of the regional rural development activity center (CARDER), and district-level government administrators. Such collaboration took two forms. The first occurred when a community development or other agent resided in a project village. Project personnel would suggest that they participate as members-at-large in the CDSS and help to reinforce health and community development messages. The second involved regional medical officers and district project personnel, who organized informational training sessions with district-level civil servants to orient them to project activities. The purpose of these sessions was to encourage support for project activities by other sectors in their contacts with project villages, and to generally facilitate collaboration in all community development activities in project villages.

Other Socio-Health Activities

Other socio-health related activities carried out by the project included (1) the production of flipcharts to accompany health messages, (2) the development and broadcast of radio messages to reinforce health messages given in the villages, (3) a literacy campaign (done in collaboration with UNICEF in a limited number of villages), and (4) a study on the use of guinea worm filters.

Flipcharts

Flipcharts accompanied each of the four health campaigns directed toward project villages. Village health animators, trained to use the flipcharts, were to use these aids in health education efforts in their villages.

Radio Messages

In 1988, the project developed health messages for radio broadcast, and these messages were broadcast from Cotonou according to regional programming. The messages, aimed primarily at women, were designed to reinforce village-level health education messages. However, it soon became apparent that there were too few radios (and/or inadequate access to radios by women) in project villages to justify continuing this activity.

Adult Literacy Campaign

In 1991, the project collaborated with *Direction nationale d'alphabetisation* of the Ministry of Culture and with UNICEF in a literacy campaign covering 27 project villages in four districts. UNICEF financed teaching materials and the *Direction* provided technical support for this activity, which was directed at CDSS's of the selected villages. Villages were selected on the basis of the availability of members of CDSS to attend literacy class and the presence of a literacy agent in the village. The literacy classes were held by a village literacy agent who was designated by the literacy coordinator at the district level. These individuals, with technical support from the *Direction*, trained their fellow CDSS members. The rational for this activity was that literacy would allow community members to benefit from written information related to health or other community development issues and to participate in and manage other community development activities. Additionally, women with literacy skills often practice better hygiene, have lower rates of both fertility and infant mortality, and can participate more fully in community decision-making. The expansion of this activity to other project villages was limited by resource availability.

Guinea Worm Filter Study

A major anticipated outcome of the project was guinea worm reduction in the project region by the provision of potable water and by improved hygiene practices. In addition to a health education campaign on guinea worm in project villages, the project conducted an epidemiologic surveillance of guinea worm in the region (see Section 3.7). The project collaborated, as well, with UNICEF and the Organization for Coordination and Cooperation in the Control of Epidemic Diseases (OCCGE) in conducting a small pilot study on the use of five models of guinea worm filters in four small villages without potable water supplies. The criteria for selecting the villages participating in the study were presence of a CDSS, high guinea worm incidence, and a small population. Study participants were given both large- and small-diameter filters of one model. Researchers discussed with the groups the rationale behind the use of the filters and demonstrated their use. Follow-up was done at three-week intervals over the three-month research period. Evaluation of the use of the filters was done by examining the debris retained and by measuring the volume of water per second passing through the used filters at the end of the project study. Study results indicated that even if villagers expressed an interest in the use of filters to reduce infection, few (28.7 percent) were able or motivated to follow through with correct use, given the limited amount of follow-up

provided over the three-month period. As a part of a national program, UNICEF is continuing a program of guinea worm education and surveillance in nonproject villages in the region, using Peace Corps volunteers and local animators, in an attempt to change behavior associated with guinea worm infection.

Outputs

The following information summarizes anticipated and achieved outputs of the project's socio-health component as of September 1991:

Output	Objectively Verifiable Indicator	Anticipated	Achieved
Provincial & district social affairs, health education, & sanitary engineering agents, and other village-level workers trained in village mobilization & village health campaigns	Number of people trained	About 50	26 district-level personnel trained
Functioning CDSS's in each participating village	Number of functioning committees	275	503 committees established: 309 in villages with new pumps, 194 in villages with existing pumps
Effective cooperation between village health committees and rural extension services for integration of all project components	N/A		Effective cooperation established
Active collaboration among concerned GRB rural extension services for village health improvements	N/A		Active collaboration
Pre-, concurrent, & post-water supply installation, health education, & pump maintenance/repair campaigns	N/A		Campaigns completed: • potable water • guinea worm prevention • safe excreta disposal • domestic hygiene • latrine use and maintenance (for families with latrines)
Upgraded skills of all personnel receiving long- and short-term participant training	Participants trained	4	Training provided for project coordinator & three supervisors

District Personnel

In the six project districts, 26 district-level personnel were deployed for the implementation of socio-health activities with village committees. These included nurses, social affairs agents, and sanitation agents; the first two cadres worked 60 percent with the project and the sanitation agents worked full-time. With few exceptions, district personnel remained the same throughout the life of the project. Following is a current breakdown of personnel by district and number of CDSS's for which they are responsible.

District	Number of Personnel	Number CDSS's
Dassa	6	124
Bante	4	80
Glazoue	4	113
Ouesse	4	44
Savalou	5	97
Save	2	46

District personnel received TOT training, which preceded each village training for which they were responsible (e.g., CDSS roles and responsibilities plus the four health campaigns: guinea worm prevention, potable water, sanitary excreta disposal (including latrine use and maintenance), and personal and domestic hygiene. Each training session was conducted twice, allowing participants to be divided into two groups in order to allow maximum participation and practice of training techniques. In addition, district personnel received an initial TOT (in adult training methodologies) and a second more-advanced TOT two years later; they also received training in supervision. In addition to learning new adult-training technologies, district personnel have in most cases developed a rapport with villagers not always seen between civil servants and the population with whom they work. Certainly this rapport contributed strongly to the effectiveness of their interventions in the villages.

CDSS

In the project zone, 503 socio-health development committees have been formed in 312 villages. With rare exceptions, villages have decided to create one CDSS for each water pump, even when there are several pumps in a village, as in the case of larger villages. (The team visited one village in which a single CDSS was responsible for two pumps placed side by side.) These CDSS's are responsible for 309 project-financed borehole wells/pumps and 294 borehole wells/pumps previously installed with UNICEF support. Committees in all project villages have participated in the first three training sessions (roles and responsibilities of CDSS

members, prevention of guinea worm, and potable water). Committees in five of the six districts have benefited from all health education campaigns; in the sixth district, initial problems of collaboration with a Swiss-supported primary health care project using the same district personnel stalled the participation of these personnel in project activities.

In order to assess the quality of outputs and evaluate the effect of project activity at the village level, evaluation team members interviewed CDSS's in 14 project villages. Members of 26 CDSS's were present for these interviews (one CDSS per pump except for the previously mentioned village in which one CDSS is responsible for both pumps). The following comments are based, in part, on these interviews.

Conditions for Project Participation

In general, CDSS's interviewed understand two of the three conditions for project participation: the collection of CFA 60,000 for future pump repairs and the formation of a CDSS. However, less than half mentioned signing a contract of commitment as a condition for participation.

Collection of pump maintenance funds

Of villages on the original project list, all but 67 collected the CFA 60,000 per pump (pre-project or new) necessary to participate in project activities. As part of GRB policy for village well maintenance, each CDSS was to collect an additional 60,000 francs annually to guarantee sufficient funds for future pump repair. Despite great effort on the part of project personnel to gain compliance with this policy, villages appear not to have adhered to it.

Recent project documents quote CFA 42,775 as the median sum in village bank accounts. During its field visits, the team found anywhere from zero to CFA 128,475 registered in village account registers. (The CDSS of the village with no repair fund claimed to have initially collected CFA 80,000 and deposited it at a district government office, where it disappeared. The village refused to conduct further advance collection and assured the evaluation team that they were capable of collecting funds as needed for repair. They specified several repairs that had been done on their pump since its installation in 1984 and their cost; the pump was functioning at the time of the visit. The village with CFA 128,475 had one CDSS and two new pumps side by side.) When CDSS's were asked whether they thought they had enough money at the bank to cover pump repairs, the majority said "not in the case of major repairs."

Few villages have had to make major repairs up to this point. However, the team noted two older UNICEF pumps broken down in one village, with seemingly little action being taken (a village of 5,000 people with four other functioning pumps and not unexpected management problems associated with a "community-based" system that is applied to a large and relatively independent population). Although CDSS's all understood that the initial collection of CFA 60,000 was for pump maintenance and repair, they did not otherwise express great

appreciation of, nor commitment to, the necessity to continue to collect an annual 60,000 francs.

Nearly half of the villages had, in addition to the bank account, a smaller amount of pump-maintenance funds in the village, which partly for convenience were more often used than the bank funds. In other cases, CDSS's collected money as needed for pump maintenance and repairs and rarely touched the village bank accounts. No CDSS acknowledged having problems getting money from their bank accounts aside from the inconveniences of distance and need for multiple signatures. At least one member of each CDSS (depending on members' literacy levels) had been trained in how to balance an account and had been given a formula for managing the pump fund records. However, in field visits only one CDSS was found to be managing its records as the project anticipated. When asked who was responsible for maintaining this accounting system, a CDSS member said it was the primary school director (who is a member-at-large of the CDSS). When asked how they keep the village population abreast of pump expenses and account balances, most CDSS's said they inform the population of the need and cost of each repair.

Methods of generating or collecting pump repair funds included (a) taxing all adults a fixed amount (which sometimes varied between men and women and between married and younger unmarried adults) of from CFA 200 to 500 per adult; (b) using the profits from a collective field crop; (c) selling water (in the case of UNICEF pumps where the collection of funds was imposed some time after the installation of the pump); (d) contributions from family dividends from the yearly sale of cotton; and (e) voluntary contributions. Project personnel found it much easier to convince pumpless villagers to collect maintenance funds in order to receive a new pump than to convince those *with* a pump of the need to collect funds for future repair (when this had not been a condition for receiving the pump).

CDSS roles & responsibilities

CDSS's primarily perceived the committee's role as one of ensuring proper pump maintenance and repair. Fewer than half mentioned their role in transmitting health messages. When asked what training they had received, fewer than half of the CDSS's cited roles and responsibilities of the CDSS as a topic, but nearly all were able to cite major elements of the various health education campaign training they had received. When questioned about management of the pump and village hygiene, role clarity became clearer. Pump caretakers saw their roles as ensuring proper use and maintenance of the pump and surrounding area, informing other CDSS members of breakdowns, and calling the trained pump repair person in case of breakdowns. Others added that they purchase spare parts as recommended by the pump repair person (usually at the district seat) and mediate disputes between women using the pump. Such disputes often arise from long lines and waiting periods for water in villages with too few wells.

Health Campaigns

Health animators conducted the health campaigns, either going house to house to explain health messages they were taught by district personnel or by organizing larger groups of villagers for presentations. In all cases, the animators used flipcharts designed in Benin to accompany their messages. Animators conducted all four health campaigns in project villages in five of the six project districts. In the remaining district, the animators received training in and conducted campaigns on only the first two subjects: potable water and guinea worm prevention. Health animators stressed the usefulness of the flipcharts in terms of (a) giving them and their messages more credibility and (b) helping to clarify and reinforce water and hygiene messages of the health campaigns.

Guinea worm prevention

All CDSS's interviewed mentioned guinea worm as a major problem prior to pump installation and claimed that it had now all but disappeared. This is confirmed by the guinea worm surveillance studies done in the project region, which report a 75 percent decrease in guinea worm incidence in villages benefiting from both a new handpump and the health education campaigns on guinea worm. (See Section 3.7, Epidemiological Surveillance for further details.) All CDSS's spoken with were able to associate guinea worm with the consumption of infected pond water, and most were able to describe in general terms the transmission cycle of the worm. CDSS's also noted that diarrhea and vomiting had lessened since the introduction of potable water and health messages. This could not be verified, however.

Potable water

The CDSS's maintained that villagers drink only pump water and that, in the case of pump breakdowns, the villagers often use the next-nearest pump; others said they use captured rainwater as a substitute when necessary during the rainy season. Judging from CDSS feedback and observations, nearly all pumps are closer to the villages than the ponds or streams previously used for drinking water. Approximately one-quarter of the CDSS's remarked upon the difference in taste between pump water and marigot water and also the occasional changes in the color of pump water during the rainy season. However, they insisted that neither of these factors was a deterrent to the use of pump water.

The protection of water from the pump to the point of consumption was also assessed. Except in one or two cases, the team could not observe the cleanliness of receptacles used to transport water from the wells to the houses, due to the timing difference between field visits and water collection. However, the team did observe the well sites and pumps, finding the sites well kept and pumps functional (except for a few cases awaiting repair).

Drinking water is stored inside houses in large earthen jars, which the team observed to be for the most part properly covered. The water within was clear, although the team was unable to

ascertain its bacteriological quality. Nor was it possible to evaluate the cleanliness of the container bottoms due to lack of light in the houses. Some water catchment into large earthen jars is done during the rainy season, although CDSS's insisted that this was for cooking and washing, only. The protection of such water varied; most arrangements were acceptable, considering the water's intended use.

When asked about water consumption, women said they go for water from three to ten times a day (depending upon family size); most referred to large wash basins as the receptacle used for water collection. Slightly under half of the CDSS's indicated that their well was used only for personal consumption (water for drinking, cooking, washing, etc.). Slightly under half indicated that their well was also used as a source of water for nearby gardens, especially during the dry season; the same number indicated that they also use well water for brick/house construction. More than half said that they also used well water to water domestic animals during the dry season. Of those who do not use pump water for other uses, most said it is because of its inaccessibility due to too many people using a single source of water.

Village hygiene

With few exceptions, the evaluation team found project villages to be practicing the principles of village hygiene that have been taught them. Garbage was generally piled in a hole or in a burn pile; there were few cases of stagnating water outside of shower walls; and although domestic animals were present, there was minimal fecal matter around and about. One village visited by the team had benefited only from the first two health campaigns, guinea worm and potable water, due to early problems of collaboration in that area. The level of village hygiene in this village was significantly different from other villages visited. However, the well/pump area of this village was well maintained.

Latrine Construction

Double VIP latrines were built in approximately 80 percent of the primary schools in project villages not already having latrines. A total of 109 school latrines were built. (Additionally, two demonstration latrines were built in community health centers.) In all, 261 family latrines have been built.

During field visits, the evaluation team observed a number of latrines, both school and family-based. In nearly all cases, they appeared to be used and reasonably well maintained. In meetings with the CDSS's, significant interest was expressed in the latrines, and individuals who did not receive one inquired about the possibilities of receiving one in the future.

The latrine construction program was not, however, without problems. Initially, at least, latrines were not an expressed need of villagers but rather an element identified by the project as an important contribution to village hygiene. The project undertook this activity in mid-1990 and, initially, progress was slow in obtaining the necessary community participation to dig the

school latrines. Participation was best where the CDSS was well organized and active and where one or more villagers had spent some time outside the village.

Training Project Supervisors

In addition to on-site training (conducted by WASH consultants) in adult training techniques and supervision, project supervisors benefited from the following short-term study trips and training:

(1) Togo: sanitation and potable water

(2) Togo: socio-sanitation aspects of water and sanitation projects

(3) Burkina Faso and Ghana: community participation

(4) Ivory Coast: redevelopment in peri-urban centers

(5) Cotonou: computer programming

Other Socio-Health Activities

Flipcharts

Flipcharts were produced corresponding to each of the four health campaigns implemented. CDSS health animators reported them to be essential in explaining health messages in the villages. The flipcharts contributed to the credibility of the animator and his/her message and helped facilitate comprehension of the message by both adults and children. Project personnel suggested developing such a flipchart for training CDSS's in their roles and responsibilities.

Adult literacy campaign

In all, 251 members of 27 CDSS's in four districts completed literacy training, which was offered in collaboration with *Direction d'Alphabetisation* of the Ministry of Culture and UNICEF. Of this group, 57 participants were women. Although this activity was not planned for in the project, it was judged essential to enable more-active community participation and to facilitate the promotion of additional community development activities. No project costs were incurred.

Guinea worm filter study

In guinea worm-infested villages with too few residents to qualify for project wells, a study was made to determine villagers' commitment to using cloth filters to prevent the consumption of nonpotable water. The study results revealed that the percentage of the population (28.7

percent) that could be motivated to use the filters was too small to warrant the production and distribution of guinea worm filters to such villages in the project zone. It emphasized the critical role that popular education about the correct utilization of filters has on their adoption and use, and the need for supervision and follow-up. However, UNICEF is continuing to pursue guinea worm eradication activities with the help of Peace Corps volunteers and local animators.

3.1.2 Assessment

Effectiveness

The planning and implementation of socio-health activities involved a combination of participatory models: contractual obligation and community decision-making. The first model involved three steps: (a) project personnel explained to villagers the benefits of having a pump and outlined the conditions the villages would have to meet in order to receive one; (b) subjects of health campaigns were identified by project personnel, health messages were developed and training was decentralized to the level of the CDSS's, who were to communicate the designated messages to the community; and (c) project supervisors and district personnel made substantial efforts to gain conformance to the GRB policy of collecting CFA 60,000 per year per pump for maintenance and repairs. Ultimately, approximately 85 percent of the villages on the original project list complied with the conditions imposed and also understood and applied health messages to some degree. However, the majority of project villages decided (whether out of lack of understanding of, or appreciation for, the proposed system) not to fulfill the obligation of collecting CFA 60,000 *annually* for pump repairs.

The second model, community decision-making, called for villages to choose CDSS members and develop a strategy to collect the initial and subsequent CFA 60,000 for pump maintenance. This approach was also envisioned as a path to the eventual development of micro-projects that it was hoped would follow as a result of the initial CDSS organization and the availability of an adequate supply of potable water.

The former strategy was necessary in order to achieve the project's quantitative targets. The latter, however, has often been found to be more effective, although initially more time-consuming, in terms of long-term impact and sustainability of effort. In general, the project achieved the quantitative targets of the socio-health component. (See Outputs in Section 3.1.1.)

