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**WATER AND SANITATION  
FOR HEALTH PROJECT**

Operated by  
CDM and Associates

Sponsored by the U.S. Agency  
for International Development

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International Science and  
Technology Institute, Inc.;  
Research Triangle Institute;  
Training Resources Group;  
University of North Carolina  
at Chapel Hill.

**PROJECT DESIGN AND  
EXTENSION TRAINING  
IN CEMENT STAVE RAINWATER  
CISTERN CONSTRUCTION  
IN TOGO  
VOLUME I**

**WASH FIELD REPORT NO. 172**

**FEBRUARY 1986**

**Prepared for  
the USAID Mission to the Republic of Togo  
WASH Activity No. 176**

213.1 - 86 PR - 6288

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IN CEMENT STAVE RAINWATER CISTERN CONSTRUCTION IN TOGO

VOLUME I

Prepared for the USAID Mission to the Republic of Togo  
under WASH Activity No. 176

by

Carl Lindblad

February 1986

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Contract No. 5942-C-00-4085-00, Project No. 936-5942  
Is sponsored by the Office of Health, Bureau for Science and Technology  
U.S. Agency for International Development  
Washington, DC 20523

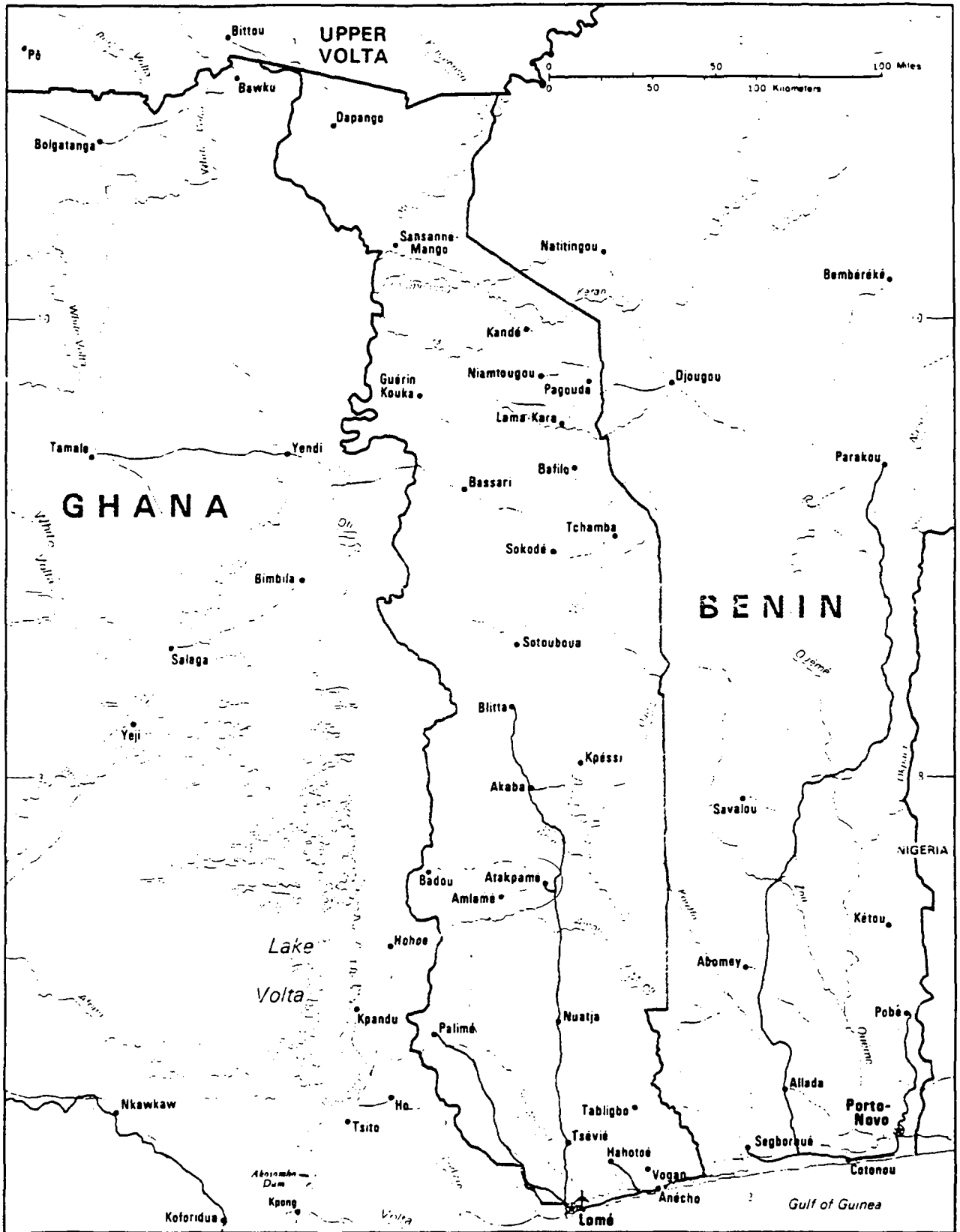
This report, which was prepared for the USAID Mission to Togo, is divided into two volumes. Volume I describes the development and implementation of two training workshops on cement stave cistern and hangar construction. Volume II, in French, comprises a trainer's guide to the Campagne Citerne Workshop as well as a construction manual for the cistern and hangar.

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# Togo



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## EXECUTIVE SUMMARY

At the request of USAID/Togo, the Water and Sanitation for Health Project (WASH) sent a trainer to Togo in September 1985 for an 11-week assignment. The purpose of the assignment was to work with the staff of the Rural Water Supply Project (PSSA) to plan, design, and conduct two, two-week cistern construction and extension training sessions for rainwater roof catchment systems in the Plateau and Savane regions of Togo. The WASH training guide on rainwater roof catchment systems (WASH Technical Report No. 27) was to be used as the basis for this training. These activities launched the new Campagne Citerne (Cistern Campaign) whose two-year goal is to construct 1,500 Benin silo/cisterns and 125 roof (hangar) catchment surfaces.

From September 27 to December 13, 1985, the consultant worked in Togo. Training took place in the Savane Region at Dapaong November 4 to 15 and in the Plateau Region at Atakpame from November 25 to December 6, 1985. A total of 65 trainees participated in the two sessions, including 31 field agents and 34 masons. Eight Togolese PSSA regional officers served as trainers, four in each regional training session.

Strong team spirit and commitment to the project's objectives on the part of the entire project staff were critical to the successful outcome. The training sessions covered a significant amount of material in the areas of village-based education, administration, logistics, and major new construction skills for both masons and project agents.

This report follows the chronology of the consultancy, as follows:

- Discussions with WASH and in-country preparations for the "Campagne Citerne"
- Planning of Campagne Citerne and designing the training
- Development of the training materials
- Preparation of the training sites and trainers
- Training sessions.

Volume II includes a trainer's guide to the Campagne Citerne workshop and the cistern and hangar construction manual both of which were developed during this consultancy.

Following is a summary of the consultant's recommendations:

1. The training materials, which were co-developed during the consultant's assignment, should be well suited to future cistern workshops, especially if the strongest Togolese PSSA trainers from the first two workshops serve as future trainers. The services of a Togo-based, senior trainer facilitator, from an organization such as INADES, would strengthen the workshops and avoid the greater expense of an expatriate consultant.



2. After the first three months of construction activity, an internal evaluation should take place. Some of the issues that should be evaluated include the effectiveness of the two workshops in launching Campagne Citerne and the need for supplementary training for masons and agents.
3. High-quality cistern construction, paced to achieve the goal of 1,500 by September 1987, will require a well-planned and efficiently managed system of materials purchase and delivery. The project might benefit from hiring additional short-term technical assistants to establish and incorporate this materials supply and delivery system.
4. Future Campagne Citerne training sessions should not exceed the trainee numbers of the first two sessions, that is, not more than 30. If trainee numbers exceed this, it will be impossible to ensure trainee participation or to provide adequate hands-on construction experience for all trainees.
5. The construction training site and the classroom should be in proximity. With only a short walk between the sites, the schedule completely fills ten and two half days. A difficult or long and frequent commute to and from the construction site will waste valuable time for training.
6. Future design adaptations of the cistern should increase the simplicity and economy of its design. Reduced cost and simplified design options might be important to future donor project support and cistern construction in the private market.
7. The management of village treasuries, established with each participating family's 5,000 FCFA\* cistern payment, can provide an important opportunity for community self-development. Strong project support and village-level training sessions are essential to ensure sound management of this resource, which will in turn strengthen the village health committee.
8. The WASH rainwater catchment training guide would be more widely applicable if it were accompanied by material to assist training guide adaptation to local project goals and objectives. The cement stave cistern construction manual would be a valuable WASH publication or training guide appendix, because the cistern is relatively inexpensive and family-sized. Further, necessary materials are readily available in developing countries.

\*FCFA: Franc of the African Financial Community (currency unit, equivalent to 0.02 French franc). During the consultant's visit, 1000 FCFA was approximately \$2.40 (US\$).

## Chapter 1

### INTRODUCTION

The Togo Rural Water Supply Project has been in existence since 1981. The project has two parts, one concerned with well drilling and pump installation, and the other with health education and sanitation. Overall, it has been a successful project, with approximately 75 percent of the handpumps in operation. Problems that arose in both the eastern prefectures of the Plateau Region and in the Mongo Region were the failure of drilling to produce water and the absence of any alternative water source except rainwater. Some rooftop rainwater catchment schemes have been developed in both regions. In the Plateau Region, individual home systems have been installed in some villages, but they are not well protected and are inadequate for much of the dry season because of evaporation. Not all villages and not all homes have them. In Mongo, one demonstration system was installed in a school during a workshop in 1983. In 1982, a WASH consultant suggested the construction of an open-air multipurpose village building (in French a hangar) which could be used for roof catchment. Recently, it has been suggested that the Benin silo cistern be used in conjunction with this structure.

#### 1.1 Scope of Work

- A. A WASH trainer will work closely with Togolese co-trainers during eight weeks to train two groups of Togolese sanitarians and social extension agents in the techniques of constructing hangars, guttering, drains, and Benin Silo cisterns.
- B. During the period September 22 to November 17, the trainer will accomplish the following:
  - Four to five days of preparation in the United States, including a detailed review of the WASH rainwater catchment trainer guide (WASH Technical Report No. 27) and a one-and-a-half day preparation meeting at WASH
  - Two weeks of preparation in the field, during which the WASH training design will be modified to suit the hangar and the Benin silo cistern and Togolese co-trainers will be prepared
  - Two, two-week joint training sessions with Togolese co-trainers
  - One week of review and revision between sessions
  - One week of evaluation and review and helping the Togolese co-trainers to prepare for a third training session during the final week.
- C. For this effort, the WASH trainer will collaborate closely with AID Washington's Bureau for Science and Technology (S&T/H), USAID/Togo, and field staff.

- D. Upon arrival in Togo, the consultant was informed by the USAID project officer that the assignment needed to be extended to December 15. This change resulted from the later than originally requested arrival of the WASH consultant and the consequent rescheduling of the planning and training sessions. These changes provided four weeks of program and training design and materials preparation prior to one week of site preparations for the first training session. (See Appendix A, "Consultant Itinerary.")

## 1.2 Planning Phase

The planning phase of the consultancy, which began in the WASH office and continued in Togo, involved programming Campagne Citerne and then designing the training and the training materials and cement-stave cistern and hangar construction manual. Campagne Citerne is a subproject of the Togo Rural Water Supply Project (see Appendix B). Its goals are to construct 1,500 Benin silo/cisterns and 125 roof (hangar) catchment surfaces in 27 villages which had dry wells and no other close-by source of drinking water. These programming and planning activities took place in Togo over a period of four weeks, from the arrival of the consultant in country until the week of the first training site preparation.

### 1.2.1 WASH Meetings, Arlington, Virginia, September 10 to 17, 1985

Dr. Raymond B. Isley, Activity Manager of the consultant activity to USAID-financed Togo Rural Water Supply Project, or Programme de Developpement Socio-Sanitaire (PSSA), was responsible for coordinating consultant preparations and briefing prior to departure. These took place principally during meetings held on September 10 and 17. On September 10, discussions included a lengthy telephone conference with Paul Guild, outgoing Togo-USAID PSSA Project Officer, and A. Malina, PSSA Technical Adviser in Togo. The teleconference focused primarily on cistern design adaptations, construction training preparations, community organization, cistern recipient criteria, and the intended number of trainees.

The 90 project villages which are "dry" (where well-drilling has not found water) are the eventual target of Campagne Citerne, although these cannot all be included in the first phase ending in mid-1987. The goal of the Campagne Citerne is to provide a minimum of five liters of water per day per person in 27 dry villages. Funds are allocated to build 1,500 cisterns by mid-1987, to contract and train 45 to 50 PSSA technicians, 40 masons and 10 carpenters hired by PSSA, and four steel workers. At the time of the September 10 teleconference, half of the skilled laborers had not been hired. These PSSA employees were to be hired by the beginning of the first training sessions, and this was in fact accomplished. The anticipated materials cost for one cistern was estimated to be 60,000 FCFA, or approximately \$150.00. The cost to the recipient families had not yet been agreed upon, although maximum recipient participation and co-financing were objectives from the early planning stage.

The second WASH meeting was a full-day briefing by Dr. Raymond Isley, Activity Manager; Sarah Fry, WASH consultant and previous PSSA Technical Advisor; and

Fred Rosensweig, WASH Associate Director for Human Resource Development. Sarah Fry's presentation was invaluable in orienting the consultant to understand and appreciate the history, objectives, and modus operandi of the PSSA. PSSA has established a strong history and reputation for combining community organization, health education, and improved water supply technologies toward the goal of reducing water related health problems. A strong sense of purpose exists among the PSSA Togolese and expatriate staff, stemming from the enduring PSSA objectives of community organization, community participation in decision-making, community education, and village-level skill training. PSSA staff believe this community-empowering orientation is the principal aspect of the project's strength in effecting improvements in the client communities it serves. Ms. Fry, like Mr. Guild and Mr. Malina in the earlier teleconference, provided clear indications that the cistern training would be designed to reflect these PSSA community and participatory approaches, which was to prove refreshingly accurate in the following weeks.

#### 1.2.2 Preliminary Discussions in Togo (September 27 to October 6, 1985)

On arrival at the Lome, Togo, airport on September 27, the consultant was met by Messieurs Guild and Malina. Two hours of preliminary briefing and discussions commenced regarding the scope of work. The consultant was informed that the consultant period requested had been expanded from a November 17 end date to December 13, 1985, due to later-than-requested consultant arrival, expanded cistern program design and preparation time, and consequently later dates for the training sessions.

The first full week of the consultant's assignment commenced with meetings of introduction and work plan discussions in the Lome offices of Mr. T. Ourou-Bawinay, National Coordinator of PSSA, and Mr. E. Papp, Senior Project Officer, USAID/Togo. The consultant's scope of work was enlarged to include an advisory/facilitator role in the project planning session in Atakpame, which took place October 7 to 9.

On Tuesday, October 1, Mr. Malina and the consultant traveled by road to Atakpame, Plateau Regional Headquarters, the intended cistern training site. (See Figure 1.) There, after an introductory meeting with PSSA Regional Director Mr. Y. Kitoglo, a four-day working session began. The objective of the session was to prepare for the upcoming Campagne Citerne planning and training design meeting involving participants from both the Plateau and Savane regions of PSSA. Participants in this pre-planning session included the consultant, PSSA technical advisers Mr. Maline, D. Laughter, G. Rosseau and Peace Corps Volunteers (PCV) attached to PSSA, L. Obrien and R. Deutsch.

The consultant became actively involved in helping to resolve numerous programming questions, including: the final cistern design adaptations; the specific responsibilities of the cistern recipient, masons, and extension agents; and the logistic requirements for construction material purchase, delivery, regional and in-village storage. Most of these issues required considerable study, discussion, and group consensus before the training materials could be developed.

The working group made field visits to the two different village sites of pilot cistern construction which had been technically supervised by PCV R.