The project plan called for "about 50" provincial- and district-level social affairs, health education, and sanitary engineering agents to be trained in village mobilization and village health campaigns. In fact, the GRB seconded 3 provincial-level and 26 district-level agents to the project's socio-health component. In addition, regional medical officers of the six districts in the project zone participated in some project training and supervision of activities.

The assignment of personnel to the project was rational, given the availability of these cadres of personnel and the initial project objectives (which did not include the creation, training, and supervision of CDSS's associated with the 194 previously installed pumps). The project benefited from the GRB's selection of competent and committed personnel. The quality of personnel assigned to this project, and their commitment and approach to the achievement of project objectives, was an essential element in the success of the project's socio-health component.

Also important to the effectiveness of these personnel was the training provided by the project. Project supervisors benefited from the long-term technical assistance to the project; WASH workshops on project planning, training, and supervision; and study trips to neighboring countries for the purpose of studying water and sanitation programs. The supervisors' approach to the planning and implementation of project activities would indicate that they have profited from all of these resources and experiences.

In addition to the WASH workshops, district-level personnel also benefited from training and technical assistance provided by project supervisors concerning all project interventions in the villages.

The participatory and decentralized planning and implementation of activities facilitated valuable skill development at three levels:

Provincial and District Levels

- Their responsibility for planning and evaluation enabled staff to develop these skills and engendered in them a sense of accountability for their plans and efforts.

- The adult learning/informal training techniques and supervisory approaches practiced during WASH workshops and implemented in the field have provided project personnel with communication and interpersonal skills, both very effective in the implementation of project activities. Project personnel demonstrate a sense of collaboration and rapport, among themselves and with village populations, not always seen in health service delivery systems and community development endeavors.

- Multisectoral collaboration at both levels allowed for a necessary complementarity of technical input and cross-sector skill development of each cadre of personnel.

- The project's emphasis on disease prevention enabled personnel to develop and appreciate the role of certain public health skills in the

prevention of disease. The Ministry of Public Health (MSP) was impressed with agents' appreciation for and practice of this important element of their primary health care strategy.

Village Level

- The conditions required for project participation and the villagers' subsequent organizing to care for their pumps created a strong sense of pump ownership within the population of project villages.

- Villagers developed an awareness of certain basic principles regarding the roles potable water and environmental hygiene play in disease prevention. This awareness has translated into fairly widespread behavioral changes in consumption of potable water and is also seen in terms of other aspects of village hygiene, though more remains to be done.

Both Levels

- The project's flexibility allowed people to learn from their experience, modify approaches as necessary, and incorporate other activities that will contribute to more-effective application of health messages and to a greater capacity for community development (e.g., literacy campaigns especially for women).

Health campaigns were very effective, especially given the limited exposure villagers had to each message (due to the volume of project activity). Health messages were clear and understood by villagers to the extent that they could repeat and explain them. Some messages were being put into practice. Villagers insisted that the pump was their sole source of drinking water. This was supported by the fact that (a) there has been a strong reduction in the incidence of guinea worm in project villages, (b) the pumps were, in general, very accessible, and (c) villagers did not acknowledge any resistance to either taste or color of pump water. In general, villages that had benefited from all health campaigns were reasonably free of visible fecal matter and solid waste. Latrines were used and reasonably well maintained.

To assess the eventual application of all messages by village populations will require a longer period of time and will depend upon consistent reinforcement by district agents. Flipcharts developed by the project for CDSS health animators have been very effective in facilitating the understanding of health messages by both adults and children, and give the animators and their messages increased credibility.

Training of CDSS's regarding the care and maintenance of village pumps was effective in that pumps and the surrounding area are properly cared for according to health messages taught;

villages are able to collect the funds necessary for maintenance and repair, and there is a functional system of trained repairmen and spare parts in the region. (See section 3.8 for more detail.)

However, some elements of pump-maintenance training are problematic. First, the GRB policy of collecting CFA 60,000 annually for pump maintenance and repair is unrealistic in view of villagers' perceptions of and experience with pump maintenance and repair needs. While the policy may have merit in the event of major repairs, it is difficult to convince villagers to collect larger sums of money than the year-to-year costs of pump maintenance and repair seem to dictate.

Second, the system proposed for CDSS accounting of pump maintenance funds is perhaps not the most appropriate. Few CDSS's seem to be using it, either because of its complexity or because people do not appreciate its utility.

Third, it was anticipated early in the project that village pump caretakers would receive very basic training in pump maintenance (e.g., how to grease the chain) and receive the tools needed to do these tasks. This has not occurred and continues to be a strong request in villages that wish to be able to take responsibility for pump maintenance.

The effectiveness of project inputs was affected by an element that was unanticipated in the project design. Due to long start-up delays, the project ultimately found itself operating in a region where there had recently been a very similar well-construction project with neither a socio-health/community development component nor a structure to facilitate adherence to the GRB policy of village responsibility for pumps, both of which were strong elements of this project. The decision to include these other villages in the project's socio-health activities, including creating a structure for future pump maintenance and repair, was necessary to ensure uniform understanding and implementation of the government's pump maintenance policy. It was also important as a way to maximize the health benefits to be gained by all populations having access to potable water in the project zone and to promote other water and sanitation practices that contribute to improved health.

However, the decision to include in the project all villages with a potable water source exacted a certain cost. Although the project was very successful in meeting quantifiable targets, it was very ambitious if considered in terms of either replicability or sustainability, for the following reasons.

- About 30 visits per village are necessary to accomplish all socio-health activities with each of the 503 CDSS's. This figures includes four to six visits for the preliminary steps leading to the village's meeting the conditions for project participation, four visits each to train CDSS health animators in each of the four health campaigns (for a total of 16 visits), and eight visits for the purpose of guinea worm surveillance.

These amount to over 15,000 visits undertaken by 26 district agents (two-thirds of whom were working with the project at 60 percent time) in less than three and one-half years. (Additional health education topics, including personal hygiene, oral rehydration therapy, and the prevention of infectious diseases, were considered for health campaigns. However, given the constraints of time and personnel, it has not been possible to include these topics.)

- Project personnel were in part motivated to carry out their tasks by the adequacy of resources, including per diems based on productivity at the district level and established at a flat rate at the provincial level (as opposed to the usual criteria of being away from one's home base overnight). Although this per diem system was very effective in promoting productivity, it would likely be difficult for the GRB to replicate in future public health/community development activities.

- The pace of project activity allowed minimal time for follow-up visits to villages for problem-solving or other project support. Such visits are essential, at least initially, to CDSS productivity beyond the most basic responsibilities. Project personnel acknowledged that CDSS's rarely meet unless the district agent is present: given their volume of work, the agents had little time for such follow-up.

More personnel for this project component would have enabled more inputs to the CDSS's. However, results would likely have been less replicable and sustainable after the project terminated.

A number of project aspects are being looked at in terms of replicability. The GRB (*Direction de l'hydraulique*) is particularly interested in the effectiveness of the socio-health component in terms of the community development process used and its effect on behavior vis-a-vis water consumption, village hygiene, and villagers' sense of pump ownership. The GRB is considering making this process an integral part of all future water projects.

The MSP sees the CDSS's as an appropriate structure through which to work in primary health care/disease prevention campaigns.

Project personnel claim that this is the first community-development-type project that has benefited from a truly multisectoral approach, which they found essential to the success of their efforts. They foresee the need for further collaboration with other sectors (such as agriculture) to reinforce messages as well as to facilitate other aspects of community development (e.g., micro-projects).

It was anticipated that district-level medical officers, as the supervisors of health personnel at the district level, would be the logical supervisors of socio-health activities within their districts. However, this was usually not very effective because medical officers have many responsibilities and were thus unable to take on this responsibility full time. Ultimately, Peace Corps volunteers assisted with this role in some districts and, with their departure, a district-level team member was selected to assume this role.

Peace Corps volunteers were appreciated in their roles as district-level supervisors. Unfortunately, as all volunteers in these roles had already completed their two years of service, the evaluation team was unable to obtain their input.

The criteria of the presence of guinea worm in the selection of project villages and prevention of guinea worm as the initial health campaign message enabled the project to have an impact upon this disease in the project zone and provided a disease against which the project could demonstrate a fairly immediate and very visible impact. Both have created credibility for other less-immediate and/or -visible disease prevention interventions.

The adult literacy program was a success in the limited number of villages in which it was available. In 27 villages, 251 CDSS members, of which 57 were women, completed the program. Because this program involved a certain amount of resources not anticipated in the project design, the project collaborated with UNICEF and *Direction d'Alphabetisation* in its implementation in project villages. It is hoped that other villages will be able to benefit when the literacy program begins another campaign next year.

Impact

While the socio-health component has generally surpassed quantitative project targets, the ultimate impact of most of these achievements will depend very much on the quality of implementation. An important impact already demonstrated is the reduction of the incidence of guinea worm by 75 percent. CDSS understanding of roles and responsibilities seems quite clear in discussions with members and in the fact that they manage the village pumps without difficulty. Most animators have related all health messages they were taught at least one time; health messages seem to have been quite clear and well understood (although not necessarily based on community-identified needs).

CDSS's have the potential leadership to become a mechanism through which other socio-health/community development activities may be pursued. An MSP representative has commented that these committees should be used for further health education inputs in other primary health care topics. Some villages have expressed interest in micro-projects, and the CDSS's provide a structure that could facilitate such activities (with other existing village groups). However, neither time nor resources have permitted the committees to develop much beyond their initial role.

In order to facilitate the development of this potential and secure the gains that have been made in knowledge, attitude, and behavioral change thus far, project personnel must support and reinforce the committees in ongoing problem-solving; reinforce the health messages, tying them to specific situations and community concerns; and assist CDSS's in identifying and/or planning other socio-health interventions/community development projects.

3.2 Borehole Construction

3.2.1 Overview

Borehole construction was undertaken by drilling crews furnished by the *Direction de l'hydraulique*. UNICEF provided technical assistance and furnished the drilling equipment, support vehicles, and all related equipment. It also paid operating costs, including fuel and per diem for crew members hired by *Direction de l'hydraulique* on a temporary basis. Through a financial contribution from USAID, UNICEF deployed technical assistance personnel, procured equipment and other commodities, and covered operating expenses (see Section 3.10.2).

The project objectives listed in the Second Project Amendment Agreement (1985) were to complete 225 boreholes by the end of the project, to construct a concrete apron around each borehole, and to install an India Mark II handpump. In the Third Project Amendment Agreement, the number of pumps and boreholes was increased to 275. According to *Direction de l'hydraulique*, more than 317 positive boreholes have been drilled to date under the supervision of project personnel. Several were financed by the CARDER agricultural project funded by the World Bank. As of June 1991, the number of positive boreholes drilled for the project and funded by USAID stood at 309. Only one village was still dry at the time of the evaluators' visit, but the drilling team will be returning to this village and has strong hopes of finding water.

A firm condition for drilling was the requirement of depositing CFA 60,000 in the bank before the drilling would commence. In consequence, 67 previously programmed villages received no boreholes, as they did not collect the necessary funds before the planned passage of the drilling crew.

3.2.2 Assessment

The borehole program exceeded project expectations by realizing more than the 275 positive boreholes programmed. In the Project Paper Amendment of 1985, it was estimated that 458 boreholes would need to be drilled for 225 positive wells (a 49-percent success rate). In fact, 403 boreholes were drilled for 317 positive wells, an excellent success rate of 79 percent. The quality of well construction appears sound and is to be commended.

The rate of borehole production, although slower than would have been expected from a commercial drilling company—particularly at the beginning of the project—was not a hindrance to project success. On the contrary, it gave the project time to set up its community development approach in the villages (including acceptability of the system). The flexibility of working with another government agency (backed by UNICEF) that was not solely concerned with the cost/benefit analysis permitted better programming and coordination.

Wherever possible the project tried to follow the mid-term evaluation recommendation of 250 persons per pump. However, one of the problems for the project was obtaining current and realistic population figures for the villages.

3.3 Latrine Construction

3.3.1 Overview

The latrine construction component, as planned before the mid-term evaluation, expected to build 206 public latrines (with a total of 646 holes) in primary and secondary schools, health and maternity centers, and social affairs centers. The evaluation's recommendation of modifying the objectives of the latrine program to 100 public and 300 family latrines was written into the Third Project Agreement Amendment.

In the first Project Paper Amendment, $225,000 was budgeted for latrine construction. No figure was given in the Third Project Amendment. The second PRAGMA contract modification included $171,600 as the latrine construction budget. The final amount budgeted was $155,179.

The objectives were not a complete sanitary cover of all project villages, as there were inadequate financial means, personnel, and time for that to happen. The program was approached as a means to demonstrate the technology, with a selected number of dynamic villages receiving a limited number of latrines. Training of project agents, local masons, and village masons was an integral and essential part of the program. Inclusion of school latrines and school teachers in the program was seen as a way of improving sanitary conditions and passing hygiene messages to the beneficiary populations.

Three types of latrines were constructed:

Multiple-hole, double VIP latrines at primary schools

These latrines have two 2-meter pits which are ventilated, cement block lined, and designed for alternate use. The shelter, provided by the project, consists of cement blocks with corrugated metal roofing.

In all, 109 latrines were completed with a total of 302 holes. The village communities adjacent to the schools were responsible for providing sand; gravel; wood for the roof struts; water; an unskilled workforce to dig the pit and assist the project mason; one or two village masons; a carpenter to finish the shelters; and lodging for the project mason. The project provided the supervising agents, a trained mason, all the cement, the rebar, roofing material, wood for the doors, PVC ventilation pipes, insect screens, and all the appropriate tools and molds, as well as transport of all project goods and personnel.

Single-hole VIP family latrines

The single ventilated pits were lined with cement block for the 2 meters. The shelters, at beneficiary expense, were usually cement block or adobe.

Demonstration latrines were constructed for 149 families (5 in each chosen village). The beneficiary families were chosen after a sanitary survey was made of each family in conjunction with the committee. The project provided cement for lining the pit; rebar; PVC ventilation pipe; insect screen; training for the village masons; and supervision of all stages of construction. Each family signed a "latrine contract" and contributed two sacks of cement; sand; gravel; water; unskilled labor for digging the pit and assisting the mason; all the materials for the shelter; and the village mason's fee.

Single-hole, improved traditional family latrine

The unventilated pits, 1.5 meters deep, were lined with wooden branches and had a reinforced-concrete slab. As the pit was unventilated, a roofless shelter was recommended to the beneficiaries.

This type of latrine was constructed for 112 families; usually about eight latrines of this type were built in each chosen village. The project provided one sack of cement, rebar reinforcement for the slab, and the supervisory assistance of the agents. The families, who signed a "latrine contract," provided the necessary water, sand, gravel, clay, rocks, and branches. They also provided the latrine shelter and all necessary labor.

The total cost of latrine construction for the PRAGMA/USAID portion of the project budget (including training, publishing of manuals, headquarters costs, etc.) was approximately CFA 45,000,000 (equivalent to about US $161,000). An analysis of the economic aspects of this component appears in section 3.9.

3.3.2 Assessment

Although the stated objectives of 100 public latrines and 300 family latrines in 60 villages were not attained (downward modification of expected units due to decreased availability of funds and time constraint), the accomplishments are nevertheless to be commended. The brief time

in which the latrine construction plan was implemented overlapped with the agents' many other project-wide health education and community development activities. Village construction activities could begin only after a significant number of sanitation and organizational meetings had taken place, and these depended on the beneficiaries' availability to participate (due to time conflicts with the rainy, agricultural season as well as with other villager priorities).

The preliminary design of the school latrines, which incorporated partially lined pits, proved to be inadequate after the first rainy season. The water table rose to within 2 or 3 meters of the surface, and the soil of the unlined portion of the pits became waterlogged and fluid, causing some collapsing of the lower parts of the pits. For safety reasons, the project rebuilt all these latrines and at the same time improved the model so that there was an alternate use double-lined pit. (After the first pit is full, it is left to biodegrade and become sterile for two years; in the meantime, the slab is moved to the other pit.)

The technical manuals, which lay out all the construction steps, are well done and define technically sound and appropriate latrines of differing costs. Essential to the training of the agents, project masons, and village masons, these manuals will be an invaluable aid to latrine-building after the end of the project. Through this component, 13 project masons and 9 sanitary agents received training in the construction of the school latrines; all 28 district agents and 48 village masons were trained in the construction of family VIP latrines; and 8 district agents were trained in the construction of the improved traditional family latrine. These technical personnel in turn trained the beneficiary population.

The approach adopted for the "simpler" improved traditional latrine should probably be revised. It is low cost and simple in concept and is basically sound, but the technical aspects—size and shape of the pits, correct number and alignment of the branches, etc.—need more-intensive supervision than the agents were always able to give. An approach similar to the one used for the other model of family latrine could be attempted—that is, training a village mason in all aspects of this type of construction. Such training might have avoided the collapse of a couple of these latrines, due apparently to incorrect sizing and inadequate branch lining of the pit.

Factors indicating the success of a latrine program include cleanliness, degree of use, and soundness of the construction. Team members visited latrines of all types; all appeared to be in regular use, generally clean, and of sound construction (with the previously noted exception of the under-supervised traditional latrines). A real "usage" evaluation could not really be conducted, however, as the latrines were of such recent construction. However, latrine popularity seemed to be spreading in the project area, as many "nonlatrine" villages requested assistance with latrine construction.

The original project gave responsibility for latrine construction to both USAID and UNICEF. In fact, the improved traditional latrine was designed and tested by a PCV under UNICEF

supervision before being integrated into the USAID project. This created some problems in defining the roles and approaches of all participants.

In large part, the apparent success of the latrine construction program lies in its integration into the project's socio-health component and also in its being seen as an output of health education activities.

3.4 Cistern Construction

3.4.1 Overview

In the Project Paper Amendment of 1985, $100,000 was allocated for the construction of rainwater-harvesting systems in villages where boreholes were considered dry. This estimate was based on a cost of $200/system with 10 systems/village in 50 villages. The verifiable objective in this Project Amendment was to be 100 rainwater catchment systems.