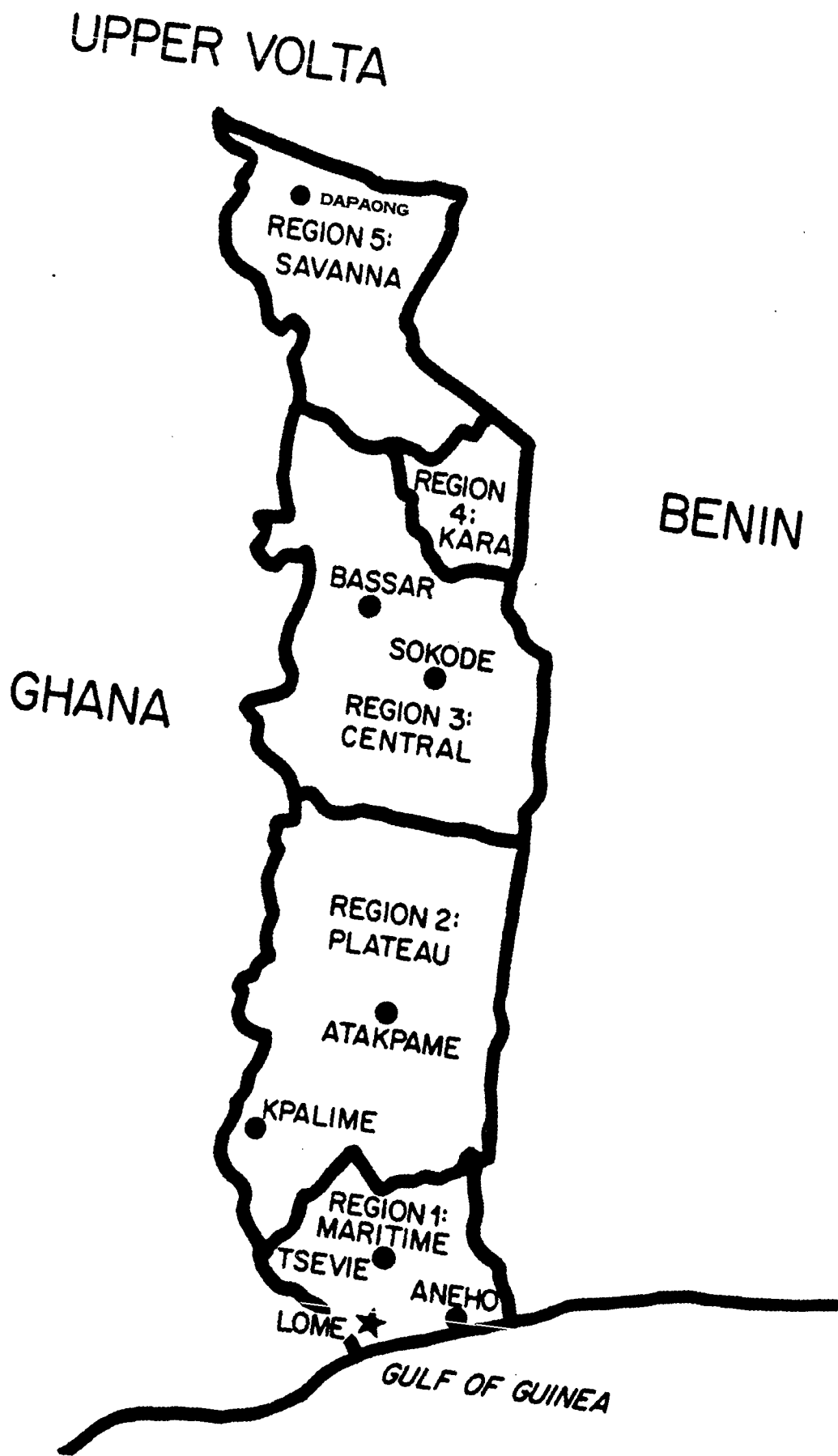


FIGURE 1. REGIONS OF TOGO

Deutsch. Both pilot construction sites appeared to have been well designed and well constructed, although two of the nine cisterns constructed had significant water leakage, apparently from the joint of the cistern floor slab and wall. The reason for this leakage could not be determined.

The maintenance needs of the foul-flush mechanism were also the subject of several discussions. It was agreed that it would be much less costly and less complex to substitute a manual foul-flush option for the automatic foul-flush mechanism. It was also agreed, however, that the first phase of construction would proceed with the automatic version (see Volume II, page 14, Construction Manual). The consultant suggested that the first cistern construction evaluation should assess this design feature and investigate possible options, especially in view of the automatic foul-flush system's performance and the opinion and experiences of the initial cistern recipients.

The cultural feasibility of communally owned and managed cisterns was also the focus of discussion. The group agreed that family ownership of cisterns would be more culturally viable than village or communal ownership, because it would help ensure proper maintenance and equitable, viable water rationing from the cisterns.

### 1.2.3 Project and Training Planning Session, Atakpame (October 7 to 9, 1985)

The PSSA national planning meeting for the fourth quarter of 1985 and for the year 1986 took place in the Atakpame Social Affairs offices. Twenty-eight agents from the Social Affairs, Sanitation, and Hydraulic Services participated in the initial three-day exercise. The roundtable type discussion included the PSSA national coordinator, PSSA regional coordinators and regional supervisors, and ranking officials from national and regional offices of the Sanitation and Hydraulic Services. Also participating in the roundtable discussions were three PSSA technical advisors, three Peace Corps Volunteers attached to PSSA, and eight Savane and Plateau Region field agents from the Sanitation and Social Affairs Services. The meeting's agenda included:

1. Solving of problems highlighted by the pilot cistern evaluation
2. Logistics of the cistern training
3. Major aspects of planning for the cistern training
4. Planning PSSA activities for the fourth quarter 1985
5. Financial planning component of 1986 PSSA activities.

The official meeting report, including the participant list and detailed reports on the five areas of the agenda constitutes Appendix C of this report. Briefly, the five points of the agenda were addressed as follows:

#### Solving of Problems Highlighted by the Pilot Cistern Evaluation

The entire delegation visited the pilot cistern construction site at the village of Kougnohou. Much discussion was centered on the cause and possible remedy of the water leakage at the base of the cistern wall, apparently where

the wall joins the foundation slab. Apart from this consideration, the delegation was impressed with the cistern and hangar (roof) design and construction.

Discussions following the delegation's return to Atakpame focused on the various causes of delays in the pilot construction. Suggestions included: improved supervision of mason teams; reduced delays in materials delivery; more clearly defined supervisory roles; and an improved village education campaign, especially concerning village labor contribution and its responsibilities in Campagne Citerne.

To avoid the problem of leaking cisterns in future construction, the Hydraulic Service recommended that a 2 cm deep channel, the same shape and dimensions as the cistern wall, be made when pouring the bottom slab of the cistern. The wall bricks (staves) would then fit into this slot to form a more watertight bond with the foundation. This design change was adopted and used during the two subsequent training sessions and will be the design used in future PSSA construction.

#### Logistics of the Cistern Training

The construction skills aspect of the training was accorded priority due to the precision and accuracy needed to construct the cistern. It was recommended and accepted that construction skill training be accorded more than half of the total training time. It was decided that training participants would be PSSA masons and PSSA field agents. Topics to be discussed simultaneously with masons and field agents would be: cistern construction techniques; planning and organization of work sites; management; and accounting of construction materials, village extension, supervision, and hierarchical responsibilities. Agents would receive separate training in village resource assessment and censusing; cistern and hangar emplacement; work records; village-level education for health committees, for cistern use and maintenance; and for work site management and evaluation.

The number of training participants for the first Savane Region training (November 4 to 15) was set at 14 masons and 10 field agents from "dry" villages. The date of the second training in the Savane Region, where there are more dry villages than in the Plateau Region, would be determined in December 1985. The Plateau Region training was scheduled for November 25 to December 6, 1985, to include 14 masons and 14 field agents from "dry" villages.

#### Major Aspects of Planning for the Cistern Training

The major strategy adopted for Campagne Citerne includes the following aspects:

- a. Construction of cisterns around already existing private and public buildings is the first priority, followed by construction of community hangars and associated cisterns.
- b. Each family group has the option of one cistern per 5 to 10 members of two cisterns for family groups with 11 to 20 members.

- c. Lengthy discussions were held concerning whether the cistern for a family with no tin roof could be attached to a neighboring roof. It was agreed that such a decision would be made on a case-by-case basis and only after each village census had been completed.
- d. The first work site in each village would be a community hangar and four cisterns. This approach would serve to train unskilled village laborers in the various phases of construction work.
- e. Villages to receive cisterns would be chosen following criteria previously established. Essentially these include villages which are "dry" after unsuccessful PSSA well-drilling attempts, where existing water supplies are distant and where the village is actively interested in and cooperative with PSSA organizational work.
- f. The logistics of selection and work organization would be determined in each village after the village census study has been completed.
- g. A Regional Commission would make decisions after the village census study regarding the acceptability of existing roofs for cistern emplacement.
- h. Contracts would be signed by cistern recipients before construction work began. To ensure continued full participation of all village-furnished laborers, those cisterns located around community hangars will not be assigned to specific families until the completion of all construction work in that village.
- i. Each family group receiving a cistern would contribute 5,000 FCFA (\$12.50 approximately) per cistern, which would be deposited in a village treasury specially created to ensure a supply of cistern repair parts and tools. Cistern recipients would then be able to purchase necessary cistern maintenance supplies from the village supply, which will be restocked with sales proceeds. Additional objectives of the 5,000 FCFA recipient contribution are to strengthen the sense of ownership and maintenance responsibility; to encourage community spirit and to permit the villagers to undertake and self-finance community development projects with the surplus money. Villages will be encouraged to increase their treasury with such money-raising projects as community fields.
- j. It was decided that sand and gravel for cistern construction would be provided by the recipient. PSSA would, when needed, provide transport for the sand, gravel, and water needed for construction and would provide all purchased nonlocal materials.

### 1.3 Preparation of Training Materials (October 7 to 25, 1985)

The first day of the planning meeting, the consultant began preparing lesson plans with six field agents from the Social Affairs and Hydraulic Services in



both PSSA regions. These six agents, who later served as trainers in their regional training, were:

- D. Agbagnon, Sanitation Service, Plateau
- K. Welengueti, Sanitation Service, Savane
- K. Gblokpor, Social Affairs, Plateau
- M. Dagbenyo, Social Affairs, Plateau
- K. Sankaredja, Social Affairs, Savane
- K. Djabey, Social Affairs, Savane

A. Eдорh, Regional Chief, Plateau Sanitation Services, also served as a trainer although he was unable to participate in lesson planning because, at that time, he traveled to France for a water supply workshop. M. Isaka, Regional Chief of Savanes Sanitation Service, joined the lesson planning group after the conclusion of the PSSA planning meeting and also served as a trainer in his region. At the conclusion of the PSSA planning session, the remaining participants joined in preparing lesson plans.

#### 1.3.1 Cistern and Hangar Construction Manuals

There had previously been no construction manual for the PSSA-model cistern and hangar; there were only rough drawings and a basic construction guide for a modified variation of the cement-stave cistern, developed earlier by Peace Corps Volunteers in Togo. The resultant draft construction manual is in Volume II. Plans exist to update and reprint the construction manual in the coming months, based on experiences from application in training and field construction.

The members of the construction manual subgroup were D. Agbagnon, R. Deutsch, K. Welengueti, M. Issaka, G. Rosseau, A. Maline and K. Tomfaya. They collectively designed illustrations for major construction steps of the cistern and hangar and drafted and produced step-by-step instructions for the construction manual. The subgroup developed training plans to permit two simultaneous training sessions to complete each step of the cistern and hangar construction in two weeks. Two simultaneous training sessions were determined necessary due to the large number of trainees and the need to ensure hands-on experience for each trainee. The resultant construction skill training schedule was used in both trainings. Only minor changes were incorporated in the second training session schedule, based on the experience of the first training session. The schedule required preconstruction of the foundation slab of one cistern and resulted in two complete cisterns and one hangar (see Appendix C).

#### 1.3.2 Management, Accounting, and Supervision

Members of this subgroup were: PCV L. Obrien, facilitator; T. Ouro-Bawinay, Y. Ketoqlo, T. Tchacondo, and T. Madjome. This group identified three training sessions, which involved developing mutually accepted management and accounting procedures as well as defining the training objectives, session content, and skill training exercises. These resultant training sessions are as follows:

- A. Management of the training site: record-keeping for masons, PSSA field agents, and construction materials storekeepers
- B. Requisition of construction materials:
  - Material needs of the hangar
  - Material needs of the cistern
  - Requisition procedures
- C. Campagne Citerne management system
  - Record-keeping
  - Materials requisition
  - Supervision
- D. Village storekeeper training
  - Training the agent to be trainer
  - Agent as trainer.

On the basis of trainee feedback during the first training session, it was concluded that the volunteer village storekeepers would need skills training in the use of the standardized record-keeping procedures and forms developed by PSSA. To attain the goal, an additional management training session was developed (and used in both trainings) whereby the agents were trained to use the storekeepers' recording system. Then the agents became the trainers as the masons were invited to participate as storekeeper trainees. The recording system — a simple double-entry ledger — was unfamiliar to many agents and most masons. The exercise resulted in skill training both masons and agents in double-entry record-keeping, and improved agent skills as trainers.

### 1.3.3 Community Extension

This subgroup included K. Gblokpor, K. Sankaredja, K. Djabey, and M. Dagbenyo. Progressing from the work completed in the two-and-a-half previous days to develop lesson topics and objectives for community extension, the subgroup developed the following seven training sessions and lesson plans:

- a. Introduction to the Campagne Citerne training
- b. Campagne Citerne, an overview of the project
- c. Responsibilities of all Campagne participants: villages, village health committees, masons, field agents, and supervisors
- d. The village health treasury and cistern recipient contracts
- e. Village census and resource assessment
- f. Village extension to prepare for and support Campagne Citerne
- g. Village-level public health training for Campagne Citerne.



## Chapter 2

### TRAINING SESSIONS

Both training sessions followed basically the same schedule and, with few exceptions, followed the lesson plans as prepared (Appendix C). Trainees and trainers alike agreed that the objectives of the training had been met. No summation seems more pertinent, however, than the trainee commentary that "we won't know how well we learned here until we apply it in the villages."

#### 2.1 Training Objectives

The training objectives developed by a consensus of the work group are, for field agents:

- a. To study and practice the community organization exercises to prepare for and support Campagne Citerne
- b. To practice the planning exercises necessary for cistern and hangar construction, material needs calculation and requisition, and programming and managing laborers and construction materials use
- c. To practice each step of cistern and hangar construction.

Those for masons are as follows:

- a. To practice and complete each step of construction for the hangar and cistern
- b. To teach village laborers (represented by the field agents during training) the various skills needed in their role as construction aides
- c. To practice record-keeping in the PSSA masons' notebook to record their work schedules material use.

#### 2.2 Participants

The originally planned number of participants in each training session was 24 (14 masons and 10 field agents) in the Savane Region and 28 (14 masons and 14 field agents) in the Plateau Region. In fact, the trainees totaled 32 in the Savane Region (12 field agents and 20 masons) and 33 in the Plateau (19 field agents and 14 masons). This larger total number of trainees was generally workable, although it stretched to capacity the construction training and limited the amount of individual hands-on skill-building experiences. It was widely agreed that future training groups should not be larger than 30 trainees. The field agents and sectoral agents who participated are responsible for "dry" villages named as the first-phase construction sites, or villages which will be included in the second phase of construction.

Approximately half of the masons had been newly hired by PSSA before they began the training. As such, they were unfamiliar with PSSA procedures, concepts, and terminology, which required that they receive a more basic orientation to major elements of PSSA activities. Approximately one-third of the newly hired masons were functionally illiterate, even though literacy had been a PSSA recruitment criterion. It was impossible to fully include illiterate and semi-literate masons in the record-keeping exercises, and the construction manual was of little use for them. Nonetheless, with coaching from agents and other literate masons, all mason trainees participated actively in the training sessions. The majority of field agent trainees had been through at least one previous PSSA skill training workshop. Participation in training workshops is apparently considered favorably; this positive feeling about PSSA training sessions proved helpful in predisposing field agent trainees to be cooperative and optimistic.

### 2.3 Training Site Preparation

One week's preparation time was allotted before each training. Trainers from each region were allotted two working days to prepare the training sessions for which they were responsible. The core training support group worked the entire week preparing the construction site, training session logistics, session posters, wall charts, and handouts.

The core training support staff included A. Malina, who provided overall coordination and planning; R. Deutsch, Construction Training Director; L. O'Brien, PCV Management Training Director; and the WASH consultant, who acted as training facilitator.

Preparations for the first training (at the Dapaong Social Affairs conference facilities) progressed with few difficulties. Irregular and inadequate water supply and initially inadequate water storage capability, however, hampered the first days of construction preparation and training. This situation was resolved after the training sessions completed a provisional cistern model for storage of construction water at each village. This water supply problem emphasized the importance of adequate water supplies for construction in each recipient village. The availability of the cistern truck from the Sanitation Service was and will be a crucial element in enabling construction progress, because much construction will take place in the dry season when water near the village will be scarce.

During the training preparation week before both trainings, the WASH consultant worked individually with each regional and core-staff trainer. This exercise included a review of the lesson plan, necessary lesson preparations, wall charts, and handouts. Then a trial-run session was conducted with the trainer presenting each of his sessions to other trainers, who acted as sit-in trainees and who afterwards offered constructive criticism. Some of the trainers were more experienced, having served as trainers in previous PSSA sessions. This previous experience made the exercise useful for improving the lesson plans and demonstrating training skills, sharing ideas, and sharpening training skills.

Construction preparations for the second training, in Atakpame, went through major last-minute changes when it was decided that future office and dormitory

construction plans conflicted with the intended and already commenced work for the cistern and hangar location. As a result, on Thursday late afternoon, the site was moved to another space, whose advantages include being in easy sight of the main road through the town. As a result of long extra hours and hard work, typical of the PSSA team, the task was accomplished in time for the opening of training the following Monday morning.

## 2.4 Logistics

Both training sessions took place in the regional social affairs facilities, the first in Dapaong and the second in Atakpame. In both cases, the classroom training sessions were conducted in a large conference room furnished with portable chairs and tables whose arrangement was altered for small group and full group sessions. Illustrations, charts, and session notes were taped to available wall surfaces and rearranged as needed.

The training facilities at the Atakpame Social Affairs office are large and suitable except that they are physically surrounded by activity and interruptive noise, especially including the large daily meetings for mother-child health monitoring and food distribution which take place in the immediately adjoining open-air meeting space. Moreover, the Atakpame Social Affairs office is an active one, daily receiving frequent telephone calls, messages from Lome and elsewhere. As a result, there were frequent daily requests for both trainers and trainees to come to the telephone or to participate in some other official activity. This understandable conflict was frequently commented on by trainers, who agreed that it would be better to use other, more isolated facilities, such as Palime, for future trainings.

The construction site for both training sessions was on a vacant space adjacent to the Social Affairs center. A bias exists to perform construction exercises in a village setting to incorporate typical work environment conditions in the training sessions. With 30-plus trainees and the need to go daily, sometimes more than once, to and from the construction site to the classroom, however, it would have been extremely difficult to manage transport logistics to a nearby available site. Moreover, it would have dramatically reduced the time available for actual training activities. In addition, it was useful to construct a model of the cistern and hangar near both regional PSSA offices, where public interest — which was considerable during the training sessions — can be channeled for educational purposes.

The construction training sessions were divided into two sections with a mix of masons and field agents. This arrangement was intended to permit more hands-on experience for each trainee and to permit each trainee to be able to see and hear what was going on. For the needs of the construction sessions, the subgroups still proved a little too large to permit efficient monitoring of all trainees' progress.

## 2.5 Training Staff

The training staff for the two regional sessions included seven trainers, three of whom were core staff and served as trainer-coordinators for both training sessions. The WASH consultant participated actively in both training

sessions as facilitator and assistant to the trainers but did not act as the lead trainer in any session. This arrangement was decided upon to maximize training skills development among the PSSA agent trainers, some of whom had served as trainers in several previous workshops. Less-experienced trainers generally received more lesson preparation assistance and in-session training back-up.