When the mid-term evaluation team visited the project, cistern construction had not yet started and drilling had only just commenced. There were only about 30 boreholes, 2 of which were negative. The cost of the cistern systems appears to have been underestimated, as the funds budgeted at that time ($75,000) could provide water by rainwater harvesting only in about six pilot dry villages. This was significantly fewer than the 15 villages that might be expected to be negative. The problem of availability of personnel to carry out this component was also raised.

On 30 March 1990, the Third Project Amendment was signed, in which this component was canceled and replaced with a proposal to carry out feasibility studies on alternatives to borehole water supply.

3.4.2. Assessment

Cancellation of the cistern construction program was quite reasonable given that by the time the final evaluation team was visiting the project, there was only one dry village. This village was going to be visited during the next drilling season, and hopes were high that a positive borehole would be realized.

During his frequent visits, the project technical officer provided the technical information necessary for the feasibility studies. Through UNICEF and with the assistance of a project PCV, two solar water-pumping stations were piloted. Final results of this experiment can be seen only over a more extended period of time, although capital investment seems quite high. Some officials expressed regret that alternatives to borehole water supply systems were not actually tried out in this project, as not all regions of Benin would have the same borehole success and the experience would have been useful.

The project was responsive to the mid-term evaluation proposal to await an increase in the number of dry villages before commencing the cistern pilot project. As it turned out, the problem of dry villages disappeared due both to higher borehole success and to flexibility in the drilling program. This also allowed the sanitation agents to concentrate on the latrine construction component, an integral part of the health education campaigns.

3.5 Construction of Project Headquarters

3.5.1 Overview

The process of the project headquarters construction started in the third quarter of 1987, when the architectural and engineering drawings were sent to REDSO. By the first quarter of 1988, the plans were completed and approved; the bid of Artico 80 was accepted in September 1988 and construction began in October 1988. The construction was to be completed by May 1989, but due in part to the Beninese banking crisis, to USAID slowness in reimbursement, and bureaucratic delays at the level of Beninese customs, the project was unable to move into its headquarters until December 1989.

3.5.2 Assessment

As mentioned in the mid-term evaluation, the idea behind the Bohicon project headquarters was to congregate project staff from the three ministries concerned in the same physical structure. This was accomplished, and working from the same headquarters are staff from Social Affairs, Health, and Sanitation as well as UNICEF personnel. Also located there is the regional headquarters of Hydraulic Services. This arrangement has saved much traveling time for supervisors and has permitted much better coordination and collaboration at the regional level of the project's different elements.

However, an unexpected side effect of the move to Bohicon was that when the Cotonou office closed down, access to the project by Cotonou ministry personnel on the project Steering Committee became more difficult, and communication, coordination, and collaboration between the project and national-level institutions was impeded. The project, however, provided transportation and per diem so that ministry personnel who are part of the Steering Committee could come to meetings.

3.6 Water Quality Analysis

3.6.1 Overview

An important project objective is to improve the quality of water furnished to the rural populations in the Zou region. The measurement of water quality is a stated component of

project activities and includes both physio-chemical and bacteriological analysis. At the time of the mid-term evaluation in November 1988, no analyses had been conducted, but testing material had been ordered.

In the second quarter of 1989, physio-chemical test equipment was received. The rig technician began to use this equipment after drilling, and by the third quarter of 1989, the pump testing crew was using it as well. No bacteriological testing had been accomplished up to this point.

In the fourth quarter of 1989, bacteriological testing equipment was officially received by the personnel of the Directorate of the Bio-Medical Analysis Laboratory (DILABM) at the Zou regional hospital in Abomey. When the DILABM team began testing handpump water for bacteriological contamination, it found a significant number of boreholes contaminated with fecal coliform.

A consultant specializing in water-quality testing visited the project in June 1990 to assess the capabilities and procedures used for water-quality testing. The results of the first two bacteriological testing campaigns (176 samples) were found to be invalid due to procedural problems (inappropriate incubator). New procedures were set up to include quality-control aspects.

By March 1991 the 252 installed handpumps had been tested and 22 boreholes were found to contain fecal contamination. The project's "clean village" campaign was to partially address this problem. In the meantime, the boreholes were to be disinfected by Hydraulic Services.

3.6.2 Assessment

Although the objectively verifiable indicator of the original Project Amendment—1,500 samples of water tested—was not reached, systematic testing of nearly every borehole has been accomplished. More importantly, standardized procedures for water-quality testing have been set up and personnel trained to carry them out.

Systematic physio-chemical testing of all the boreholes has permitted a mapping of the corrosiveness/hardness qualities of the underground water in the project area. This information is essential for choosing the most-appropriate handpump materials.

The final bacteriological testing results (indicating a certain amount of fecal contamination in boreholes) need to be acted upon in the near future. As important as the actual disinfection of the boreholes is to find out the causes of the contamination and establish procedures for avoiding this contamination. One approach may be to train artisan mechanics to systematically disinfect boreholes during repairs of underwater pump components and to mention more-sanitary procedures during these repairs.

It should be remembered that the quality of the borehole water is significantly better than any traditional water source. Future emphasis and testing should be not only on the quality of borehole water but also on the quality of water found at the home (random sample). Regular bacteriological testing of borehole water and water kept in the home should continue, and should be accompanied by training of pump mechanics and by health education campaigns for water users, to educate them in sanitary transportation and storage of water and in hygienic practices.

3.7 Epidemiological Surveillance

3.7.1 Overview

A methodologically sound, reliable, and easy-to-implement epidemiological surveillance system can be a very useful and important component of a WS&S development project. Not only will it serve to demonstrate the effectiveness of project interventions, it also can serve to promote and strengthen national health strategies and to improve local data collection, analysis, and reporting capabilities. Such a system can also serve as an important management tool.

Guinea worm prevention and control were used in this project as one means of demonstrating the impact of project interventions on the health and social well-being of beneficiaries. A reduction in the incidence of guinea worm infections was always a general objective. It formally became a project specific objective in the Third Project Agreement Amendment (1990).

3.7.2 Implementation

The target established for this project component was at least a 30 percent reduction in the incidence of guinea worm infection over the life of the project. The reduction was to be determined through a series of prevalence surveys, which collected data at each of the project villages about the number of cases of guinea worm infection and their degree of severity (whether or not the individual was incapacitated by the infection).

In January 1988, the initial survey was carried out in over 500 villages in northern Zou. The results were used to identify those villages exhibiting high prevalence rates, one of the criteria used to select villages that would receive project interventions. Thereafter, the surveys were carried out on a biannual basis (April and December) to coincide with the beginning and termination of the transmission/infection period. The data were collected by the district agents under the supervision of the project's health education assistant and the three project supervisors.

The protocol for collecting guinea worm infection data in project villages was developed by an epidemiologist from ORSTOM/OCCGE. The data collection protocol for the national survey was developed by a consultant engaged from the Centres for Disease Control. A Beninese

epidemiologist, engaged by UNICEF, is improving the monthly survey and follow-up forms for the Benin national guinea worm control program.

3.7.3 Outcome/Results

Reports prepared by project staff and consultants based on the analysis of the prevalence data seek to demonstrate a causal relationship between the project interventions (the presence of an improved well and the reception of health education programs on guinea worm control) and a decrease in the incidence of guinea worm infection over the project period. The total number of guinea worm cases identified in all villages surveyed reportedly decreased by over 46 percent between the period of July 1989 through June 1990 and the same period the previous year. Since the first survey (January 1988), the number of cases in the project villages has reportedly fallen by 60 percent. On a regional (*sous-préfecture*) basis, the most-significant decrease in the annual number of cases recorded occurred in Bantè, where a 90 percent decrease in total cases over the study period was reported (from 1,477 cases in 1989 to 142 in 1990).

In one of the reports, villages surveyed in the guinea worm surveillance campaign were categorized according to the presence or absence of an improved water supply and the implementation of a training program in guinea worm control. Table 1 shows guinea worm incidence rates for villages surveyed between January 1988 and December 1990. Villages that had not benefited from project interventions recorded a 41 percent decrease in the incidence of guinea worm infection between 1988 and 1990; those that received an improved water supply system but no health education training relating to guinea worm control experienced a 35.5 percent decrease; those that received the health education program but had not as yet benefited from the installation of a handpump showed a 26.7 percent decrease. In villages that had benefited from both a new handpump and the health education program, the incidence of guinea worm infection fell by over 75 percent.

Table 1

Reported Decrease in Guinea Worm Incidence Rates
1988 - 1990
North Zou Province, Benin

Intervention	Number of Villages	Percentage Change
None	205	-41%
No well but received education	43	-26%
Well/No Educational Program	46	-35%
Full Intervention	118	-75%

3.7.4 Assessment

Several weaknesses in the epidemiological surveillance component warrant special attention, as they limit the validity of the claims made about the impact of project interventions on the incidence rates for guinea worm infection:

1. *The lack of baseline data and an established epidemiological surveillance protocol at the commencement of the project*

The absence of baseline epidemiological data on water-related diseases, including guinea worm, was a major shortcoming. Additionally, and perhaps of greater importance, the first and second surveys were carried out before a protocol for guinea worm surveillance had been established. The content and format of the survey forms changed considerably after UNICEF became involved in guinea worm surveillance. The reliability of the data is unknown due to the lack of any data quality assurance surveys for the first few surveys. Hence, the interpretation of the differences found between intervention and nonintervention villages may be erroneous due to the incomparability of data collected before and after the establishment of a common protocol.

2. *The criterion of a high prevalence rate of guinea worm infection*

As a high prevalence of guinea worm infection was one of the criteria for the selection of villages to receive project interventions, a significant differential in prevalence rates between project and nonproject villages should exist in the 1988 data. In other words, the prevalence

rate at the start of the project in nonproject villages should be lower than for villages targeted to receive the interventions (this was never established in any of the studies). As the baseline prevalence rates for the two sets of villages are unequal, the validity of a comparison of the changes in incidence rates over the study period is limited.

A review of the primary data collected shows that, in fact, there is a significant difference in guinea worm prevalence between the villages that were finally selected to receive the project interventions and those that were not. Hence, over the life of the study period, it would be expected that the reduction rate recorded would be greater in the intervention villages than in the nonintervention villages.

3. *The lack of explanation of confounding variables on guinea worm infection*

None of the analyses provide any explanation regarding the circumstances that may account for the higher rates of reported guinea worm infections in certain villages. For example, no attempt was made to determine the presence of "imported" cases, e.g., those individuals infected from sources outside of the villages who were present on the day of the survey. Nor was there any testing of the water sources used by the villages to determine the presence of the cyclops in the water consumed by the villagers. The lack of explanation for these and other confounding variables limits the validity of the findings.

4. *The lack of a time-series analysis of the data in relation to when the project interventions occurred*

The reports cited above correlated the guinea worm infection data with a variable that indicated either the presence or absence of a handpump. No consideration was given to the status of the handpump, the date of its installation, or whether all community members had in fact modified their water consumption behavior (drinking water only from a protected source). The lack of an analysis of the time interval between the implementation of project interventions and the results of subsequent guinea worm prevalence surveys compromises the validity of the study results.

Despite these shortcomings, it is worth noting that the emphasis the project placed on guinea worm prevention, control, and measurement served to increase the visibility of this debilitating disease and to highlight the need to develop a national strategy for its control and prevention. Partly as a result of the project, a national seminar on guinea worm control and prevention was held in 1989. One of its outcomes was the creation of a national coordinating committee for the prevention and control of guinea worm, under the auspices of UNICEF and the MSP. In fact, UNICEF decided to model the national guinea worm control program on the strategy used in the Benin water and sanitation project.

The following are presented as mechanisms to address the weaknesses identified in the project's epidemiological surveillance component:

- Accepted and scientifically sound epidemiological surveillance protocols should be established prior to the commencement of project activities.

- A protocol common to all parties interested in undertaking epidemiological surveillance activities of guinea worm infection or any other water-related disease should be negotiated prior to the commencement of such activities.

- As a means of economizing on the time and effort required to carry out epidemiological surveys, thought should be given to adopting a sentinel-site surveillance protocol.

3.8 Pump Maintenance

3.8.1 Overview

This component in the project design was a direct responsibility of UNICEF. The pump maintenance system established by the project has three tiers: village committee, pump repair fund, and pump caretaker at the village level; private-sector artisan repairman and merchant sellers of pump parts at the local/regional level; and hydraulic services, at the national/regional level, providing training, supervision, and regulation of the whole system. A summary of the process follows.

When a pump breaks down, the village caretaker notifies the president of the village committee, who in turn notifies the artisan repairman of the nature of the breakdown. The artisan, usually after a site visit, procures the necessary spare parts from the locally authorized merchant (sometimes accompanied by committee members). The artisan then proceeds to the village and completes the repair whereupon the village pays him CFA 1,000 per repair for below-ground work or CFA 500 for above-ground work, and reimburses the actual costs of the parts and transportation. Parts and transportation have been established at a fixed price, so there are no negotiations involved. The committee is supposed to maintain an account at a district bank and keep a small portion of the money in the village for immediate use. (The bank account is opened with CFA 60,000—equivalent to approximately $200 when the project started—to be renewed annually.)

Until recently, the artisan was paid CFA 400 for each preventive-maintenance monthly visit. *Direction de l'hydraulique*, however, has decided to reduce these obligatory maintenance visits to one every six months. At this point the new fee system has not been established.

At the provincial level, *Direction de l'hydraulique* maintains a monitoring control over all activities. At present, two Peace Corps volunteers provide training for artisans and monitor pump maintenance. *Direction de l'hydraulique* authorizes the artisans and monitors their work, monitors spare parts availability and price, and serves in an emergency capacity if a repair is beyond the artisan's capability. Normally this would not be required except in the case of a collapsed casing, as the artisans appear capable of all repairs.

Direction de l'hydraulique provided the tool kits (valued at about CFA 200,000—funded by the project) at no cost to the artisans. They, in turn, are responsible for replacing any misplaced tools.

Initially, *Direction de l'hydraulique* itself was responsible for the distribution (sale to the committees) of spare parts through local authorities at the district level. A spare-parts system using the private sector has been started this year. A merchant in Cotonou (Jupiter) obtained a stock of spare parts in conjunction with the purchase of some new pumps and has an agreement with three local merchants (in Bohicon, Dassa, and Save) to distribute parts at the local level.

3.8.2 Assessment

Several weaknesses were observed in this component, and the project was beginning to address them. For the committee's initial training on their roles and responsibilities, it was understood by the project that the pump caretaker would be trained in minor preventive-maintenance tasks. The caretaker would be technically trained and receive the material necessary for these tasks from the UNICEF component. This has not yet occurred.

In general, the qualification and responsiveness of the artisans seemed to be good, and they seemed to be well accepted by the population. PCVs played an important monitoring and training role with the artisans. But there seems to have been little coordination among the different project participants on the contents of the messages and the approach to be used with the committees.

Unfortunately, there are too few tool kits for all the artisans trained. In this system, where the artisan has no financial stake in the tools, it is hard to see how in the long term it is sustainable—especially as it appears that *Direction de l'hydraulique* would like to turn this component totally over to the private sector. Perhaps a credit system to allow the artisans to purchase the tools could be set up in conjunction with the parts merchants.

Even though *Direction de l'hydraulique* has as yet issued no certificates certifying artisan competence, the idea was accepted as valid and the certificates were said to be in the process of being developed. Artisan certification should be an essential role played by *Direction de l'hydraulique*, if the artisans are going to be taken out from under direct supervision. The department also said that it was considering setting minimum fees for the artisans and letting

competition among several certified artisans in a particular zone set the maximum prices in the long term.

The spare-parts distribution system using the private sector seems to be functioning. The team visited the local merchant at Dassa, who had parts in stock valuing nearly CFA 1,300,000. The stock had been delivered by Jupiter in June 1991, of which about CFA 100,000 had been sold by September. The merchant seemed confident that as the pumps aged there would be more demand for parts. The merchant also had, as a reference, parts list with the name, a pictorial representation, and the official price of each part. (This list is also supposed to be in the possession of each committee.) Price regulation becomes a very important role for *Direction de l'hydraulique*.

A national policy requires an annual contribution from villages of CFA 60,000 for pump repair and spare parts. This figure, calculated in conjunction with the regional *Conseil de l'Entente*, was based on a different pump (the Abi-Vergnet, which can have some expensive annual maintenance costs) from that used in the project. The figure also assumes that the beneficiaries would have to save funds to replace the pump. Because the India Mark II has much-lower annual maintenance costs, it was very difficult to convince the CDSS's to collect this annual maintenance fee. The idea of accumulating funds over 10 years to replace the pump is theoretically valid but runs counter to present cultural practices. Nor was this a very convincing argument for the beneficiaries to collect CFA 60,000 each year. This national policy should be reviewed, taking into account not only real maintenance costs of each type of pump but also cultural practices regarding long-term savings.

3.9 Economic Aspects

3.9.1 Cost-Benefit Analysis

Although the project includes no analysis of the costs and benefits of project interventions, the evaluation team was of the opinion that a retrospective study of the project's economic aspects would be worthwhile for the purposes of comparing the results with those of other rural WS&S projects. The original intent was to produce a cost-benefit analysis of the project's primary activities, but the benefits accruing to the beneficiaries of WS&S projects are difficult to quantify accurately and reliably at the best of times. Attempting to determine the social (including health) profitability of a project as complex as the one under study is even more difficult. Hence, a cost-benefit analysis, in the traditional sense, cannot be undertaken.

The cost side of the equation can be more easily quantified. However, the calculation of accurate cost estimates is problematic, as none of the project stakeholders accounted for expenditures according to specific project-activity categories. The cost estimates found below are based upon project-related financial information made available by the donors, with costs

allocated to specific project activities according to the calculations used in the original project budget.