Construction trainers in the Savane Region had had little or no previous experience in constructing the cement-stave cistern, because the pilot construction had been in the Plateau Region. These trainers were thus at a disadvantage during some of the key skill training exercises, and this put more responsibility on the lead trainer, PCV R. Deutsch, and the core training staff.

The regional training staff were chosen (prior to the consultant's arrival) by the regional PSSA officials. Trainers were chosen based on previous experience and perceived ability. The core training coordination staff were the PSSA water resources technical advisor and the two Peace Corps technical specialists in construction and management.

The WASH consultant was pleased with the trainers' performance and cooperation in both training sessions and was especially impressed with the dedication, competence, and hard work of the core training staff. A complete list of both sessions' trainers and their respective classes is found in Appendix B, Volume II.

## 2.6 Two-Week Session Schedule

The exact session schedule varied somewhat between the first and second session because of variations in both construction progress and classroom discussions. The schedule for training in construction of the cement-stave cistern must dictate the timing of the whole schedule because of such considerations as the curing time of the bottom and top slabs of the cistern. This also means that the cistern wall can only be raised after a minimum of three days' curing of the bottom slab.

The original schedule designed in the planning sessions had all construction hands-on training occurring in the afternoon and classroom work in the morning when trainees would presumably be more mentally alert and energetic. Almost unanimous reaction of the first workshop trainees, however, preferred morning construction work, when the temperature was considerably cooler. This trainee suggestion was adopted and proved to be a practical one. A breakdown of the overall session schedule is found in Appendix C, Volume I.

## 2.7 Trainee Evaluation

During both the Savane and Plateau regions training workshops, there was a mid-course verbal evaluation and a final written evaluation. The mid-course evaluation was helpful in identifying the areas of construction skill training which had been most difficult for the trainees to master. This resulted in review work especially in cistern and hangar layout and the use of the water



Photo 1. Trainees pouring the reinforced foundation of the cistern.

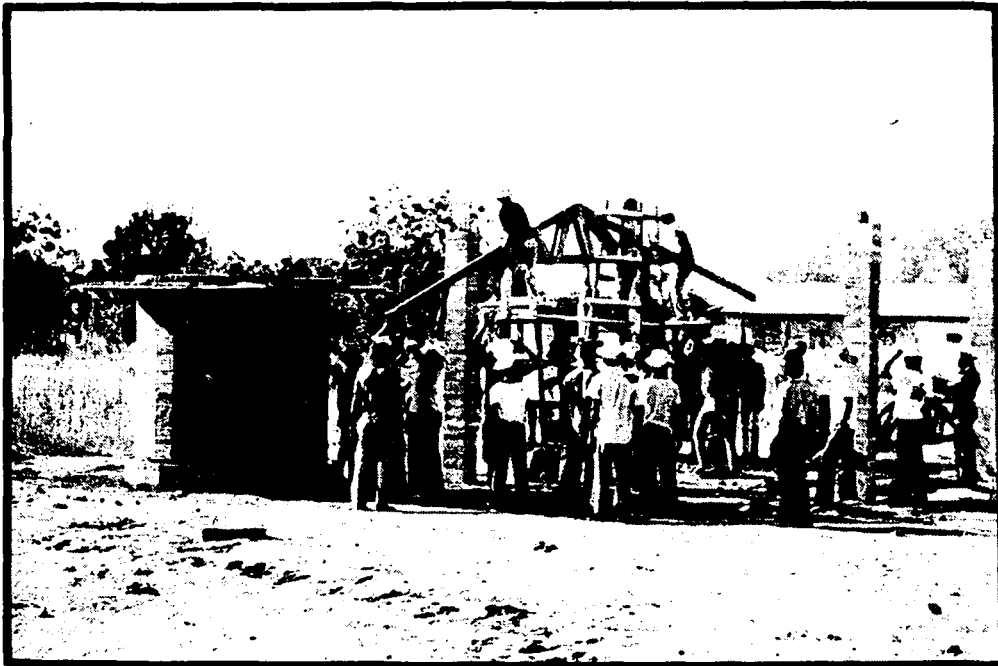


Photo 2. Trainees hoist the roof beam atop reinforced pillars to build the catchments hangar.





Photo 3. Trainees raising the walls of the cement-stave cistern.

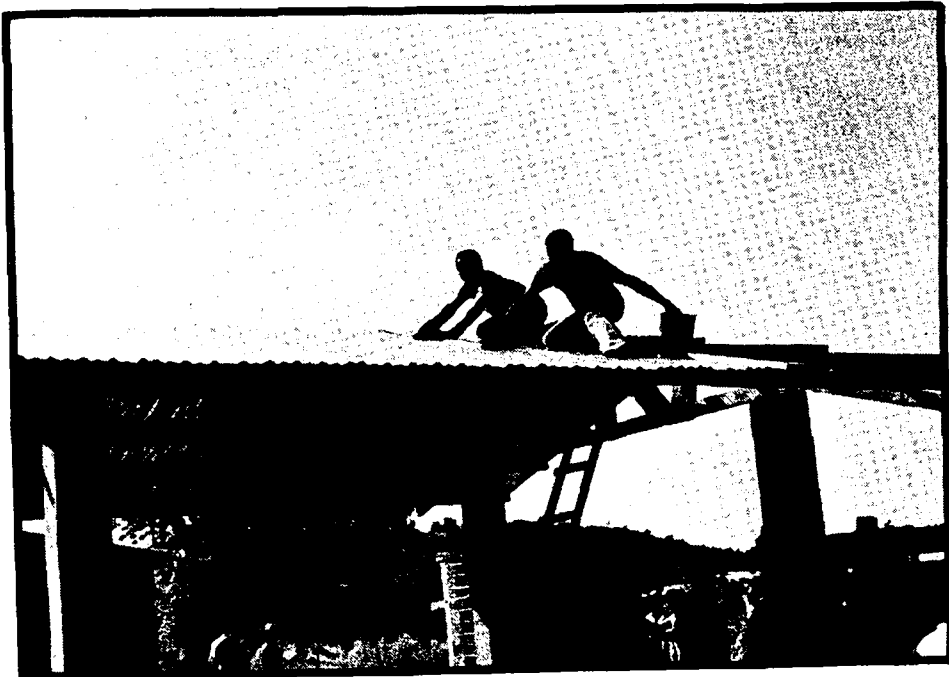


Photo 4. Trainees nailing the roofing on the water catchment hangar.



Photo 5. Trainees hoist the formwork to pour the cistern's cover slab in place.



Photo 6. Trainees cementing the cistern drain and faucet.



Photo 7. Trainees removing the wooden form work from under the cistern's reinforced cover slab. Partially completed catchment hangar above.



Photo 8. Trainees beginning to apply the exterior layer of mortar to the cistern.

leveling device. Both mid-course and final evaluations were positive regarding the handling and mastery of classroom sessions and hands-on skill training.

Several trainees from both workshops suggested that the training was too short and that the first week was exhausting. Trainers also agreed in their evaluations that the workshop was intense and could possibly be extended a few days. The WASH consultant believes that two weeks is about the maximum time which can be justified to take from field agents' schedules and that it would be difficult to maintain the human energy required of both trainers and trainees for any period much longer than two weeks. It is highly advisable to develop a two- or three-day training review workshop after the first evaluation, which is recommended two or three months after construction work begins in the village.

## 2.8 Evaluation of WASH Workshop Design for Rainwater Roof Catchment Systems

As stated in the introduction, the training guide was designed to equip local project promoters with the skills to use the steps and techniques to identify and undertake a RWCS project in communities in developing countries. The training guide covers a broad range of environmental resource and technology options in order to serve as an introduction to cistern project development in the broadest possible circumstances. Any local use of the training guide where the cistern project is already defined and project funding commitments made, would require selective and adaptive use of the contents. Before training to promote RWCS can effectively commence, management officers need to assess the specific goals and objectives which are to be achieved through the training and the follow-on field work of the trainees. These specific objectives vary between projects and regions, and it is critical that the local objectives be examined before the training guide (or any general approach training guide) can be adopted for local use. In an already formulated cistern project it can rarely be wholly adapted. By its nature, it must be adapted to the local objectives, needs, and resources. Almost no adaptational guidance, however, is provided in the training guide which may limit its use to senior trainers.

To illustrate some of the areas where adaptation was needed, few field agents in the Togo/PSSA, other than the higher-ranking supervisors, are empowered to undertake such a broad scope of responsibilities as those addressed by the WASH RWCS training guide. In the Togo/PSSA, much of the general resource inventory and especially the technology options had been reviewed by regional supervisors and technical advisors. This was a necessary step in securing funding support for the training itself and for the construction assistance at the community level. In fact, the first pilot test of the RWCS training guide was in the Togo/PSSA in 1983 and undoubtedly served to advance the project's focus and planning, especially through the review of technology options and technical considerations in project planning and development.