Borehole drilling/handpump installation/training of handpump technicians

This activity accounted for approximately 69 percent of total project resources, equal to approximately US $4.42 million. Factoring out the costs related to the training of handpump technicians (extrapolating from cost estimates prepared by a representative of UNICEF[2]), the net expenditures for borehole drilling/well construction/handpump installation approximate $4.2 million. This figure includes salaries and benefits (including relocation and transportation allowances) for expatriate project personnel; salaries and benefits of Beninese project personnel (government and nongovernment); cost of all equipment and supplies, including vehicles and drilling rigs; in-kind value of the services of PCVs who supervised the handpump technicians; per diem for construction and activity-monitoring; and other items relating to this activity. The estimate of the value of each donor's contribution to this activity appears in Table 2.

Table 2

Expenditure Estimates for the
Benin Rural Water Supply and Sanitation Project
by Principal Project Activity[1]
(US $)

Donor	Borehole Drilling/ Handpump Installation/ Technician Training	Latrine Construction
USAID/PRAGMA	946,600	340,600
USAID/UNICEF	2,083,800	123,300
UNICEF	482,000	165,000
Other[2]	915,400	174,800
Total	4,427,800	803,700

1 Based on calculation of non-administrative-related planned and actual expenditures, but includes some hygiene education activities.

2 Represents estimates for value of goods, services, and other contributions from the Government of Benin and Peace Corps.

[2] UNICEF. Cost Analysis/Standardization Study on UNICEF WATSAN Interventions, Memo from C. de Rooy to J.P. Meert (UNICEF Cotonou), dated June 28, 1990.

The cost estimates for this activity can be computed as follows:

Total number of improved wells completed (30/06/91):	298
Total number of boreholes drilled (as of 30/06/91):	417
Total number of positive boreholes (as of 30/06/91):	309
Estimated population served (@ 250 people/well as per project target):	74,500
Estimated population served (@ 500 people/well as per prevailing GRB policy):	149,000
Cost per completed well (298):	$14,858
Cost per potential completed wells (309):	$14,330
Cost per capita (using project target population estimate):	$59.43
Cost per capita (using GRB target population estimate):	$29.71

Factoring out the costs associated with the handpump technician training component, the average estimate per unit cost for a fully equipped well is $14,140.

The calculations presented in the Project Paper Amendment (1985) estimated the average per-unit cost for an improved well installation at $11,000, with a per-capita cost of $44 (225 wells x 250 people per well). The final evaluation report for the USAID-financed Togo Rural Water Supply and Sanitation project calculated a $9,700 cost per improved well. While the estimated costs for the Benin project are relatively higher, it should be kept in mind that the hydrogeological conditions in Togo and the actual ratio of positive to total boreholes drilled may differ enough to account for the differential in estimated costs. It should also be kept in mind that drilling and handpump installation activities in the Togo project ended in 1987, a year before they commenced in the Benin project.

The per-capita costs are calculated using a denominator based on the guidelines for the number of people to be served by a handpump. In fact, the per-capita costs could be lower than the estimates presented in this report, as there is no real indication of the number of people who consume water drawn from the project wells. The estimated total population for the project villages is approximately 60,000 people, a figure based on census estimates from 1982. More-recent census figures do not exist. However, it can be expected that, in reality, the total population of project villages is much greater, even when immigration to larger villages that may have occurred in the intervening 10 years is taken into consideration. In any event, the per-capita costs relating to well improvement are quite low, indicating a relatively high degree of efficiency.

Latrine construction

The base cost for the latrine construction component can be calculated in three ways:

- Based on the total estimated expenditures from all donors involved in latrine construction activities

- Based on the total expenditures relating to the latrine construction activities specific to the USAID/PRAGMA portion of the project

- Using the previous figure, discounting the costs related to both direct and indirect support of services rendered by the expatriate civil/sanitary engineer

Because the evaluation team had too little time to determine UNICEF'S actual expenditures on latrine construction activities, the analysis is restricted to the cost figures available from the USAID/PRAGMA portion of the project. Additionally, as the manner in which PRAGMA's expenditure statements are reported does not permit an accurate assessment of the proportional costs associated with the expatriate civil/sanitary engineer's services, all costs related to this individual have been factored out.

The total cost calculated for each of the latrine types constructed under the USAID/PRAGMA portion of the project budget are as follows:

Latrines built at public facilities:	$73,770
Total number of public improved latrines completed (30/06/91):	109
Estimated beneficiary population (@ 200 children per school):	21,800
Cost per unit for public latrines:	$676.78
Cost per capita for public latrines:	$ 3.38
Family VIP latrines:	$31,400
Total number of family VIP latrines completed (as of 30/06/91):	261
Estimated beneficiary population (@ 10 persons/family):	2,610
Cost per family VIP latrine:	$120.30
Cost per capita for the family VIP latrine:	$ 12.03
Improved traditional latrines:	$ 6,000
Total number of improved traditional latrines completed (as of 30/06/91):	112
Estimated beneficiary population (@ 10 persons/family):	1,120
Cost per unit for the improved traditional latrine:	$ 53.50
Cost per capita for the improved traditional latrine:	$ 5.35

It should be noted that the total costs relating to this activity include the expenditures made on latrines that had to be reconstructed subsequent to the pit cave-ins. Hence, the per-unit

and per-capita costs are higher than expected. Nevertheless, the estimated per-unit and per-capita costs for the latrines constructed under the USAID/PRAGMA portion of the project budget compare favorably with the estimates from a UNICEF/Benin study: $618 per public latrine, with a per-capita cost of $3.09/child.

3.9.2 Willingness and Ability to Pay

One of the main project elements relates to the establishment and operation of village-generated accounts in local credit unions, which are to be used to finance handpump repair and the purchase of parts, as well as the costs of regular visits by the artisan-repairmen. GRB policy for handpump maintenance demands that the village deposit into their credit union account an initial CFA 60,000, followed by annual deposits of this same amount. The project adhered to this policy.

Project experience demonstrates two things:

1. Villages are willing and able to establish a bank or credit union account and generate an initial deposit of CFA 60,000 as a precondition to the improvement of their wells. In fact, only 67 of the initial 376 villages selected were either unable or unwilling to comply with this criterion. For those villages complying with the policy, the time taken to collect the required sum and establish an account was relatively short. The majority of the accounts are maintained at the local CLCAM (*caisse locale de credit agricole mutuelle*). Hence, project experience would appear to indicate that villagers are both willing and able, for the most part, to collect a considerable sum of money as a precondition for the improvement of their water supply source.

2. The annual contribution of an additional CFA 60,000 is neither popular nor observed. The project's quarterly reports indicate that significant time and effort were expended by project personnel and district teams to convince and persuade villages to comply with this policy element. However, only 19 percent of the project villages complied, and the remainder either collected only a fraction of the sum required or collected nothing further.

The data collected by the project team and by the evaluators during the course of the village visits indicate that the majority of the credit union accounts show a positive, and in many cases significant, balance of funds. It should be kept in mind, however, that the majority of handpumps were recently installed. Hence, repair costs should be minimal. In fact, based on the village surveys conducted for this evaluation, the average annual repair costs for the India Mark II handpumps have been lower than anticipated (approximately CFA 5,000 per year per village).

The interesting fact is that, in some instances, the accounts are not used to finance all repairs. Instead, some CDSS's collect funds as required through a variety of mechanisms (per capita/per household/donations). While this may indicate villagers' willingness and desire to fully and directly support the repair of the handpump, the collection of funds as required may take several days. Thus, the handpump may be nonfunctional for a period of time. Theoretically, the withdrawal of funds from the village account should reduce the time required to repair the pump. However, the prevailing practice would seem to indicate a reticence to use the village account. A paradox exists: the funds are available at the bank or CLCAM, but villagers appear to perceive accessing these funds as less convenient than collecting additional funds for repairs, even if it means the pump is closed for a few days until spare parts are purchased.

3.9.3 Sustainability/Replicability

The GRB's capacity to sustain existing project activities is a very important point at this juncture, given USAID's impending disengagement from the project. The following represent the minimum resource requirements to continue project activities in northern Zou:

- Deployment and logistical support (recurrent costs) for existing provincial- and district-level staff
- Continuation of a scaled-down project Steering Committee to oversee the implementation of project activities and to develop a post-project strategy document
- Resources to the CDSS's and the villages to assist them in continuing project initiatives such as health and hygiene education and other community development activities

A preliminary assessment of project expenditures to date, and of the personnel (salaries, benefits, per diem), operations and maintenance, logistics (transportation), and commodity requirements to continue project activities indicates an average annual investment by the government (and its partners) of approximately US$ 300,000. Whether or not the GRB has the financial resources to meet the anticipated recurrent costs is unknown.

Regarding the resource requirements to replicate the project elsewhere, at the present scale of financial resources invested it would appear to be beyond the means of the GRB alone. A significant level of investment would have to be forthcoming from an external source. However, whether a replication of this project requires all of the personnel, financial, and materials resources that have been invested in the USAID project is a question calling for further study. This may be a point to be deliberated further by the project Steering Committee.

3.10 Administration and Management

3.10.1 Process Overview

Five aspects of the project's administrative and managerial structure and process are discussed in this report: financial resource inputs and functional distribution of costs; financial management system; inventory control system; organizational structure; and interagency collaboration/cooperation.

Initially, the USAID contribution was to be disbursed through two mechanisms: a Cooperative Grant Agreement contribution to UNICEF to support drilling and handpump installation activities, and direct payments by USAID/Togo-Benin for disbursements relating to all other line items. The contribution to UNICEF was to be applied in three ways: to support the deployment of a four-person drilling team with complementary administrative assistance, to provide expendable drilling equipment and supplies (including O&M), and to support the implementation of a handpump maintenance and repair program.

The USAID component was to help deploy a multidisciplinary team of long- and short-term project personnel through personal service contracts; purchase commodities and vehicles for the health and sanitation intervention activities, construction materials for latrines and a training center, water quality analysis equipment and supplies, and additional drilling and handpump equipment and supplies; and pay for training activities and project evaluations. However, this arrangement was modified shortly thereafter.

In August 1987, a Tripartite Agreement was signed under which PRAGMA Corporation was engaged on a cost-reimbursement plus fixed-fee basis to administer project funds relating to the budget's technical assistance component and to manage the project on behalf of USAID.

Based on a review of the Cooperative Grant Agreement between USAID and UNICEF and the Tripartite Agreement document between USAID and PRAGMA, the evaluation team concludes that these parties have fulfilled satisfactorily their respective scopes of work.

3.10.2 Financial Resources

In the Project Paper Amendment (1985), USAID allocated $6,250,000 toward the project. This sum represented the balance between the original (1980) project budget and the value of disbursements for goods and services procured in 1980-81, prior to its suspension. By the end of calendar year 1990, following the approval of the Third Project Agreement Amendment, the total approved USAID contribution to the project had increased by $875,000, to $7,582,000. This amount included a supplemental contribution to UNICEF of $150,000 (see Table 3). During this same period, there were seven Modification of Contract agreements, four of which relate to the technical assistance budget administered by PRAGMA

(see Table 4). The technical assistance budget increased by $1,626,118, representing a 73 percent growth rate over the life of the project.

Table 3

USAID Project Budget
LOP (1981 - 1991)
(US$)

	1986[1]	1989[2]	1990[3]	1991[4]
Technical Assistance	2,218,958	3,165,088	3,845,076	4,337,171
UNICEF Cooperative Agreement	2,092,000	2,092,000	2,242,000	2,242,000
Direct A.I.D.-Contracted Purchases[5]				
Disbursements 1980/81	457,000	457,000	457,000	457,000
Disbursements Since 1986	1,940,042	992,912	1,037,924	1,037,924
TOTAL PROJECT BUDGET	6,708,000	6,707,000	7,582,000	8,074,095

[1] Extrapolated from Project Paper Amendment (March 1985) and Tripartite Agreement (May 1987).
[2] Revised project budget as per 2nd Project Agreement Amendment (December 1985) and the Modification of Contract N° 2 (undated).
[3] Revised project budget as per 3rd Project Agreement Amendment (March 1990).
[4] Proposed revision of project budget, as per information contained in Benin Project Extension Request document, submitted to USAID/Togo-Benin December 1990.
[5] Includes construction, training, equipment, and commodities.

Table 4

Technical Assistance (TA) Budget
Administered by PRAGMA Corporation

	1987[1]	1987[2]	1988[3]	1989[4]	1990[5]
Salaries	247,069	247,069	262,734	317,619	417,415
Fringe Benefits	46,943	46,943	49,919	60,346	79,315
Overhead	170,528	170,528	181,340	219,222	288,100
Travel/Transport	147,236	147,235	156,235	103,761	113,770
Allowances	212,069	212,069	218,057	296,281	361,491
Equipment	223,700	256,015	256,015	279,540	289,763
Subcontractors	1,032,165	997,106	1,358,895	1,320,266	1,517,577
Other Direct Costs	46,273	46,273	50,317	103,037	120,577
Local Costs	—	—	386,650	322,829	477,755
Fixed Fee	92,975	95,720	131,356	142,187	179,313
TOTAL TA GRANT	2,218,958	2,218,958	3,051,518	3,165,088	3,845,076

[1] as per Tripartite Agreement, May 1987.
[2] as per 1st Modification of Contract, July 1987.
[3] as per 2nd Modification of Contract, undated.
[4] as per 4th Modification of Contract, June 1989.
[5] as per 7th Modification of Contract, March 1990.

The financial/estimated in-kind contribution for each donor appears in Table 5. USAID provided the largest proportional contribution to the project (almost 70 percent of the total value of all contributions). The GRB contribution, accounting for 12.6 percent of total contributions, represents the second-largest proportional donation. It includes the salaries of Beninese personnel assigned to the project and also the value of other goods and services, such as the land upon which the project office is situated. UNICEF, through its own funding sources, contributed additional personnel and materials; its grant accounts for approximately 10 percent of the total resources invested. The Peace Corps contributed volunteers, who served as supervisors of handpump technicians, oversaw latrine construction, and worked in the guinea worm campaign activities. The contribution of the United Nations Development Programme relates to the use of a drilling rig that was purchased and used in an earlier water supply development project.

The majority of disbursements to the project from all sources occurred during the first 20 months. These relate primarily to the procurement of capital equipment, such as project vehicles, drilling equipment, and handpumps. By the end of December 1990, almost 96 percent of the revised budget for the USAID contribution to the project had been expended. Expenditures on project activities continued past the revised PACD, and, by the end of June 1991, disbursements exceeded the USAID project budget (revised) by $89,000 (1.2 percent). Given that the project exceeded its targets and, in fact, undertook several activities beyond its original scope of work, it would appear that the project team utilized the available financial resources efficiently and effectively. All the more so, when one considers that the project budget was conceived in the early 1980s and modified (slightly) only once over the course of the project, while the project targets were increased.

3.10.3 Financial Report

A financial audit of the project is not within the scope of this evaluation. The following material represents an overview of the expenditures in the local cost budget administered by the PRAGMA project office in Bohicon. Local costs include support to Beninese project personnel, training activities, operating costs, equipment, and latrine construction activities. Salaries and benefits for expatriate staff, travel and relocation allowances for expatriate and PRAGMA staff, direct costs, equipment purchases, consultant fees/travel and per diems, disbursements to the two subcontracting firms (MCD and Bryler), and overhead/administration fees are handled through PRAGMA's U.S.-based office. A statement of local cost expenditures is submitted monthly to PRAGMA by the financial officer at the project office. In turn, the project office receives from PRAGMA a monthly accounts statement relating to nonlocal expenditures.

Table 5

Financial Resource Inputs
1987-1991
(US $000s)

	USAID	UNICEF	GRB	Peace Corps	UNDP	Total	Cumulative %
1987	890.0	540.0	307.0	115.0	400.0	2,252.0	20.4
01/88-06/88	1,2500	67.0	197.0	20.0	—	1,534.0	34.2
07/88-12/88	1,569.2	48.2	294.5	102.0	—	2,013.9	52.4
01/89-06/89	1,020.0	110.0	50.0	100.0	—	1,280.0	64.0
07/89-12/89	767.8	108.7	124.5	62.6	—	1,063.6	73.6
01/90-06/90	1,260.6	105.6	102.0	40.0	—	1,508.2	87.2
07/90-12/90	525.6	82.5	160.2	35.4	—	803.7	94.6
01/91-06/91	386.8	30.0	160.0	20.0	—	596.8	100.0
Total Financial Contributions	7,670.0	1,092.0	1,395.2	495.0	400.0	11,052.2	
Revised Budget	7,582.0	1,092.0	1,330.8	475.0	400.0	10,879.8	
% TFC/RB[2]	101.2	100.0	104.8	104.2	100.0	101.6	
Share of Total Contribution	69.4	9.9	12.6	4.5	3.6		

[1] Covers the period January 1987-June 1991 inclusive.

[2] The total financial resources expended to date (e.g., total contributions) as a percentage of the original budget, for each donor.

As Table 6 demonstrates, total expenditures on local operating and capital costs through 30 June 1991 marginally exceeded the budget. In fact, the budget allocated is exceeded substantially for only one line item, "monitoring trips." However, when one considers the nature of the project activities and the number of trips the staff required to supervise those activities, it is quite within reason that this line item be overexpended.

Table 6

Financial Report for Local Costs[1]
USAID-funded

	Budget 1985[2]	Budget 1989[3]	Total Expended	% Total Expended Budget 1989
Beninese Personnel	16,380	37,353	39,173	104.8
Training:				
• District teams	25,000	22,123	22,460	101.5
• Village health comm.	15,000	50,509	50,446	99.8
• Provincial meetings	1,800	43,194	41,601	96.3
• Training materials	100,000	49,723	51,978	104.5
Equipment:				
• Garage equipment	168,200	56,313	50,506	89.7
• Latrine construction	225,000	155,179	160,173	103.2
• Alternate water systems	100,000	5,000	3,836	76.7
Operating Expenses:	107,200	176,970	184,806	104.4
Monitoring Trips:	4,640	33,764	41,713	123.5
Abomey-Bohicon Project Headquarters Complex O&M:	90,000	99,865	96,157	96.3
Cotonou Office O&M	—	34,762	36,665	105.5
Water Quality Testing	26,125	42,640	38,192	89.5
Total Local Operating Costs	879,345	807,395	817,706	101.3

[1] Through to 30 June 1991.
[2] Based on budget calculations prepared for Project Agreement Amendment N° 2, December 1985.
[3] Based on budget calculations prepared for Project Agreement Amendment N° 3, March 1990.