The project's goal of 1,500 standardized cisterns constructed over the next two years requires that a strong foundation of analysis and project planning be completed before beginning the training. The options and resources which could be anticipated in each community needed to be largely known before the first day of training. In the interests of construction quality and efficiency, a standard cistern model had been chosen, based on cost and available resources. The cistern model entails a very specific list of local

and nonlocal construction materials and a significant variety of new construction skills for the masons and extension agents. The system for procurement, transport, and storage and accounting for the construction materials had been carefully planned based on the existing accounting and administrative procedures of the PSSA. Such preparations were essential and necessarily standardized the procedures which were to be followed by all agents, masons, and regional supervisory personnel.

Thus, the training needs of PSSA were specific regarding the:

- Cistern model, the cement-stave cistern which is not included in the WASH training guide
- Management and community extension functions and procedures, which were necessarily derived from the PSSA structure and the competence levels of the agents and masons and their organizational responsibilities.

The committee development process of planning the project operations and the training was an invaluable feature of the chain of events leading to and including the training. This same committee leadership, structured problem-solving approach is central to the operation of Togo/PSSA and one which it promotes in the communities it serves.

For the needs of the PSSA, the RWCS training guide adaptation process is not given sufficient detail either in the introductory sections or in the body of the text. It would require relatively little additional material to add an overview chapter to provide general stepwise guidance for local officials in identifying their own project goals and objectives.

It is a demanding process of conceptualization to formulate the objectives of a project and the supporting information and skills needed to enable project agents to reach those objectives. It is critical that this conceptualization of project and training objectives be the first step and that it precede adaptation of the existing WASH training guide. To this end, I suggest that an overview and user's adaptation guide be added to the WASH training guide. Such adaptation aids would:

1. Provide an overview of the responsibilities and provisions which may need to be made in the process of planning a RWCS and supporting training
2. Briefly explain the conceptual role of each chapter in the training guide and instruct the user regarding the possible adaptations of the chapters
3. Present appended examples of the training guide as adapted for actual use in different regions and circumstances.

This preparation and adaptation process would also serve to complete all possible pretraining, village-level resource assessment and decisions regarding the focus of agents' project activities. It might also focus the training to reduce the amount of materials to be covered during the training time. As it stands, the WASH training guide covers a range of material so

broad that it is difficult to ensure skill mastery from the 19 sessions in the two weeks allotted.

The addition of appended course materials, guides, and comments from its actual applications could be useful as a model of how the training guide can be adapted in different situations. It is recommended that the cement-stave cistern construction manual be made available through WASH, perhaps as an appendix to the WASH RWCS training guide. It is a relatively inexpensive, large volume cistern (6 m<sup>3</sup>), whose potential applications are promising.



## Chapter 3

### RECOMMENDATIONS

The following recommendations principally concern future program considerations for Campagne Citerne. These recommendations were developed in collaboration with the training staff and USAID PSSA project officers.

#### 3.1 Future Use of the Campagne Cistern Training Guide

The training materials, which were co-developed during the consultant's assignment, should be well suited to future cistern workshops, especially if the strongest Togolese PSSA trainers from the first two workshops serve as future trainers. The weaker trainers might be replaced with selected trainees from the first two workshops. For future workshops, it will be unnecessary to bring in a consultant senior trainer if a suitable Togo-based trainer facilitator can be found by arrangement with an organization such as INADES/Togo. Practice and constructive feedback are critical for further improvement of PSSA agents' training skills.

#### 3.2 Project Monitoring

After the first three months of construction activity, an internal evaluation should take place. Some of the issues which should be evaluated include supplementary training needs for masons and agents; village acceptance and involvement; construction materials and equipment supply; and design adaptations of the cistern to existing village buildings. Future training sessions should be adapted to reflect these findings.

#### 3.3 Campaign Logistics Requirements

High-quality cistern construction paced to achieve the goal of 1,500 by September 1987 will require a well-planned and efficiently managed system of materials purchase and delivery. Delays in purchase and inefficient delivery will unavoidably delay the village-level construction and jeopardize construction quality. On the basis of numerous past problems in materials procurement, the project might benefit from hiring additional short-term technical assistance to establish and incorporate efficient materials supply and delivery system.

#### 3.4 Training Session Participant Members

Future Campagne Citerne training sessions should not exceed the trainee numbers of the first two sessions. With 30 to 35 trainees, it is difficult to ensure adequate hands-on construction experience and full participation of all trainees. If trainees exceed 30 to 35, the quality of the training will certainly be jeopardized. A larger trainer total would necessitate the addition of a third small group for construction skill training, would



increase training staff members, and would create major logistics and scheduling problems for the construction site.

### 3.5 Training Site Location

The construction site and the classroom training site should not be more than a few minute's distance from each other due to the lengthy and involved construction skill training and the limited time for classroom sessions, which are equally important. Long commuting time between classroom and construction site will reduce the available training time. As scheduled, the training time completely fills two weeks (ten full days and two half days).

### 3.6 Future Adaptations of the Cistern Model

Future design adaptations of the cistern should increase the simplicity and economy of its design. Reduced cost and simplified design options might be important to future donor project support and cistern construction in the private market.

### 3.7 Village Treasury Management and Support

The management of village treasuries, established with each participating family's 5,000 FCFA cistern payment, can provide an important opportunity for community self development. Mismanagement of the village treasury will have equally important consequences. Strong project support and village-level training sessions are essential to ensure good management of this resource, which will in turn strengthen confidence in the village health committee and the project in general.

### 3.8 Adaptation Guidelines for WASH Rainwater Catchment Workshop Design

The WASH training guide would be more widely applicable if it were accompanied by additional material to assist local project goal identification and subsequent adaptation of the training guide to local project goals and objectives. Appended course outlines from actual WASH training guide adaptations would be helpful to show users possible training guide applications based on local needs. The cement-stave cistern construction manual would be a valuable WASH publication or training guide appendix, because it is relatively inexpensive and family-sized, and the necessary materials are relatively available in developing countries.



Photo 9. Trainees and trainers of the Atakpame, Campagne Citerne Workshop (Plateau Region).



Photo 10. Trainees and trainers of Dapaong Campagne Citerne Workshop (Savane Region).



APPENDIX A  
Consultant Itinerary



### Work Itinerary

9-10-85 P.M. Meeting with Dr. R. Isley  
Discussions re terms of reference  
Telecon to P. Guild, USAID/Togo PSSA Project  
Officer, and A. Malina, Technical Adviser,  
PSSA  
Discussion re training dates, site, trainees,  
cistern model and arrival date

9-17-85 A.M. WASH briefing  
Dr. R. Isley: overview of WASH and scope of  
consultancy  
Ms. S. Fry: history of PSSA and assignment  
Dr. R. Isley: understanding the client  
Mr. F. Rosensweig: goals of the consultancy,  
work plan and adoption of the WASH Rainwater  
Collection Manual

9-26-85 Depart Washington, D.C.

Fri 9-27 Arrive Lome, Togo

Sat 9-28 Informal briefing by P. Guild, USAID and A. Malina,  
PSSA

Sun 9-29 Weekend

Mon 9-30 9:30 a.m. Meeting with Mr. Ourou-Bawinay, National Coordinator  
of PSSA/USAID  
Discussions re introduction of consultant,  
scope of work, work calendar, training or-  
ganization

11:00 a.m. Meeting with E. Papp, USAID Senior Project Officer  
Discussions re introduction of consultant,  
terms of reference, schedule of work, USAID  
financing, cistern design, village labor and  
financial obligations as cistern recipients

3:00 p.m. Meeting with Mr. D. Kefou and K. Assingbou, Hydraulic  
Service Officers  
Discussion re introduction of consultant, de-  
sign and reinforcement of the cement stave  
cistern, training preparations and logistics

Tue 10-1 10:00 a.m. Travel via car to Atakpame, PSSA Regional Center

3:00 p.m. Meeting with Mr. Y. Kitaglo, Regional Director of Social Affairs and PSSA  
Discussion re introduction, project planning, work logistics, training, materials development

4:30 p.m. Meeting with D. Laughter, A. Malina and G. Rosseau, PSSA Technical Advisers  
Discussion re cistern project planning procedure, logistics, and training objectives

Wed 10-2 8:00 a.m. Introduction to Robert Deutsch, construction adviser, and Louis Obrien, management adviser, both Peace Corps Volunteers attached to PSSA  
Field trip to PSSA cistern pilot project villages

9:00 a.m. Village of Okougnohou, Prefecture of Ogou  
Eight 6 m<sup>3</sup> Cement-Stave Cisterns recently built around sheet metal roof cisterns given to the village for communal use by the villagers, who furnished unskilled labor for the cistern construction work.  
Cisterns appear well-constructed although minor leaking is apparent around the base of two cisterns. Reason for leaks not certain.

3:00 p.m. Village of Ezime, Prefecture of Amou  
Single cistern recently constructed at health clinic, furnishing water inside the clinic by pipe. Cistern appears well constructed, no leaks apparent and water clear and clean.

Thu 10-3 AM and PM Meeting with Malina, Laughter, Rosseau, Obrien and Deutsch  
Discussion of project and training, objectives, training organization, design of cistern construction manual, and outlining of hands-on training strategy

Fri 10-4 AM and PM Continuation of 10-3 discussions  
Division of classroom sessions of training into general sections:  
1. village organization and educational outreach approach and content  
2. responsibilities of cistern recipients and PSSA masons and agents  
3. cistern recipient contracts

These initial divisions of the classroom training were agreed upon to serve as focus of the training planning and organization sessions of two following weeks.