3.10.4 Functional Distribution of Costs

The project's major components were drilling and handpump installation (including the training of handpump technicians for maintenance and repair activities); latrine construction; and health education/community development activities. Table 7 breaks USAID expenditures into their functional categories. The total expenditures figure is the total value of the UNICEF

Cooperative Grant Agreement amount from USAID ($2,242,000) plus the total expenditures incurred by PRAGMA and its subcontractors through 30 June 1991 ($3,933,554). It does not include the line item from Table 3 "Direct AID-Contracted Purchases," as the figures for expenditures against this category were unavailable for the purposes of this analysis.

The data in Table 7 were drawn from information contained in the monthly accounting statements that PRAGMA submitted to USAID. The columns represent the salaries and benefits relating to each local and expatriate project team member assigned to a specific activity, the value of equipment/commodities (including vehicles) for each category, O&M/Petrol, oil, and lubrication (POL) (if available), and the proportional share for other activities, according to their primary function over the life of the project. This analysis proved to be problematic, given the format of PRAGMA's monthly account statements and the time available to carry out such a detailed inquiry. Therefore, the calculations are estimates and should not be viewed as definitive. They should, however, provide an indication of the relative costs across the principal project categories.

Borehole drilling and handpump-related activities accounted for 49.1 percent of total expenditures, community development/health and hygiene education activities absorbed 8 percent, and latrine construction activities 6.6 percent; local administration and management activities are estimated to have absorbed approximately 13.7 percent. The proportional figures change considerably when administration and other costs are factored out, moving to 77 percent, 10.3 percent and 12.7 percent respectively. These figures compare favorably with the costs of other USAID-funded water supply and sanitation projects in Togo and Burkina Faso.

When the contributions of all donors are taken into consideration (see Table 8), the relative distribution of costs among the principal activities changes only slightly. The percent of total contributions to well construction activities decreases, while those for latrine construction and community development/health education increase as a proportion of total costs. This is due to the substantial direct and in-kind contributions from the GRB, UNICEF, and Peace Corps to the latter two activities.

It should be kept in mind that latrines were constructed on a demonstration basis. If sanitary coverage had been a project objective—with public latrines constructed at all schools in all project villages and family latrines at every household—the actual and relative value of the latrine construction activities would have increased perceptibly.

Table 7

Estimated Functional Distribution of Costs
USAID Grant, 1987-1991[1]
(US$)

	Drilling/ Pump Installation	Latrine Construction	Community Development Health Education[2]	Administration/ Management	Other	Total
Personnel	1,403,500	205,740	209,860	528,700	—	2,347,800
Euipment/Vehicles[3]	761,300	64,150	119,280	39,500	—	984,230
Materials/Supplies	12,600	2,100	65,920	53,780	—	134,400
O&M/POL	53,000	—	58,830	184,340	—	296,170
Drilling/Construction	514,000[4]	128,700[5]	—	—	—	642,700
Handpumps	225,270	—	—	—	—	225,270
Monitoring[6]	56,890	6,700	29,720	—	—	93,310
Meetings[7]	3,840	—	13,440	41,600	—	58,880
Other[8]	—	—	—	—	1,392,794	1,392,794
Total Expenses	3,030,400	407,390	497,050	847,920	1,392,794	6,175,554
% Total Expenses	49.1	6.6	8.0	13.7	22.6	100.0

[1] Through 30 June 1991. Total expenditures are calculated as the total value of the UNICEF Contribution Agreement grant from USAID ($ 2,242,000) plus the total expenditures incurred by PRAGMA Corporation and its subcontractors, from May 1987 through to 30 June 1991 ($ 3,933,554). Where applicable, the calculations for specific project components include salaries and benefits for assigned local and expatriate personnel, the purchase price of project vehicles, equipment and supplies, POL, and other items allocated to each component.

[2] Includes the costs relating to the guinea worm health education activities and biannual surveys.

[3] Vehicles allocated to the project components to which they were originally assigned.

[4] Includes preliminary surveys, photointerpretation, site preparation, drilling, well construction costs, handpump caretaker training. Estimates based on cost allocation information provided in appendix to grant contribution agreement letter dated February 11, 1986.

[5] Includes POL.

[6] Includes costs relating to water quality tests.

[7] Includes local costs in support of WASH workshops/seminars and project coordination and planning meetings, including *Journées de reflexion* (June 1990).

[8] Includes salaries and benefits, travel and per diem for PRAGMA, MCD, and Bryler personnel; equipment purchase by PRAGMA for project, and construction costs for project office complex.

Table 8

Functional Distribution
of Total Project Costs
All Donors

Well Construction	46.6%
Latrine Construction	10.1%
Community Development/Health Education	7.4%
Administration/Other	35.9%

3.10.5 Commodity Procurement and Inventory Control

The evaluation period was too short to undertake a comprehensive review of the project's commodity procurement and inventory control system. However, discussions with the administrative/financial assistant and a review of project documents and files indicate that the commodity-procurement procedures and inventory-control systems followed accepted standards and practices.

Prior to his departure from the project in March 1990, the former chief of party carried out a complete inventory of all equipment and supplies belonging to the project. Agreements for the transfer of project commodities are still to be concluded. Ownership of motorcycles/mobylettes was transferred to the district agents to whom they had been assigned.

Transferring the ownership of the project office complex could be problematic, given the involvement of three GRB ministries in the project. A decision remains to be taken on this issue. To facilitate the transfer of commodities and property, the evaluation team recommends that a complete record of these and the transfer of remaining vehicles, commodities, and equipment be included in the project's final completion report.

3.10.6 Financial Management Procedures

The mid-term evaluation noted that the local accountant engaged by the project had marginal capabilities. In the interim, the former PRAGMA chief of party developed and implemented a financial management system for tracking and accounting for local cost expenditures using an adaptation of an over-the-counter software package. The reports generated are comprehensive and easy to read, providing a full accounting of local cost expenditures and meeting basic accounting standards.

Shortly after the project offices transferred to Bohicon, a former Peace Corps volunteer with several years experience in the project was engaged as the administrative/financial assistant.

However, the orientation provided to familiarize this individual with the established accounting procedures was minimal, due to the personnel changeover that was taking place at the time. Consequently, the financial officer has had to devote substantial energy and time learning to understand the accounting procedures. He is, however, very conscientious about maintaining accurate financial records and producing timely account statements. An inventory control system has been established and is maintained for equipment and supplies, including fuel, and for vehicle maintenance costs. Overall, at least in relation to the administration of locally administered funds, the accounting procedures appear to be acceptable.

3.10.7 Organizational Structure

As may be seen in Figure 1, at the national level the project is under the overall direction of the Ministry of Equipment and Transportation (*Ministère de l'Equipement et des Transports*). A national coordinator, assigned from *Direction de l'hydraulique*, provides project management and is assisted by a technical advisor (chief of party) from PRAGMA/MCD. A project Steering Committee (*Comité de suivi*)—comprising representatives from each of the ministries involved (Equipment, Health, Labor and Social Affairs, Foreign Affairs, and Planning) USAID, UNICEF, and Peace Corps—assists the project managers by approving work plans and helping in problem solving.

Besides the chief of party, PRAGMA/MCD contracted technical advisors for health education, engineering, and administrative/financial services. The GRB provided technical directors in drilling and pump installation. UNICEF provided a well-drilling and handpump installation team. Peace Corps provided several volunteers, who acted in various supervisory capacities (handpump technicians, latrine construction technicians, and health educators).

At the district level, chief medical officers were to provide overall supervision. Project activities are conducted by teams of district-level specialists in health, social affairs, and sanitation. At the village level, development and socio-health committees consisting of at least seven members have been formed; these committees receive training and advice from the district teams and provide the focal point for managing and disseminating all project activities within the village.

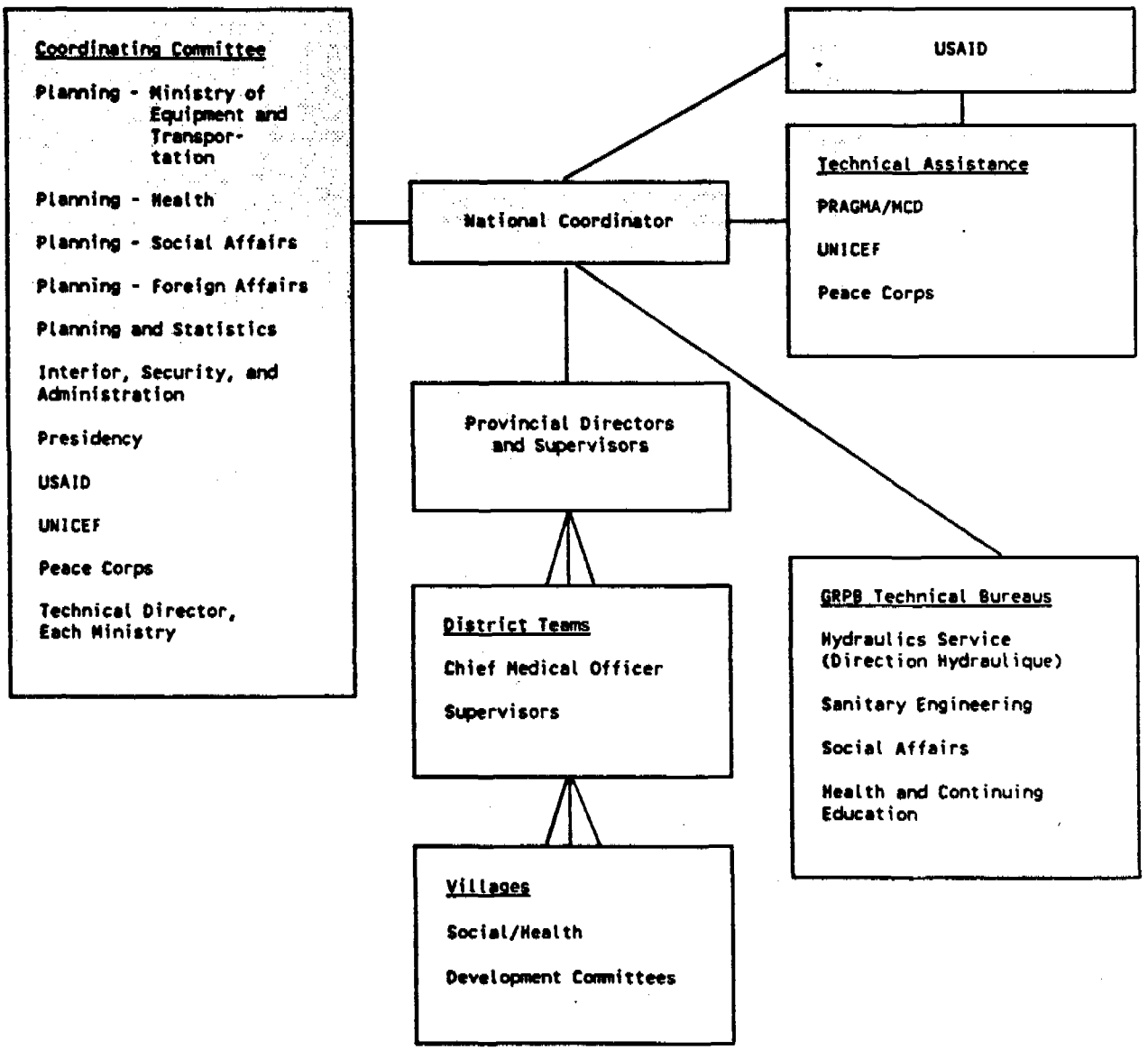
Several factors have influenced in varying degrees the project's management and operational effectiveness:

- *The prevailing political and economic climate in Benin over the course of the past several years*

The project is being carried out during a difficult period in Benin. The country is emerging slowly and cautiously from an economic and financial crisis. The recent installation of a democratically elected government, following upon a Marxist-Leninist military regime that lasted almost two decades, is bringing about a climate for change within the country. The

Figure 1

Organigram For
Rural Water and Sanitation Project



transitional period was difficult, however, and has affected the project. In several instances, ministers have not as yet designated representatives to the project's Steering Committee. Hence, it has not met since January 1991, and the elaboration of a post-project strategy document remains to be done. It is recommended that ministry representatives to the project Steering Committee be designated and that a Task Force be established to prepare a post-project plan of action.

- *The uncertainty of the project's future with each approaching PACD*

Another factor that affected the project's capacity to function at its full potential relates to the uncertainty surrounding the PACD. As the project approached the PACD of 31 March 1989, the project team had no confirmation of the project's continuation. The services of several project-related individuals, such as the *médecins-chefs*, were transferred by the Ministry of Public Health in anticipation of the project's termination and because their services were required elsewhere. A similar situation prevailed in December 1990, and is being repeated at present. Newly arrived ministry personnel have to be orientated to the project's objectives and activities, a situation which limits the effective and continuous operation of the project.

- *The lack of a project office in Cotonou*

The project office in Bohicon became operational in December 1989, and there is a feeling among project staff that the closure of the Cotonou office in December 1990, due to the impending PACD, affected the relationship that had been established with national government officials. On the other hand, the presence of the primary office in Bohicon did allow provincial- and district-level government personnel a greater degree of participation in project activities and also improved access to project villages, resulting in a savings in time and POL costs.

On the positive side, the project benefited from a high degree of commitment from project personnel. This commitment has had a profound effect on the project's capacity to influence government policy to the extent that it apparently has and to surpass the targets established. Despite the uncertainty surrounding project continuation, the increase in the number of wells and latrines to be constructed, and the decrease in the number of people effectively involved in project activities, the core project team has managed to surpass expectations and to achieve a high-quality project.

3.10.8 Interagency Collaboration/Cooperation

The assessment of interagency cooperation collaboration by a team of consultants in June 1991[3] identified several important factors that limited the efficiency of project planning and

[3] Sebastien, H., J. Collbran, and M. Saint-Lot, *Assessment of Interagency Collaboration/Coordination/Communication in Planning and Implementing the Benin Rural Water and Sanitation Project (680-0201) and its Guinea Worm Eradication*

implementation. The evaluation team concurs with several of their findings and believes the following issues warrant special attention:

- Insufficient design specificity in the project-planning phase
- Divergent perceptions between UNICEF and USAID of the nature and "ownership" of the project
- Competitive and parallel chains-of-command and decision-making processes for the coordination of project activities, as a result of the structure imposed by USAID
- Effect of the prevailing political situation on the GRB's capacity to participate actively in project policy review and planning, particularly at the national level

The evaluation team identified several additional factors:

- UNICEF and USAID/PRAGMA differed in their approach to establishing relationships with project villages. The UNICEF approach was very "top-down," while the USAID/PRAGMA team used a participatory approach that involved community members actively in project activities. Only toward the end of the project was there an indication of a greater degree of collaboration and understanding between UNICEF and PRAGMA on the approach to be used.
- The effectiveness of the national coordinator as the overall project manager depends on a clear understanding of how the partner donor agencies function. A weakness of the organizational structure was the lack of a resident USAID counterpart for the Beninese national coordinator. A USAID counterpart would have been useful in facilitating the national coordinator's job, particularly with respect to the interpretation of USAID policy.

Within the Benin water sector, the project has had an impact on the conceptualization of community development approaches. Meetings between government officials and donor representatives involved in sector development activities have resulted in agreement that the project's integrated, community-centered approach should be the standard adopted or in the least aimed for in future WS&S development projects.

Component, July 1991, draft.

3.10.9 Monitoring and Evaluation

The mid-term evaluation report noted five points relating to monitoring and evaluation activities that warranted attention:

- *Project staff were concerned about an apparent lack of sufficient feedback from project management.* During the current evaluation, field-level project staff indicated general satisfaction with the contribution and approaches of supervisory staff.

- *Changes to the format of the quarterly reports were suggested to improve their utility as a tool for planning and for monitoring.* The evaluation team found a marked improvement in both content and format of the quarterly reports, which are a useful and important management instrument. One government official commented that he found them very instructive and useful for assessing or reviewing project activities with the national coordinator. Project team meetings are held regularly and include a review of the past quarter's activities; discussion of problems that affect the achievement of objectives, and the means to resolve them; and elaboration of activity plans for the next quarter.

- *National directors of ministries responsible for project implementation (Directorates of Health Education, Sanitation, and Social Affairs) should make regular field visits.* This situation appears unchanged since the mid-term evaluation was carried out, possibly due to the closure of the Cotonou project office as well as to the political situation of the past few years.

- *Provincial-level technical directors have shown little involvement in project activities.* This situation has changed with the opening of the project office to Bohicon. *Direction de l'hydraulique*, a major project stakeholder, now maintains an office within the project office compound.

- *District medical officers, although responsible for overseeing all district operations, rarely participate in the project.* The factors that apparently limited the medical officers' active involvement in project activities continue. Generally, other duties take much of their time. Also, their mandate does not permit them to directly supervise district team members who are not employed by the Ministry of Public Health.

Of note is the quality of the reports filed by PRAGMA, MCD, and Bryler representatives who visited the project. The reports are very detailed and provide practical suggestions to the project team. However, the last visits were made in June, 1991. Additional visits would have been useful to team members to assist in the review of ongoing project activities and to provide reassurance and information concerning the future of project activities.

The project assembled a considerable amount of socio-economic, health, and technical data. Standard commercially available software is used for the computer-based management information system. Lotus 1-2-3 is used to track progress on latrine construction, and dBASE III+ is used to maintain records about the creation of village health committees and the implementation of training modules.

However, several weaknesses were noted in the prevailing management information system (MIS). First, there was no initial coordination between UNICEF and PRAGMA as to the format and content of the databases to be used for monitoring progress and achievements. Although attempts have been made to integrate the two databases, there are significant formatting differences. For example, UNICEF identified the location of boreholes using longitude and latitude coordinates, with the village name as a secondary identifier. PRAGMA, on the other hand, identified villages according to their accepted name.

Because it appears that the names used in several instances are not identical, it is impossible to match villages from the two databases. To complicate matters further, errors appear to have been made in locating villages according to their cartesian coordinates, and the computer-based borehole location map currently being developed by an expatriate at *Direction de l'hydraulique* shows several boreholes located in Togo and Nigeria. Another shortcoming of the UNICEF information system is the fact that the identification number assigned to each borehole is inscribed on neither the pumps nor the apron. An identification number would facilitate the matching of the borehold locations with the villages.

Finally, no attempt appears to have been made to determine the information needs of *Direction de l'hydraulique* or the other ministries involved in the project. Hence, the utility of the database to the government for post-project activities is unknown.

In the future, before implementing project activities, efforts should be made to develop a standardized database that serves the purposes of all project stakeholders. Additionally, resources should be provided for the conceptualization and development of the database (if necessary, through a consultant); commercial and standard software packages should be used, to avoid the problems inherent to the servicing and use of customized software; and a data management/MIS specialist should be engaged as a member of the project team.

Chapter 4

CONCLUSIONS

4.1 Overall Conclusions

1. Generally, the project achieved all of its quantitative targets, in several instances surpassing expectations.

   - More than 500 village health committees created (target: 275)
   - Construction of 109 VIP latrines at primary schools (target: 100)
   - Construction of 261 family VIP latrines as demonstration units (target: 300)
   - 417 boreholes drilled, of which 309 are positive (a 78 percent success rate; the expected success rate in the 1985 Project Paper Amendment was 49 percent)
   - Installation of 309 India Mark II handpumps (target: 275)
   - Reduction by over 30 percent in the annual incidence rate of guinea worm infection (target: 30 percent)

2. The handpump maintenance system, which relies on village funds, village watchmen, trained artisan repairmen, and spare parts supplied through private entrepreneurs, appears to be functioning well. Its sustainability will require regular follow-up and supervision by *Direction de l'hydraulique*.

3. Most project villages quickly collected the initial minimum funds required (CFA 60,000) and established an account as a precondition to the drilling of a borehole and installation of a handpump.

   - 309 villages complied (67 villages had not yet complied as of 30 June 1991).
   - The precondition was accepted by the drilling technicians.
   - Enough funds were available to cover handpump repairs needed during the initial years.

4. The annual contribution of CFA 60,000 to the CDSS handpump account in subsequent years (a GRB national policy) appears to be excessive in relation to the immediate needs for maintenance/repair of the India Mark II handpump.

5. The system proposed for CDSS accounting of pump maintenance funds is perhaps not the most appropriate in that few committees seem to be using it, either because of its complexity or because people do not appreciate its utility.

6. The use of a participatory and "cascading" training approach was well accepted by all project participants and contributed to project success.

7. Flipcharts provided to village-level trainers by the project give village animators increased credibility and help them explain health messages to both adults and children.

8. Health messages were clear and understood by villagers to the extent that they could repeat and explain them; some were being put into practice. The eventual application of all these messages can be assessed only over a longer period of time and will likely depend upon consistent reinforcement by district agents.

9. The latrine-construction program revealed that a real demand exists.

10. The quality and high level of commitment of all those involved with the project was a major contributing factor to the achievement of project objectives.

11. The project's emphasis on "prevention" permitted Ministry of Health/Ministry of Social Affairs field-level agents to appreciate and implement this aspect of the national primary health care policy.

12. The project's openness to the integration of other approaches and activities, such as adult literacy, strengthened the community development component.

13. The choice of high guinea worm infection prevalence as one of the criteria for village selection and guinea worm prevention as the core message for the first health education module was propitious. Its immediate and demonstrable impact served to lend credibility to the other health/hygiene education modules and to the district agents as trainers.

14. The integration into the project of villages that had been the beneficiaries of previous borehole/handpump-installation projects promoted and permitted a more rational and regional approach to community development.

15. The policy cited in point 14 exacted a certain cost, however. Although the project was very successful in meeting quantifiable targets, it was perhaps too ambitious if considered in terms of either replicability or sustainability. These are some reasons:

- To accomplish all the community development/socio-health activities in each of the 503 CDSS's would have required approximately 30 visits per village, or a total of more than 15,000 visits by 26 or fewer district agents (two-thirds of whom were working part-time with the project) in less than three and one-half years.

- Project personnel were in part motivated by the adequacy of resources to carry out their tasks. For example, the per-diem system was very effective in promoting productivity. But such a system would likely be difficult for the GRB to replicate in any future public health/community development activities, without outside financial assistance.

- The pace of project activity allowed no time for scheduling follow-up visits to villages for problem-solving or other support.

16. The existence of two related but distinct subcontracts (UNICEF and USAID) resulted in differing approaches at the field level. For example, the district agents used a participatory approach in dealing with the CDSS's, while the drilling teams/handpump maintenance personnel used a more-directive approach. The existence of parallel chains-of-command also created some confusion.

17. Project design and implementation did not adequately address the training needs of pump caretakers in view of their anticipated roles, in part because the technical and socio-health components suffered from a lack of integration.

18. The initial and mid-term planning and coordination workshops were essential elements of project success.

19. On several occasions the uncertainty about the project's PACD had a negative effect on the capacity of project personnel to plan project activities over both short and long term and to develop a post-project strategy.

20. Peace Corps volunteers served a useful role as supervisors of district-level team members and as participants in other project activities (e.g., handpump maintenance and latrine construction).

21. The local costs component of the USAID contribution was administered effectively by the contractor, PRAGMA, and proved to be an efficient means for disbursing funds.

22. The effective project duration (3 1/2 years) was too short to permit the project to address some of the issues raised in the aforementioned conclusions (items 2, 4, 5, 12, 14, 15, 16, and 19).

4.2 Specific Conclusions Related to the Scope of Work

The scope of work that defined the final evaluation of the Benin Rural Water Supply and Sanitation Project covered a wide range of issues and activities. Several elements of the SOW were quite general and are addressed in several sections of this report; others are addressed in specific chapter subsections. The following material addresses each SOW element:

1. *Extent to which the inputs have been provided efficiently and have produced the desired results.* Project resources appeared adequate for the needs of the project. The project team has succeeded in achieving the project's quantitative targets. (For details on inputs and outputs for each specific project activity, consult Chapter 3.) It should be noted that were it not for the per diems provided to GRB personnel involved in the project, project activities might not have been implemented. Over the course of several months, the per diems constituted the only source of income, as government personnel were not paid a salary for several months due to the bankruptcy of government finances.

2. *Extent to which mid-term evaluation recommendations were addressed.* Generally, all of the recommendations from the mid-term evaluation were implemented except those relating to cistern construction which were abandoned (see Section 3.4). Problems were encountered regarding the implementation of the lessons learned for the water-quality-analysis activities (see Section 3.6). As mentioned, the political situation prevailing in Benin for the past several months has constrained the activities of the project Steering Committee and the elaboration of a post-project strategy plan. However, the national project coordinator is confident that this situation will be resolved within the next few weeks.

3. *Adequacy of project management by PRAGMA, UNICEF, and USAID.* The management of project activities by PRAGMA and UNICEF appears to have been carried out efficiently and effectively. The level of cooperation between the two groups for the planning and timing of project activities was good. However, the level of collaboration, particularly as regards the approach used at the village level, could have been improved earlier.

   The lack of a resident USAID counterpart to the project's national coordinator affected his capacity to manage the project. In effect, the coordinator worked in a vacuum, not having the benefit of a counterpart knowledgeable about the modus operandi and

policies of USAID. Additionally, USAID personnel made few project monitoring visits, the most recent being in 1990.

4. *Adequacy of the project monitoring system for project implementation, analysis, and decision-making.* The project established a computer-based MIS to track progress of project activities, and this system was adequate for project purposes. Additionally, there was a marked improvement in the content and format of the project's quarterly progress reports following the mid-term evaluation. These reports served as important management tools (see Section 3.10.5).

5. *Adequacy of the project design to achieve the project purpose and contribute to goal attainment.* In general, the project design was adequate, although more attention should have been paid initially to the parallel chain-of-command structure for project activities (see Section 3.10). Also, the lack of consideration for sustainability issues, particularly the means and mechanisms to support a continuation of project activities after USAID's disengagement, was a major design fault. The project now faces a situation that could have been resolved had sustainability issues been addressed earlier (see Section 3.9.3).

6. *Adequacy of financial management control system, e.g., monitoring of local costs by PRAGMA.* Following the recommendations of the mid-term evaluation, PRAGMA developed an adequate financial management control system for the administration and monitoring of local costs (see Section 3.10.6).

7. *Extent to which the project is making an impact in the target area.* The project has had a major impact on the well-being of the population in the target area. Additionally, the GRB has indicated its intention to promote the adoption of the community development model developed and implemented under project auspices in all future rural WS&S projects.

8. *Extent to which women have participated in the project other than as beneficiaries.* Women and children were the primary target group for the majority of project activities. The evaluation team was unable to determine the specific level or degree to which women in particular benefitted from project activities. However, information collected during the course of the village surveys suggests that women are active participants in the village health committees and bring about water and sanitation-related behavioral changes in the household and the community. See Section 3.1 for more details.

9. *Appropriateness of the contractor's (PRAGMA) and grantee's (UNICEF) scopes of work and level of resources to meet project objectives.* It appears that PRAGMA and UNICEF have satisfied the terms of their respective SOWs and that they were provided

with the resources required to fulfill them, with the exception of the constraint placed on the project team by the project's limited time frame.

10. *Extent to which the GRB, USAID, PRAGMA, and UNICEF met their respective responsibilities.* In general, all parties appear to have fulfilled their respective responsibilities. As mentioned in point 5 above, the project would have benefitted from a better initial orientation about the approaches to be used in implementing project activities proposed by PRAGMA and UNICEF. Also, a more-frequent active involvement of USAID representatives (project-monitoring visits) could have benefitted the project.

11. *Adequacy of management and coordination at all levels.* Coordination among PRAGMA, UNICEF, and the GRB appears to have been very good, as pertains to the planning and implementation of project activities (their sequential timing and supervision). The project's national coordinator should be credited with having accomplished the difficult task of ensuring a good interagency coordination, particularly given the difficult economic and political context in which the project operated.

12. *Adequacy of the drilling and pump-installation process.* This appears to have been carried out in a professional manner. See Sections 3.2 and 3.8 for details.

13. *Extent to which the water control/monitoring and potable water supplies/pump maintenance systems have been developed and utilized.* The multi-tiered handpump maintenance system established for the project functions well. The village-level handpump repair and maintenance fund/bank account requires a serious review, as there appears to be some resistance by communities to replenishing it (Sections 3.8 and 3.9). The water-quality-control component of the project suffered from several deficiencies (see Section 3.6).

14. *Adequacy of village plans for obtaining potable water in the event of a pump breakdown.* To date, the handpumps installed under the project have suffered few breakdowns. When breakdowns have occurred, villagers have used other handpumps to draw water (see Section 3.1).

15. *Extent to which the training program objectives and plans have been achieved.* The objectives of the training component were achieved satisfactorily, although too little time was available to the project team to implement all of the health/hygiene education modules in all of the village health committees. A point that should be carefully studied in the planning phase of future projects relates to the anticipated workload for field staff. The evaluation team notes that the project field staff carried out over 15,000 visits to village health committees in relation to the project's training component, a situation that caused some overload and limited the capacity of field staff to carry out subsequent supervisory visits (Section 3.1).

16. *Extent to which the health education program components (guinea worm, potable water, health committee roles and responsibilities, latrines, environmental sanitation, personal hygiene, behavioral observation, and social marketing) have been developed and carried out in each project village.* The "cascading" and participatory approach used in the training component accounted for its success; additionally, the pedagogic materials used, particularly the flipcharts, proved to be innovative and useful (Section 3.1).

17. *Adequacy of the procurement plan to achieve project outputs and purpose.* PRAGMA established a standard and adequate commodity procurement and inventory control system. Material resources appear to have been sufficient and adequate for project purposes (Section 3.10).

18. *Extent to which the sanitary excreta-disposal facilities component has been carried out.* The latrine construction and sanitation-related health/hygiene education components of the project were carried out successfully. Although the quantitative target for the construction of family VIP latrines was not achieved, the project took the initiative in constructing an improved traditional pit latrine model on an experimental basis for 112 families. Hence, the total number of latrine units built at family compounds (VIP and improved traditional) exceeded the target established for the project (Section 3.3).

19. *Whether the village sanitation actions undertaken (drainage and protection of water sources; proper garbage disposal) have achieved project expectations.* The project implemented a health/hygiene education module relating to the village environment, and several solid waste disposal units were constructed. The evaluation team remarked on the seemingly improved sanitary environment of villages that had benefitted from these activities, in comparison with those that had yet to receive those interventions (Section 3.1).

20. *Extent to which impediments to project implementation were resolved.* The major constraints to project implementation were largely beyond the control of the project, these being the political and financial/economic crisis that prevailed during much of the field activity period. Perhaps of greater importance, however, were the uncertainty and last-minute decisions taken regarding the PACD. This situation limited the capacity of the project team to effectively plan project activities (Section 3.10).

Chapter 5

RECOMMENDATIONS

1. *Direction de l'hydraulique* should continue supervision of—

   - The village handpump accounts and the cost of maintenance
   - The training of handpump caretakers and artisan repairman, providing some form of certification
   - The availability and cost of handpump spare parts

2. The utility and appropriateness of the CFA 60,000 annual contribution should be reviewed by all interested parties.

3. To maintain the momentum generated by the present project, the Steering Committee should create a Task Force as soon as possible to elaborate a post-project strategy paper. It may be useful to engage a consultant-facilitator to assist the Task Force in this activity.

4. The existing village-level financial management system for handpump repair should be reviewed and improvements implemented to increase effectiveness and efficiency.

5. Literacy activities, particularly for women, should be continued to reinforce the potential impact of project activities.

6. In order to ensure sustainability of the project's positive elements, efforts should be made to maintain the deployment of district agents and the means required to support their responsibilities.

7. Latrine construction should be continued, but only as an integral part of the health education activities of the socio-health component.

8. The CDSS's should be encouraged and supported by the Ministry of Health and Social Affairs to transmit other primary health care messages (e.g., EPI, malaria prevention, AIDS, etc.).

9. The project should be accorded an effective time frame of five years. While it has achieved its quantifiable targets, it has not necessarily achieved all of its stated objectives (the qualitative aspects). Improving health status requires a continual reinforcement of health/hygiene education messages. To terminate project activities

at this point would be premature, as they have not had time to take their full potential effect, and thus USAID's investment would be less effective.

Chapter 6

LESSONS LEARNED

1. To maximize the effectiveness of WS&S projects and to ensure a common and integrated approach to their implementation, the socio-health component should take precedence.

2. Project beneficiaries should be expected to contribute financially before the commencement of any activities that require long-term maintenance.

3. Planning and coordination workshops are essential at the beginning of multisectoral projects and at regular intervals during implementation.

4. Health education messages should be an integral component of primary school curricula, as a means of reinforcing water and sanitation messages given in the villages.

5. Participatory training approaches and the decentralization of training activities are important elements to the success of community development projects.

6. Providing pedagogic support materials, such as flipcharts, to village-level trainers contributes to their credibility and to the clarity of the messages.

7. The design of village-level financial management systems should take into consideration existing systems.

8. Literacy is an essential element to the effective functioning of the management aspects of community development projects and, where appropriate and warranted, literacy campaigns should be integrated into all projects.

9. Health messages on subjects that have immediate and visible effects give credibility to the trainers and to subsequent messages. Hence, these should be presented as the first in the sequence of training modules.

10. Expectations for sustainability should take into account the level of financial and logistical inputs provided by the external support agencies, within the context of local realities and the capacity of the recipient government to provide the same level of inputs.

11. Water-quality analysis activities should not be restricted to the water source. If an expected benefit of improved water-supply activities is an improvement to human health, then water stored at the household level should also be tested (random

sample) and remedial actions developed (e.g., chlorination of boreholes; health education to improve water-handling and -storage practices).

12. Decisions about the type of water supply system to be developed should be linked to the size of the population to be served, the level of capital investment required, and the capacity of the population to organize itself to support recurrent costs.

13. Latrine construction programs should be undertaken only as integral parts of the health education activities of a project's socio-health components.

14. The awarding of symbols of recognition (e.g., tee-shirts, badges, etc.) is an effective means of reinforcing and promoting good community development and behavioral activities.

15. Projects aiming to influence human behavior should have a minimum five-year time frame for the implementation and evaluation of project activities.

Appendix A

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Appendix B

PERSONS CONTACTED

(in alphabetical order)

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WOROU, Fatchinin	Sanitation Agent, Bantè
ZOSSOUNGBO Jean	Sanitation Agent, Glazoué

Appendix C
VILLAGES VISITED

(7-13 September 1991)

Bantè:

- Adjigo
- Agbon

Dassa:

- Lema
- Gnonkpingnon
- Vedji
- Godogozou

Glazoué:

- Rifo
- Agouagan
- Kabolé
- Iba-Omahan

Savalou:

- Miniki
- Lahotan

Savé:

- Dani

Ouesse

- Atata

Appendix D
VILLAGE QUESTIONNAIRE AND SUMMARY OF RESULTS

EVALUATION FINALE DU PROJET USAID 680-0201 : PROJET EAU ET ASSAINISSEMENT EN MILIEU RURAL

QUESTIONNAIRE

14 villages ont été visités. Ces villages étaient représentés par 26 CDSS (un CDSS par pompe, sauf un village où un CDSS s'occupait de deux pompes), dont 2 villages avec 4 CDSS, 6 villages avec 2 CDSS et 6 villages avec 1 CDSS.

Rôle du comité

1. Quel est le rôle du comité de développement socio-sanitaire (dans ce projet d'eau) dans votre village?

La maintenance de la pompe a été cités par 23 CDSS.
La sensibilisation et la formation des population a été mentionés par 11 CDSS.
Huit (8) CDSS ont parlé des deux rôles - la pompe et la sensibilisation.