10-5/6 Weekend

10-7 8:00 a.m. Full plenary session including twenty-eight participants from the two PSSA regional offices (Savanes and Plateaux) and each of the Togo government services participating in PSSA: Sanitation Service, Social Service, and Hydraulic Service

Discussion was directed by Mr. Ouro-Bawinay, National Coordinator of PSSA. The meeting agenda was:

1. solving problems highlighted by the pilot cistern evaluation
2. logistics of the cistern training
3. major subject areas of the cistern training
4. planning PSSA activities for the fourth quarter of 1985
5. financial planning of 1986 activities

3:00 p.m. Field visit to pilot project cisterns in villages of Okougnohou and Ezime\*\*

10-8 Consultant and seven participants were named to form separate working group to develop training design for community organization. Working group members:

- G. Rosseau - Technical Adviser, Savanes
- D. Agbagnon - Sanitation Service, Plateaux
- K. Gblokpor - Community Development, Plateaux
- M. Daghenyo - Community Development, Plateaux
- K. Sankaredja - Social Affairs, Savanes
- K. Djahey - Social Affairs, Savanes
- K. Welengueti - Sanitation Service, Savanes

10-9/10 Working group continues

10-11 Discussions and planning established: major community organization training session objectives and sessions' content

10-9/10/11 Remaining full working group divides into two additional small groups to develop:

- cistern construction manual and construction training design
- management, reporting and accounting forms, related training objectives and sessions' design

10-12 8:00 a.m. Three working groups report to the whole committee on results of their discussions and planning

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\*\* See entries 10-2.



11:30 a.m. Reporting of each working group, and assignment of  
trainers by session

10-13 Sunday

10-14 Three working groups continue to develop training  
materials by session in community organization,  
management and accounting, construction techniques

10-15 Working groups continue

10-16 Working groups continue

10-17 Working groups continue

10-18 Report of three working groups and drafting of train-  
ing schedule

10-19 Travel to Lome, weekend

10-20 Weekend

10-21 Typing, duplication and collation of training mater-  
ials in National Office of PSSA Coordination, Lome

10-22 Materials duplication continued

10-23 Materials duplication continued

10-24 Materials duplication continued

10-25 Materials duplication continued; collation of train-  
ing manual

10-26 Travel to Lama Kara

10-27 Travel to Dapaong, Savanes training site

10-28 Preparation of training site, construction materi-  
als. Review of each class session with responsible  
PSSA agent trainers, Peace Corps Volunteers and  
Technical Advisor trainers.\*\*

10-29 Preparation continued

10-30 Preparation continued

10-31 Preparation continued

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\*\* See list of trainers by session in Appendix D, Vol. II

11-1		Preparation continued
11-2/3		Weekend
11-4	8:00 a.m.	Beginning of Savanes training for "Campagne Citerne"*
11-5		Training continues
11-6		Training continues
11-7		Training continues
11-8		Training continues
11-9	AM	Field trip to census demonstration village, Dapaong Kpergou, Prefecture Tone
11-10		Weekend
11-11		Training continues
11-12		Training continues
11-13		Training continues
11-14		Training continues
11-15		Final review, evaluation and reception to close training
11-16		Travel to Lama Kara
11-17		Travel to Atakpame, Plateaux training site
11-18		Preparation of Plateaux training site, construction materials and review of each training class session with responsible PSSA agent trainers
11-19		Latrine evaluation planning session
11-20		Preparation of cistern training site and trainers
11-21		Travel to Lome, training materials duplication
11-22		Materials duplication, collation continued
11-23		Weekend
11-24		Travel to Atakpame

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11-25		Beginning of Plateaux training for "Campagne Citerne"
11-26		Training continues
11-27		Training continues
11-28		Training continues
11-29		Training continues
11-30	AM	Field trip to take census of demonstration village, Avedje, Amou Prefecture
12-1		Weekend
12-2		Training continues
12-3		Training continues
12-4		Training continues
12-5		Training continues
12-6		Final review, evaluation and reception to close training
12-7		Travel to Palime
12-8		Weekend
12-9		Travel to Lome, report writing
12-10		Report writing
12-11		Report writing
12-12		Report writing
12-13		Report writing Debriefing with:
	12:30-3:00	B. Howard, Program Office, USAID/Togo
	3:30-5:00	E. Papp, Senior Project Officer, USAID/Togo
12-14		Weekend
12-15		Weekend
12-16	3:00 p.m.	Final meeting with E. Papp, USAID, and A. Malina, PSSA

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12-17      6:30 p.m.      Depart via air to Washington, D.C.  
            6:00 p.m.      Arrive Washington, D.C.



APPENDIX B

Togo Rural Water Supply Letter to Ministry of Public Health,  
Social Affairs and Women





*Embassy of the United States of America*

Agence Américaine pour le Développement International  
Lomé, Togo

le 28 Juin 1985

USAID/Togo/85/134

Objet: Projet d'Approvisionnement en Eau  
et Assainissement, Projet U.S.A.I.D.  
No. 693-0210  
Lettre d'Exécution No. 11

Monsieur le Ministre,

J'ai l'honneur de vous adresser cette lettre pour demander votre approbation du plan d'exécution de la grande campagne des Sources alternatives d'eau du Projet d'Approvisionnement en Eau et d'Assainissement, No. 693-0210.

Vus les résultats du projet pilote dans la Lettre d'Exécution No. 10, et les deux réunions des responsables du projet élargis, c'est-à-dire, le personnel des Affaires Sociales, de l'Hydraulique, et de l'Assainissement, attaché au projet, la stratégie suivante est arrêtée et adoptée.

Même en reconnaissant que la fourniture de 20 litres d'eau par jour et par personne, comme le préconise l'O.M.S. comme l'idéal dans tous les villages secs, l'étude détaillée des 90 villages secs (villages à forages négatifs) dans les deux régions du projet (les Plateaux et les Savanes), et des contraintes logistiques nous amènent un plan d'exécution plus modeste. Donc, un approvisionnement en eau potable tout le long de l'année à raison de 5 litres par personne et par jour sera assuré dans onze (11) villages prioritaires dans la région des Plateaux et seize (16) dans la région des Savanes, en construisant des citernes standards de type Silo Citernes du Bénin, d'abord pour les toitures en tôles existantes (habitations privées ou bâtiments publics), ensuite par la construction des hangars communautaires standards de collecte d'eau de pluie pour compenser le déficit en surface existant de collecte d'eau.

Les critères de choix des villages secs prioritaires sont les suivants:

- a) village dynamique,
- b) population moins de 1.000 habitants,
- c) village infecté par le ver de Guinée,
- d) point d'eau le plus proche, pollué ou non, situé à plus de 2 km en saison sèche,
- e) disponibilité des agents pour superviser les activités de construction.



Les caractéristiques des activités de construction sont:

Silo Citerne du Bénin: - capacité : 6 m<sup>3</sup>  
- coût : 60.000 F CFA (U.S.\$130.00)  
- rythme de construction: 7 citernes/mois/équipe  
de maçons

Hangars : - surface : 84 m<sup>2</sup>  
- coût : 300.000 F CFA (U.S. \$650.00)  
- rythme de construction: 2 hangars/mois/équipe  
de maçons

Contraintes pluviométriques:

- surface de collecte: 2 m<sup>2</sup> toiture en tôle/personne dans les  
deux régions
- population servie : 6 personnes/citerne aux Savanes  
10 personnes/citerne aux Plateaux
- hangars utilisés : 7 citernes/hangar aux Savanes  
4 citernes/hangar aux Plateaux

Avec les caractéristiques et le nombre d'ouvriers qualifiés disponibles au projet, les résultats pouvant être obtenus dans les deux ans restants du projet sont:

- Savanes: Construction de 1.100 citernes et 95 hangars dans 16 villages d'une population totale de 6.600 habitants avec neuf équipes de deux maçons chacune.
- Plateaux: Construction de 440 citernes et 30 hangars dans 11 villages d'une population totale de 4.400 habitants avec quatre équipes de deux maçons chacune.

Pour éviter des conflits au cours de la distribution d'eau, chaque famille participera à la construction et par conséquent aura la charge de sa propre citerne. Le village fournira la main-d'oeuvre locale, les matériaux disponibles sur place tels que: sable, gravier, un magasin pour le stockage des équipements et des matériaux, du logement pour les équipes de construction, et si possible des ouvriers locaux qualifiés. Le Projet fournira le support logistique, le support matériel tel que: fer à béton, ciment, bois, tôles, etc., les outils nécessaires, le transport, le personnel technique et de supervision qui sont ou seront affectés par le Gouvernement Togolais ou sous contrat avec le Projet.

Un accord sera signé entre le village et les autorités compétentes du Projet définissant les responsabilités de chacun pendant la construction aussi bien que dans l'entretien. Les villageois seront formés pour les tâches d'entretien, de l'utilisation adéquate, du contrôle de l'eau à travers des activités d'éducation sanitaire qui interviendront simultanément au cours de la construction.