2. Comment les membres du comité étaient-ils choisi?

Tous les CDSS ont été choisis par consensus pendant une réunion de la population du village.

3. Quelles sont les maladies les plus fréquentes dans votre village chez les adultes et les enfants?

Avant la pompe:

Ver de Guinée	- 26 CDSS
Diarrhée	- 24 CDSS
Vomissement	- 21 CDSS

Autre maladies mentionnées :

Bilharziose, maladies de la peau, céssité, vers intestinaux, maux d'oreille, toux, paludisme, rougeole, coliques, plaies.

Maintenant, après la pompe:

Plus de ver de Guinées	- 26 CDSS
Diminution de certaines maladies	- 26 CDSS

Persistance de certaines maladies
(paludisme, rougeole, etc.) - 26 CDSS

4. A quelles formations les membres ont-ils assistés?

	Nbr. de CDSS
a) rôle du comité	9
b) eau potable	26
c) prévention de ver de Guinée	25
d) danger des selles	25
e) village propre	24
f) hygiène personnel	3
g) utilisation des latrines	9

5. Est-ce que ces formations ont répondu aux problèmes de santé les plus importants dans votre village?

Les 26 CDSS ont répondu 'oui', surtout au niveau de la disparition du ver de Guinée et la diminution de certaines maladies et l'acquisition de certaines notions (préparation de la TRO).

6. Selon vous, est-ce qu'il y a des maladies qu'on peut attraper de l'eau de marigot? Lesquelles?

Le ver de Guinée, les maux de ventre, la diarrhée et vomissement ont été cités par les 26 CDSS.

7. Est-ce que le village souffre de ver de Guinée?

Les 26 CDSS ont dit qu'ils ne souffraient plus du ver de Guinée

8. Selon vous, qu'est-ce qui cause le ver de Guinée?

L'eau du marigot ou l'eau contaminée ont été citées par les 26 CDSS comme causes du ver de Guinée.

9. Comment peut-on éviter le ver de Guinée?

Utiliser l'eau de la pompe exclusivement comme eau de boisson a été cité par les 26 CDSS, 18 CDSS ont aussi cité l'eau filtrée ou bouillie.

10. Qu'est-ce que vous avez fait au village après la dernière formation donner par les agents?

Les 26 CDSS ont vulgarisé les enseignements reçus, ou de concession en concession ou par des rassemblements de la population en utilisant les aides visuelles (les boites à images).

11. Que pensez-vous des boites à images?

Les 26 CDSS ont trouvé les Boites à Images très utiles, quelques-un voulaient des copies supplémentaires pour chaque membre du CDSS.

12. Est-ce que les villageois ont changé de comportement après leur formation par le Comité? Comment?

Tous les 26 CDSS ont pensé que les villageois ont changé de comportement en citant les exemples suivant: village plus propre, l'utilisation de l'eau de la pompe au champ, selles enterrées.

13. Qui a choisi/comment a-t-on choisi le site du forage? (critères de choix, responsabilité du choix)

Le technicien seul a choisi le site pour 5 des CDSS, mais 21 CDSS ont participé à ce choix avec le technicien.

Cotisation

14. Quelles étaient les conditions pour avoir un forage/une pompe dans le village?

		Nbr. de CDSS
a) 60.000 CFA dans un compte à la banque		24
b) signature du contrat		11
c) création d'un comité villageois (CDSS)		24
d) autre	- aménagement du site	4
	- existance d'organisation de jeune (ancienne pompe)	2

15. Comment a été faite la cotisation initiale?

	Nbr de CDSS
- Cotisation par les adultes et les jeunes	17
- Souscription volontaire	1
- Travail de groupement	7
- Vente de l'eau de l'ancienne pompe	1
- Ristourne sur la vente de coton	1

16. Qu'est-ce que vous savez, et pensez, de la cotisation pour la pompe? C'est pour faire quoi?

Les 26 CDSS ont déclaré que la caisse était pour la réparation de la pompe.

17. Qui décide pour quoi on va dépenser des fonds?

	Nbr de CDSS
a) les membres du comité	22
b) le président du comité	1
c) le président et quelques membres	3

18. Combien d'argent avez-vous dans la caisse?

	Nbr de CDSS
- Compte à la banque uniquement montant: 5.000 à 128.475F	24
- Compte à la banque et au village montant au village: 670 à 32.500F	11
- Compte à la banque et à la Sous-Préfecture (Ouesse)	1
- Cotisation ponctuelle sans caisse	1

19. Ce montant est-il suffisant?

	Nbr de CDSS
- Oui	4
- Insuffisant (pas assez pour les grosses pannes) (expliquer votre réponse)	21

20. Si votre caisse est à la banque, avez-vous eu des problèmes pour retirer l'argent?

Aucun des 25 CDSS avec des compte à la banque n'ont eu des problèmes pour retirer leur argent.

21. Avez-vous un cahier comptable où on enregistre les entrées et les dépenses? (Véfifier la réponse en contrôlant le cahier)

	Nbr de CDSS
- Suivi de la gestion proposée pour le projet	1
- CDSS n'ayant pas suivi le système	25

22. Est-ce que un bilan de la caisse a été fait?

- Les 26 CDSS disent qu'ils font un bilan d'une manière ou une autre.

23. Comment payez-vous la réparation de la pompe?

	Nbr de CDSS
a) compte en banque	16
b) l'argent de la caisse au village	17
c) cotisation ponctuelle	1

24. Quel est votre système de renouvellement des fonds?

	Nbr de CDSS
- Champ collectif	7
- Cotisation	8
- Vente de l'eau	7
- Pas de système	4

25. Est-ce que le projet vous a demandé encore des cotisations?

	Nbr de CDSS
- Renouvellement des fonds,oui	23
- Non	3

Responsable de pompe

26. Comment avez-vous choisi le responsable de la pompe? (critères de choix)

	Nbr de CDSS
- Habilité mécanique	22
- Caractère/disponibilité	8

27. Quelles sont ses responsabilités? (termes d'emploi)

	Nbr de CDSS
a) contrôle quotidien de l'utilisation de la pompe	23
b) chercher/acheter les pièces de rechange	11
c) aménagements des alentours	16
d) appeler l'artisan en cas de panne	20
e) aviser le comité en cas de panne	20
f) régler les disputes	10
g) autre - graisser la chaine	12
surveiller la réparation	6
garder les anciennes pièces	2

28. Est-ce qu'il à reçu une formation sur la réparation de la pompe? (technique, autre)

- Aucun des 26 responsables de pompe n'a reçu de formation technique.

29. Est-ce qu'il est récompensé pour son travail? Comment?

- Tous les 26 responsables de pompes étaient volontaires.

30. Quels outils lui sont disponibles? Qui les a acheté?

- Aucun responsable de pompe n'avait d'outil. (Parfois ils utilisaient des clefs personnels pour le graissage)

Réparation de la pompe

31. Y-a-t-il un stock de pièces de rechange au village? Si oui, quelles pièces?

- Il n'y a aucune pièces de rechange en stock dans les villages.

32. Depuis l'installation de la pompe, est-elle tombée en panne?

	Nbr de CDSS
a) oui. Plusieurs fois	24
b) non.	2

33. Quelles réparation ont été effectuées? A quel coût?

- 24 CDSS ont changé des pièces de rechange. (roulements, coupelle, axes)

34. Quelles ont été les durées des pannes?

	Nbr de CDSS
1 à 3 jours	24
1 mois à 2 ans	3

35. Où achetez-vous les pièces?

	Nbr. de CDSS
A la sous-préfecture	9
Chez l'artisan	9
Chez les commerçants	7

36. Qui est votre artisan réparateur?

- Tous les 26 CDSS connaissaient les noms et prénoms de leur artisan réparateurs.

37. Etes-vous content avec les services de l'artisan réparateur?

- Aucun des 26 CDSS a de problèmes avec leur artisan réparateur.

Sources d'eau

38. Quelles sont les sources d'eau que vous utilisez pendant la saison sèche? Pour quel usage?

- Tous les 26 CDSS disent qu'ils utilisent l'eau de la pompe exclusivement pour tous les usages en saison sèche.

39. Quelles sont les sources d'eau que vous utilisez pendant la saison des pluies? Pour quel usage?

	Nbr de CDSS
Pompe: pour boire	26
Eau de pluie: pour autre usage	25
Eau de puit à grand diamètre	8
Marigot pour la lessive et la construction	5

40. Si la pompe tombe en panne, comment allez-vous vous approvisionner en eau potable?

	Nbr de CDSS
A d'autres pompes	15
Citernes	5
Eau filtrée ou bouillie	4

41. Quelle source d'eau (entre marigot et pompe) est le plus pratique au niveau de l'accès, de la distance, durée de la corvée, de la facilité de puisage?

Tous les 26 CDSS trouvent la pompe plus pratique.

42. Y-a-t-il des problèmes avec le goût ou la couleur de la pompe?

	Nbr de CDSS
Oui, au début	6
Couleur: changement pendant la saison de pluie	4

43. Est-ce-que vous utilisez l'eau de la pompe pour des besoins autre que personnel?

		Nbr de CDSS
Non		10
Oui:	a) jardin	10
	b) abreuvoir	14
	c) construction	9

44. Combien de fois les femmes puisent de l'eau à la pompe par jour?

- Les réponses étaient très variables - entre 3 et 10 fois.

45. Est-ce que le forage fournit assez d'eau pour répondre aux besoins du village?

	Nbr de CDSS
a) oui	8
b) non (préciser)	
(1) il y a trop de monde pour un seul puits/forage	19
(2) le débit du forage est insuffisant	2

Latrines

46. Combien de latrines a-t-on construit au village avec l'appui du projet?
Neuf villages ont été visités où les latrines ont été contruites.

47. Comment est-ce qu'on a décidé où construire des latrines? (critères)

	Nbr de village
Après enquête	5
Par le village	4

48. Est-ce-que les latrines sont utilisées?

	Nbr de village
a) oui. Par tout le monde	8
b) non. Latrines non achevées	1

49. Qu'allez-vous faire une fois que la fosse est pleine?
Les neuf villages ont dit qu'ils récupèreraient les dalles et reconstruiraient la latrines.

50. Est-ce-que d'autres familles ont construit des latrines?
???

OBSERVATIONS

Protection de l'eau

1. Propreté des récipients d'eau qu'on amène au forage:

	Nbr de CDSS
a) tous les récipients sont propres	1
b) la plupart des récipients sont propres	5
c) aucun des récipients est propre	4
d) pas d'observation	16

2. Est-ce que les environs du forage sont propres et bien entretenu (pas d'eau stagnant)?

	Nbr de CDSS
a) oui	22
b) non	4

3. Stockage d'eau à la maison (demander a quelques personnes si on peut passer voir le stockage d'eau chez eux) est:

Observation difficile. Dans presque tous les cas, l'eau de boisson était gardé dans les chambres, et dans les jarres recouverte.

Latrines: construction, utilisation et entretien

1. Modèle visité

a) familiale: -simple fosse renforcé, ventilée
-traditionnelle améliorée: simple fosse non-renforcé sans ventilation

b) école: -double fosse, ventilée

2. Utilisation des latrines :

Les latrines sont assez bien utilisées, sauf quelques réticences au niveau des latrines familiales traditionnelles où il y a eu des cas d'éboulements

3. La propreté des latrines :

Les latrines sont assez propres en générale.

Village propre

1. Comment dispose-t-on des ordures?

	Nbr de CDSS
a) dans les fosses à ordure	4
b) on jette les ordures dans un endroit spécial et on les brûle régulièrement	20
c) pas de système: les ordures sont jetés partout	3

2. Y a-t-il de l'eau stagnante près des douches?

Non, en générale.

DOLEANCES

	Nbr de CDSS
Demande de latrines	15
" plaque de félicitation	2
" formation sanitaire	8
" pisciculture	7
" construction de pistes	3
" outillage pour la pompe	1
" de forage et pompe	3

Appendix E

PROJECT CRITICAL DATES AND ACTIVITIES

CRITICAL DATES FOR PROJECT

PROJECT ADMINISTRATION/MANAGEMENT		TECHNICAL ACTIVITIES	PROJECT ACHIEVEMENTS
1980 February	Authorization for a 5 year rural water supply and sanitation improvement project in Benin.		
August	Partial funding agreement signed with GPRB. PACD established as September 30, 1985.		
December	1st Project Agreement Amendment - full funding obligated.		
1981 December	Project activities suspended.		
1984 October	Lifting of suspension on US technical assistance to Benin.		
November	Water resources and health sector study undertaken by USAID.		
1985 May	Project Paper Amendment forwarded to GPRB for review. PACD revised to September 30, 1988.		
July	Letter of agreement for project objectives and budget signed by GPRB		
December	2nd Project Agreement Amendment approved.		
1986 June	Project National Coordinator nominated and installed.		
September	Pragma Chief of Party arrives.		

PROJECT ADMINISTRATION/MANAGEMENT		TECHNICAL ACTIVITIES	PROJECT ACHIEVEMENTS
1987 April		Project start-up workshop (WASH).	
May	Tripartite Agreement signed with Pragma.		
June		*Arrival of Health Education Specialist and* Civil/Sanitary Engineer.	
July	1st Modification of Contract, revising the value of line items within Technical Assistance budget. Total TA budget value not modified.	Commencement of health education/community development activities.	
	Purchase of vehicles and equipment to establish project office in Cotonou.		
September		1st TOT workshop for district team members. Village selection. PCV training starts.	
1988 January		1st Guinea worm prevalence survey (500 villages).	- Hydrogeological survey of 22 villages completed. - 90 village health committees (VHCs) created. - 15 positive wells drilled.
February		Commencement of borehole drilling.	- 3 of 6 district teams trained.
March	Initial transfer of funds to project by Pragma.	First functioning well inaugaurated.	
April		2nd Guinea worm prevalence survey (300 villages).	- 54 village health committees created. - 18 positive wells drilled.
May	Renegotiation of Pragma contract to include local cost administration.	Elaboration of latrine construction and handpump maintenance strategies.	- 10 handpumps installed
June	*Pragma financial officer visits to* assist in establishing financial management procedures.	Training of latrine promotion and construction activities. *Retraining of 4 PCVs - health education* modules.	

PROJECT ADMINISTRATION/MANAGEMENT		TECHNICAL ACTIVITIES	PROJECT ACHIEVEMENTS
1988 July		TOT for district teams on 1st training module: roles & responsibilities of VHCs	- 132 village health committees created - 149 VHCs given training in VHC roles & responsibilities
October	Construction of Bohicon project offices begins.	TOT for district teams on 2nd training module: clean water	- 19 VHCs receive training in caisse villageoise creation and management - 79 VHCs receive training in Guinea worm control
November		Mid-term evaluation (WASH).	- 3 positive boreholes drilled
December		3rd Guinea worm prevalence survey. Start of 3-month pilot project to measure utilization of filters for Guinea worm control.	- 17 handpumps installed - remaining 3 district teams trained
1989 February	2nd Modification of Contract, increasing value of Technical Assistance budget to be administered by Pragma.	SEERT-BENIN, local company that stocked and sold handpump spare parts, declares bankruptcy.	- 90 new VHCs created - 74 VHCs given training in VHC roles & responsibilities
April		4th Guinea worm prevalence survey. Commencement of Guinea worm control education campaign. TOT for district teams on 3rd training module: safe excreta disposal practices	- 91 VHCs receive training in caisse villageoise creation and management - 124 VHCs receive training in water-related health education and Guinea worm control - 87 positive boreholes drilled - 66 handpumps installed
May		TOT for district teams on health and adult education (WASH) Training for project personnel: family latrine construction Training of DH and UNICEF personnel in physico-chemical water quality analysis techniques	- 64 public latrines constructed
		Annual campaign for replenishment of *caisses villageoises* begins	

	PROJECT ADMINISTRATION/MANAGEMENT	TECHNICAL ACTIVITIES	PROJECT ACHIEVEMENTS
1989 June	3rd Modification of Contract, increasing the value of the Technical Assistance budget administered by Pragma.	Development and presentation to GRB of national Guinea worm control strategy document	- 19 new VHCs created - 31 VHCs given training in VHC roles & responsibilities - 15 VHCs receive training in caisse villageoise creation and management - 105 VHCs receive training in water-related health education and Guinea worm control - 8 positive boreholes drilled - 8 handpumps installed
September		Savalou truck driver engaged to import handpump spare parts from Togo declares disinterest in continuing this activity	
November	Project office moves to Bohicon.		- 55 new VHCs created - 12 VHCs given training in VHC roles & responsibilities - 18 public latrines constructed - 26 positive boreholes drilled - 24 handpumps installed
December	Pragma/MCD contract extended for three months, to March 30, 1990, without additional funds. Phase II Project Implementation Document submitted to AID/Lomé, requesting extension of PACD to December 31, 1990.	Pilot project for family latrine construction begins 5th Guinea worm prevalence survey	
1990 March	Termination of technical assistance contract. Original Pragma Chief of Party and Civil/Sanitary Engineer leave Benin. Health Education Specialist designated COP, and new Admin/Fin Asst. assumes duties. Project monitoring visit by Bryler representative. 3rd Project Amendment Agreement approved, revising PACD to December 31, 1990 and providing a supplemental grant of $875,000, of which $150,000 allocated to UNICEF Contribution Agreement.	Socio-health surveys of project villages conducted for family latrine construction activities Sensitization campaign for households where family latrines to be constructed Publication of training materials on excreta disposal and latrine construction/maintenance Replacement of single pit with double pit latrines	- 28 new VHCs created - 31 VHCs given training in VHC roles & responsibilities - 221 VHCs receive training in Guinea worm control - 89 VHCs receive training in general water-related health/hygiene education - 41 positive boreholes drilled - 33 handpumps installed - 24 public latrines constructed

PROJECT ADMINISTRATION/MANAGEMENT		TECHNICAL ACTIVITIES	PROJECT ACHIEVEMENTS
1990 April	7th Modification of Contract, revising the value of line items within the Technical Assistance budget.	6th Guinea worm prevalence survey	- 5 new VHCs created - 64 VHCs receive training in VHC roles & responsibilities - 95 VHCs receive training in Guinea worm control - 375 VHCs receive training in general water-related health/hygiene education - 134 VHCs receive training on excreta disposal practices - 45 positive boreholes drilled - 61 handpumps installed - 11 family latrines constructed
June	Project monitoring visit by Pragma/Bryler representatives. Consultancy of water quality control specialist.	Three day seminar (*Journées de reflexion*) of government and donor agency reps to discuss handpump maintenance strategies Construction of family latrines begins	
October	Project monitoring visit by Pragma/Bryler representatives, to formulate an outline of project final report, in anticipation of imminent PACD.	TOT for district teams on 5th training module: domestic and personal hygiene	- 84 VHCs receive training in general water-related health/hygiene education - 289 VHCs receive training on excreta disposal practices - 100 VHCs receive training on personal and domestic hygiene - 137 family latrines completed
December	Pragma submits a request to AID/Lomé for an extension of the PACD to September 30, 1991 and a supplemental grant of $492,095. Several Beninese project staff leave or are reassigned elsewhere by GRB in anticipation of termination of project. Pragma receives verbal agreement from AID/Lomé of no-cost three-month time extension for project, making revised PACD March 30, 1991.	7th Guinea worm prevalance survey. TOT for district teams on 6th training module: village environmental sanitation	

PROJECT ADMINISTRATION/MANAGEMENT		TECHNICAL ACTIVITIES	PROJECT ACHIEVEMENTS
1991 March	Revised PACD passes, with no indication of decision concerning request for supplemental budget and extended PACD.	Health education/latrine construction/handpump installation activities with VHCs continues Village literacy campaign begins (in cooperation with UNICEF)	- 21 VHCs reconstituted in villages that received handpumps under previous UNICEF project - 43 VHCs receive training in VHC roles & responsibilities - 36 VHCs receive training on excreta disposal practices - 17 additional boreholes drilled - 93 family latrines constructed
April		8th Guinea worm prevalance survey.	
June	Expenditures on project activities exceed value of Technical Assistance budget.	VBC/UNICEF/PC joint consultancy to assess interagency collaboration during project.	
July	Extension/supplemental grant approved. REDSO preparing PIO/T.		
September	Project staff preparing for disengagement of USAID and termination of project.	Final project evaluation (WASH).	
	Meeting of gov't representatives to discuss water supply development project strategies, and to reconstitute Project Steering Committee.		