En supplément, environ dix sources seront aménagées dans les villages secs par une équipe de deux maçons avec la participation indispensable des Affaires Sociales, de l'Assainissement, la supervision de l'Hydraulique et la participation villageoise.

Le coût de cette grande campagne du Projet de Sources Alternatives peut être détaillé comme suit:

<u>1. Matériaux de Construction</u>	<u>CFA</u>	<u>U.S.\$</u>
a) Citernes: - Plateaux	27.000.000	60.000
- Savanes	66.000.000	150.000
b) Hangars : - Plateaux	10.000.000	20.000
- Savanes	29.000.000	65.000
c) Aménagement de sources:	<u>1.500.000</u>	<u>3.500</u>
Imprévus	13.000.000	31.500
TOTAL	<u>147.000.000</u>	<u>330.000</u>
<u>2. Formation</u>		
a) Préparation/Planification Citernes:	1.500.000	3.500
Formation du personnel - Plateaux	3.750.000	8.500
- Savanes	7.000.000	15.500
b) Préparation/Planification Aménagement de Sources	350.000	700
Formation du personnel - Plateaux	<u>1.000.000</u>	<u>2.200</u>
Imprévus	1.400.000	4.600
TOTAL	<u>15.000.000</u>	<u>35.000</u>
<u>3. Outillage</u>		
pour 42 ouvriers qualifiés	<u>3.750.000</u>	<u>10.000</u>
Total pour la campagne	<u>175.600.000</u>	<u>375.000</u>

4. Salaires (pour mémoire)

Le salaire des 42 ouvriers qualifiés sera d'environ 30.000.000 F CFA (soit US \$65.000) pour les deux ans, avec ces coûts couverts par les autres rubriques budgétaires du Projet.

Monsieur le Ministre, je vous demande d'examiner ce document, et s'il a votre approbation, veuillez contresigner et renvoyer l'original à USAID en autorisant le commencement de cette activité. Le second original est destiné à vos archives.

Je vous remercie de votre assistance et je serai disponible à vous fournir toutes information complémentaires.

Veuillez agréer, Monsieur le Ministre, l'expression de mes sentiments les plus distingués.

Myron Golden  
Représentant de l'U.S.A.I.D.

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Barry Moussa Barqué  
Ministre de l'Equipement,  
des Mines et des Postes et  
Télécommunications

Son Excellence  
Monsieur Barry Moussa Barqué  
Ministre de l'Equipement, des  
Mines et des Postes et  
Télécommunications  
Lomé

APPENDIX C  
Workshop Schedule



## Campagne Citerne Training Schedule, First Week

Monday	8:30	Introduction to the workshop <ul style="list-style-type: none"><li>- the class schedule</li><li>- workshop norms and procedures</li><li>- construction manual</li><li>- construction skill training activities</li></ul>
	12:00	Lunch break
	14:30	Construction skill training <ul style="list-style-type: none"><li>- digging cistern foundation</li><li>- pouring subfoundation</li><li>- digging and pouring the foundation for the provisional cistern (for construction water storage)</li></ul>
	18:00	Day's session ends and trainers meet for review of day's work and preparations for following day's sessions.
Tuesday	7:30	Classroom review of Monday's construction skill training and preview of today's, referring to relevant sections of the construction manual
	8:00	Construction skill training <ul style="list-style-type: none"><li>- cleaning gravel and sand</li><li>- making cement brick staves</li><li>- making formwork for and pouring the cistern bottom slab</li><li>- preparing the wall channel in the slab</li><li>- raising the walls of the construction site cistern</li><li>- mortaring the cistern interior</li></ul>
	12:00	Lunch
	14:30	Complete construction work above
	15:40	Classroom session: Field Notebooks for Masons, Field Agents and Village Storekeepers
	16:30	Division into small groups: notebook entry sessions for masons and agents
	17:30	Brief review meeting for trainers
Wednesday	7:30	Review of previous and upcoming construction skill training
	8:00	Construction skill training <ul style="list-style-type: none"><li>- raising the wall of previously prepared cistern</li><li>- making formwork for and pouring the cover slab and manhole cover</li></ul>
	12:00	Lunch

14:30 Complete construction work above

15:20 Classroom session: An Overview of PSSA and Campagne Citerne

16:10 Training staff role-play explaining Campagne Citerne to a village health committee

16:50 Discussion of role-play

17:30 Review meeting for training staff

Thursday 7:30 Construction training review and preview

8:00 Construction skill training  
- laying out hangar pillars and four cisterns around the hangar  
- digging pillar foundations and pouring foundation, placing steel reinforcement rods  
- building lower half of pillar

12:00 Lunch break

14:30 Classroom session: The Responsibilities of Participants in Campagne Citerne — Villagers, Village Health Committees, Masons, Field Agents, and Supervisors

16:30 Training staff meeting

Friday 7:30 Construction training review and preview

8:00 Construction skill training  
- using the water level device to determine hangar pillar height  
- continue building pillar and placing roof anchor brackets

12:00 Lunch

14:30 Complete construction work above

15:45 Classroom session: Introduction to the Village Census and Resource Assessment

17:30 Training staff meeting

Saturday 7:15 Depart to village site for trial census/assessment

8:00 Introduction to Health Committee elders

8:30 Six teams form and disperse to take census of individual family concessions, measure and assess existing metal roofs in the concession.

10:00 Assembly, discussion and thank you's with committee and participating family heads

11:00 Return to training center

Weekend break

Second Week

Monday 7:30 Review and preview of construction skill training

8:00 Mid-training verbal evaluation

9:00 Classroom session: Cistern Contracts and the Village Treasury

10:20 Small group discussion and critique of individual and village contracts

12:00 Lunch break

14:30 Construction skill training  
- assembling pre-cut rafter sections  
- placing and securing the rafters  
- pouring foul-flush components

16:30 Classroom session: Village Extension Meetings to Organize Campagne Citerne

16:45 Preparing extension meeting role plays in two small groups

17:15 Presentation and critique of first role play: Explaining Campagne Citerne at the Village Meeting

18:30 Trainer review meeting

Tuesday 7:30 Review and preview of construction skill training

8:00 Presentation and critique of second role play: Extension Meeting for Signing Contracts

9:30 Classroom session: Requisition of Construction Materials

10:00 Requisition exercises in small groups

12:00 Lunch break

14:30 Classroom session: Public Health Lessons to Support Campagne Citerne

16:15 Construction training review of critical skills



	17:30	Trainers' meeting
Wednesday	7:30	Review and preview of construction skill training
	8:00	Construction skill training - mortaring cistern interior walls - construction of foul-flush mechanism
	12:00	Lunch break
	14:30	Classroom session: The Management System
	15:30	Classroom session: Planning and Timing of Construction Activities
	17:30	Trainers' meeting
Thursday	7:30	Review and preview of construction skill training
	8:00	Construction skill training - removing cover slab form work - complete foul-flush mechanism - attach gutters
	10:20	Classroom session: Training Village Storekeepers
	10:45	Small group sessions with field agents as trainers and masons as acting storekeepers
	12:00	Lunch break
	14:30	Field trip to village demonstration site for gutter installation
	17:30	Trainers' meeting
Friday	7:30	Review of previous day's construction skill training
	9:00	Final, written evaluation of training workshop
	9:30	Review of storekeeper training sessions
	11:00	Global review and evaluation of construction skill training
	12:00	Lunch break
	14:30	Discussion and planning session of post-training Campagne Citerne activities
	17:00	Official closing of training session and distribution of the training group photograph for each trainer and trainee
	19:30	Informal reception
	21:30	Trainees depart

APPENDIX D

Participant List, Savane and Plateau Regions



List of participants in Campagne Citerne Workshop

Dapaong, Savane Region

Field Agents

A. Daoudou  
A. Mamah  
A. Agbokpa  
S. Atoukou  
K. Agode  
K.B. Ativi  
K. Doumegno  
K. Pouwaka  
T. Webb  
S. T. Akpe  
G. Kountouti

Masons

Y. Mowoko  
D. Liguétique  
K. Ezao  
T. Ayeva  
B. Atakpardjea  
K. Folly  
K.D. Agleve  
K.D. Agban  
E. Banissa  
A. Akoutou  
K. Outikpa  
K. Nagbe  
Z. Djeri  
S. Ashanti  
K. Atandji  
T. Kassinga  
K. Tchalim  
L. Kounta  
T. Kolani  
B. Lare  
D. Sambieni

Atakpame, Plateau Region

Field Agents

P. Koutouma  
K.K. Kpeliti  
A. Keteku  
K. Emefa  
M. Hessou  
V. Akodedzro  
I. Yekini  
K. Donyoh  
K. Degbin  
A. Aleke  
K. Modjinou  
Tata-Deku  
K. Batahina  
T. Richards  
A. Badanaro  
S. Degboevi  
Y. Tomfaya  
S. Banaboko  
K. Dekakpatema

Masons

K. Degbe  
K. Agboto  
K. Zoumbo  
K. Logossou  
A. Tchikiri  
K. Aledi  
K. Pagnayou  
K. Ledi  
K. Atchole  
A. Gnalo  
A. Moumouni  
A. Assosso-Toure  
K. Ametana  
K. Wonam