Appendix F

REPORT OF THE BENINESE EVALUATORS

RAPPORT D'EVALUATION FINALE DU PROJET USAID "EAU ET ASSAINISSEMENT EN MILIEU RURAL" DANS LA ZONE NORD DU DEPARTEMENT DU ZOU

Introduction

Du 1er/9 au 22/9/91, ont séjourné à Bohicon une mission d'évaluation dépêchée par WASH et une délégation béninoise, en vue d'évaluer le Projet USAID "Eau et Assainissement en milieu rural"

La délégation des consultants Wash est composée de :

- Mme Suzanne PLOPPER : spécialiste en Education Sanitaire
- Mr. Alan MALINA : Ingénieur Sanitaire
- Mr. James CHAUVIN : Analyste Financier

La délégation béninoise est composée de

- Mme KOFFI Régina : Sage Femme d'Etat Service Information - Education - Communication du Ministère de la santé
- Mr. SOSSOU C. Sylvain : Attaché Administratif à la direction de la Coordination des Ressources Extérieures du Ministère du Plan et de la Restructuration Economique.

Le but de cette évaluation finale vise les objectifs suivants :

1 - Voir si le projet a pu atteindre tous ses objectifs.

2 - Identifier les facteurs qui ont facilité ou limité la capacité du projet à atteindre ses objectifs.

3 - Tirer des enseignements de cette expérience qui pourraient être utiles à l'USAID et au Gouvernement Béninois dans la planification et l'exécution d'autres projets.

Dans ce cadre, les deux délégations se sont rendues dans quelques villages de chacun des 6 sous-préfectures concernées par le projet, choisis par échantillonnage et selon les critères suivantes :

- Anciens villages : 12

c'est-à-dire là où les forages datant du début du projet et où tous les thèmes de santé ont été développés.

- Nouveaux villages : 1

là où tous thèmes n'ont pas été abordés.

- Villages de rattrapage : 1

village disposant des anciennes pompes UNICEF et n'ayant pas antérieurement un système de vulgarisation dans les ménages.

Au total, 14 villages comprenant 26 comités ont été visités. Les évaluateurs ont eu à interroger les membres des comités de développement socio-sanitaires installés dans chaque village et selon le nombre de puits forés. A ce sujet, l'équipe a élaboré un questionnaire comportant 50 points relatifs aux 3 grands volets du projet.

Il est à souligner que le temps imparti à l'évaluation est insuffisant et n'a pas permis de prendre tous les contacts souhaités (rencontre avec les médecins chefs des sous-préfectures et avec les représentants du corps de la paix).

S'agissant du 1er point, les objectifs principaux du projet sont les suivants :

- Installer des systèmes d'adduction d'eau potable par forage de 275 puits pour 225 villages dans la zone Nord du Département du Zou.
- Diminuer l'incidence du ver de guinée de 30%.
- Mettre en place un système d'entretien des pompes.
- Former les villageois en hygiène et assainissement
- Promouvoir la construction des ouvrages sanitaires au niveau des villages.

L'analyse des réalisations au niveau des différents volets du projet prend en compte les deux autres points sus indiqués.

I - VOLET FORAGE DE PUITS

Au départ, l'enquête préliminaire avait révélé la nécessité d'améliorer la santé et les conditions de vie de 504 villages du Zou Nord en les dotant de sources d'eau potable. A ce jour, le projet a pu forer 309 puits positifs dans 312 villages, montrant ainsi que l'objectif à ce niveau est largement atteint voire même dépassé. Toutefois, il faut souligner que les villages n'ayant pas bénéficié des puits à la suite de l'enquête préliminaire continuent de porter leur espoir sur le projet.

1.1 ORGANISATION SUR LE TERRAIN

Chaque village désireux de bénéficier du projet est tenu de verser la somme de 60.000 francs dans un compte ouvert à cet effet au CLCAM, et son comité de développement socio-sanitaire (CDSS) est chargé de la maintenance de la pompe, de la sensibilisation et de la formation des populations en la matière. A cet effet, il a été constaté que la plupart des comités connaissent et jouent sans accroc leur rôle.

A ce niveau, il subsiste le problème de gestion transparente, car très peu de comités se conforment à la méthode de gestion préconisée par le projet.

1.2 ENSEIGNEMENTS A TIRER

La consommation de l'eau potable a mis en évidence la disparition progressive voir l'élimination quasi totale du ver de Guinée dans tous les villages ; conscients de ce fait, les villageois acceptent aujourd'hui volontiers les enseignements susceptibles d'améliorer davantage leur état de santé. Cette disponibilité facilite quelque peu les tâches ardues assignées aux agents de santé sur le terrain et a permis de faire assimiler les différents thèmes d'éducation pour la santé et leur mise en pratique à 60%.

Par ailleurs, il est utile de mentionner que tout le monde se sent concerné par les objectifs visés par le projet. Ainsi, les enseignants ont été intimement associés parce qu'ils ont la charge de la couche la plus vulnérable que constituent les élèves qui sont plus réceptifs aux messages et plus favorables au changement, capables de transmettre les enseignements reçus dans le milieu ; de même, les agents du Développement rural qui sont responsables de certains groupements de femmes contribuent au bon déroulement du projet.

La diminution du ver de Guinée et d'autres maladies liées à l'eau a augmenté le taux de productivité des villageois, La survie des enfants est aussi préservée et l'exode rurale est freinée.

II- VOLET SOCIO-SANITAIRE

Ce volet vise à organiser les villageois autour des points d'eau pour assurer une bonne maintenance des pompes et à les aider à adopter des comportements pouvant améliorer leur état de santé.

Dans ce cadre, 9 thèmes ont été développés au cours des ateliers de formation pendant 3 jours à une semaine, au profit des formateurs sur le terrain qui sont généralement des infirmiers, des agents d'hygiène et des assistantes sociales.

Le programme a permis à ceux ci d'être formés sur les thèmes suivants :

- Rôle et responsabilité du comité
- Eau potable
- Prévention du ver de Guinée
- Danger des selles
- Village propre
- Hygiène personnel
- Utilisation des latrines
- Apprentissage des adultes et
- Planification des activités.

L'équipe formateur au niveau du département est composé de 3 agents du Gouvernement et de deux assistants qui préparent ensemble les matériels didactiques et forment l'équipe qui est sur le terrain sur les sept premiers thèmes sus cités.

Les enseignements sont vulgarisés au niveau des villages à travers les comités de développement socio-sanitaires qui se chargent à leur tour de transmette les messages à leur population avec l'appui des boîtes à images d'illustration concrète du contenu de chaque thème.

Lors des interviews au cours de l'enquête dans les villages, les comités, ainsi que la population ont démontré l'intérêt qu'ils portent à la mise en pratique des enseignements du programme socio-sanitaire ; ainsi, l'utilisation de l'eau de la pompe, de l'eau bouillie ou de l'eau filtrée comme eau de boisson en est une preuve. Il en est de même pour les villages ayant bénéficié de latrines où on a pu observer un environnement plus sain (pas de selles émises dans la nature).

L'observance des règles d'hygiènes a permis une nette diminution de certaines maladies liées à l'eau dans les villages visités telles que : diarrhée, vomissement, mais ils insistent sur la persistance du paludisme, de la rougeole etc...

En somme, les méthodes et le contenu des ateliers de formation, aussi bien pour les agents de santé que pour les comités de village, ont permis à ceux-ci d'obtenir des résultats concluants sur ce volet du projet.

ENSEIGNEMENTS A TIRER

- Le volet socio-sanitaire, en particulier, l'éducation pour la santé est un creuset de dialogue entre les techniciens de santé et la population et devrait donc constituer un appui de premier plan à tout programme de développement sanitaire.

C'est pourquoi dans le cas précis de ce projet, le constat est que le taux de fréquentation des centres de santé au niveau des sous-préfectures a sensiblement diminué grâce aux changements positifs de comportements des populations (diminution des causes fréquentes de consultation : ver de Guinée, diarrhée, vomissement, parasitoses, coliques, dermatoses etc...)

Cette prise de conscience des populations concernées atténue les difficultés que rencontrent les agents pour faire passer leur message.

- Les agents de santé et les assistants sociaux sont mieux intégrés dans les communautés et sont davantage imprégnés de leurs problèmes de santé ce qui leur permet d'être plus apte à contribuer à leur résolution. Ils ont également acquis l'habitude de planifier leurs activités de prévention en direction des populations contrairement à la routine qui consistait à attendre le malade au Centre de santé. Cette démarche cadre bien avec l'un des objectifs du Ministère de la Santé, à savoir, accorder la primauté de la médecine préventive sur la médecine curative.

- Le programme socio-sanitaire a développé au sein des paysans, l'esprit d'équipe et de solidarité au sein des villages et ce, par des créations de champs collectifs dont les revenus des produits agricoles servent à financer la participation du village au renouvellement des fonds d'entretien des pompes et à d'autres besoins.

- Le fort taux de participation des femmes au sein des comités a contribué sensiblement au résultat positif auquuel le projet est parvenu.

- Les thèmes enseignés au cours de la réalisation du projet cadrent parfaitement avec les objectifs du projet et la méthodologie utilisée

semble bien appropriée, ce qui a amélioré qualitativement les connaissances des cadres béninois impliqués dans le projet.

- Enfin, la motivation des agents superviseurs et autres agents a été un élément déterminent au regard des résultats concluants auxquels le projet est parvenu, grâce aux moyens techniques, matériels, logistiques et aux per diem mis à leur disposition.

III-VOLET CONSTRUCTION DE LATRINES

La construction de latrine est une activité promotionnelle qui a pour but de réduire les maladies d'origine hydrofécale en encourageant les mesures d'hygiène et d'assainissement du milieu dans les villages.

A cet effet, 2 types de latrines ont été réalisés : les latrines à 1 ou 2 fosses ventilées et les latrines traditionnelles améliorées.

Notons que sur les 206 latrines écolières initialement prévues, l'évaluation à mi parcours a recommandé de réduire le nombre à 100. A ce jour 109 ont été" réalisées.

En ce qui concerne les latrines familiales, l'évaluation a préconisé de construire 300 au lieu de 150 prévues. A ce jour 261 ont été construites.

L'objectif du volet latrine peut donc être considéré comme atteint.

Avant de construire des latrines, des enquêtes préliminaires ont été menées dans tous les villages concernés par le projet et ont permis de déterminer les familles bénéficiaires, quelque soit le type de latrines à construire. Mais malgré l'enthousiasme que ce volet a suscité au niveau de la population, il n'en demeure pas moins que des problèmes ont surgi dans certaines localités, précisément dans la sous-préfecture de Glazoué où l'instabilité du sol en saison pluvieuse a causé des cas d'éboulement en ce qui concerne les latrines traditionnelles améliorées réalisées par le projet. Ces incidents ont entraîné des effets psychologiques dans l'acceptation de ce type de latrines et dans son utilisation effective. Cependant, conscients de l'utilité de l'usage des latrines, certains villageois de ces localités contribuent personnellement à l'amélioration de la technologie utilisée en finançant le revêtement des parois en matériaux définitifs. Mais par contre dans d'autres localités, le même type de latrine construit n'a pas connu de problème particulier et est apprécié en raison du coût moins onéreux.

S'agissant des latrines de type standard, celles à 1 fosse ont été installées dans les familles et à 2 fosses dans les écoles.

Dans la plupart des villages visités, la mission a constaté avec satisfaction l'utilisation effective de ces latrines dans des conditions d'hygiène acceptable : une jarre d'eau et un pain de savon sont souvent mis à côté de chaque latrine.

Il est à souligner que la vulgarisation des thèmes "danger de selles" et "utilisation des latrines" a donné des résultats très positifs et les villageois qui n'ont pas encore bénéficié de latrines savent qu'il faut déféquer dans un trou et fermer. Nombreux sont les villages qui ont formulé encore des demandes pour la construction de latrines.

ENSEIGNEMENT À TIRER

D'une manière générale, l'environnement plus sain dans les villages qui ont bénéficié des latrines du projet et de l'éducation pour la santé a favorisé la diminution des maladies d'origine hydrofécale.

Conclusion

Le projet d'adduction d'eau et d'assainissement en milieu rural est un projet intégré, mais redimensionné par les évaluateurs à mi-parcours en raison de son caractère trop ambitieux.

A quelques exceptions près, tous les objectifs ont été atteints grâce à la collaboration franche et étroite des responsables du projet que sont : le coordonnateur national, le chef projet, les assistants techniques et consultants de l'USAID, de l'UNICEF et de Pragma, les volontaires du Corps de la Paix et les cadres nationaux formés par le projet.

Il a été bien accepté par ses bénéficiaires en l'occurrence les villageois, en raison de ses objectifs qui prenent en compte l'amélioration des conditions de vie dans les communautés villageoises par :

- La consommation de l'eau potable en quantité et en qualité, en vue de la prévention du ver de Guinée et des maladies liées à l'eau.
- La promotion d'une bonne hygiène et d'un assainissement du milieu.
- L'enseignement de l'auto gestion et par
- L'alphabétisation des adultes notamment les femmes.

Par ailleurs, ce projet a permis aux superviseurs en particulier d'acquérir des notions sur la planification des activités et sur les méthodes d'apprentissage des adultes en milieu rural.

RECOMMANDATIONS

1 - Il est nécessaire de mettre à contribution dans le programme socio-sanitaire de l'après projet, les autorités religieuses et autres personnes influentes des villages pour aider les techniciens et les CDSS à mieux faire passer les messages.

2 - Il serait souhaitable que le volet socio-sanitaire soit appuyé du programme élargi de vaccination avec stratégie avancée et d'un thème sur le paludisme.

3 - Continuer le programme d'alphabétisation des adultes initié par le projet, surtout des femmes en vue de promouvoir l'auto-gestion de leurs affaires.

4 - Instituer des prix d'encouragement et continuer de distribuer des plaques de félicitation aux villages les plus méritants.

5 - Envisager dans les meilleurs délais la formations des responsables de pompe au niveau de chaque comité de Développement Socio-Sanitaire.

6 - Le Gouvernement Béninois doit faire en sorte qu'il n'y ait plus à l'avenir de chevauchement de 2 bailleurs de fonds sur le même projet dans une localité donnée sans un accord préalable entre les deux (c'est la cas des Projets Suisse et USAID à Ouessé). Pour ce faire, il est nécessaire d'organiser une table ronde avec les différents bailleurs de fonds en vue de définir clairement les bases d'une politique nationale d'animation et d'éducation autour des points d'eau dans les projets d'hydraulique villageoise.

7 - Face aux accidents ou aux risque d'accidents dont sont souvent victimes les cadres intervenants dans le projet à divers niveau, il serait souhaitable que la prise en charge intégrale des cas d'accidents de travail soit assurée par le projet dans la 2ème phase.

8 - Instruire les Ministres ci-après : Santé, Affaires Sociales, Hydraulique impliqués dans le programme du projet, de maintenir, chacun en ce qui le concerne, les agents formés par le projet à leur poste respectif pour le suivi harmonieux des acquis du projet.

9 - Au regard de tout ce qui précède, l'appui de l'USAID pour le financement de la 2ème phase du projet d'adduction d'eau et d'assainissement en milieu rural dont l'extension nécessiterait une enveloppe financière de 1839,625 millions de Francs CFA est sollicité.

Cette 2ème phase reste nécessaire parce que tous les objectifs de la 1ère phase n'ont pas pu être atteint du fait du retard accusé dans son démarrage.

Ont signé :

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