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**WATER AND SANITATION  
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# **TRAINING IN SPRING CAPPING FOR FIELD AGENTS IN ZAIRE**

## **WASH FIELD REPORT NO. 73**

### **MAY 1983**

Prepared For:  
**USAID Mission to the Republic of Zaire**  
Order of Technical Direction No. 100

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May 2, 1983

Mr. Richard Podol  
Mission Director, USAID  
Kinshasa, Zaire

Attention: Mr. Richard Thornton

Dear Mr. Podol:

On behalf of the WASH Project I am pleased to provide you with 10 (ten) copies of a report on Training in Spring Capping for Field Agents in Zaire.

This is the final report by David Goff and is based on his trip to Zaire from October 2 to December 20, 1982.

This assistance is the result of a request by the Mission on June 14, 1982. The work was undertaken by the WASH Project on June 29, 1982 by means of Order of Technical Direction No. 100, authorized by the USAID Office of Health in Washington.

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

Sincerely,

Dennis B. Warner, Ph.D., P.E.  
Director  
WASH Project

cc. Mr. Victor W.R. Wehman, Jr., P.E., R.S.  
AID WASH Project Manager  
S&T/H/WS

DBW:cdej

WASH FIELD REPORT NO. 73

ZAIRE

TRAINING IN SPRING CAPPING FOR FIELD AGENTS IN ZAIRE

Prepared for the USAID Mission to the Republic of Zaire  
under Order of Technical Direction No. 100

Prepared by:

David Goff

May 1983

Water and Sanitation for Health Project  
Contract No. AID/DSPE-C-0080, Project No. 931-1176  
Is sponsored by the Office of Health, Bureau for Science and Technology  
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Washington, DC 20523

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## EXECUTIVE SUMMARY

The Associate Peace Corps Director (APCD) for health in Zaire (PC/Z) organized an in-service workshop using experienced Peace Corps Volunteers (PCVs) to train ten other PCVs in spring capping. Both trainers, Barry Pollock and Randy Jacunski, requested technical assistance in construction methods and materials. An arrangement was made whereby the WASH consultant participated in the implementation of this training program in rural villages around Nyangese near the eastern border of Zaire.

Following this, a week was spent assisting SANRU 86 (a USAID-funded rural public health project) in designing a training program in water and sanitation for their health agents, focusing on spring capping. Fortunately, several of the proposed program elements, e.g. trainers and participants, were available and readily mobilized. Continuing under a requested extension, the WASH consultant worked with a select group of PC and GOZ consultants with experience in spring capping training to organize and implement a series of four pilot rural water and sanitation workshops in Bas Zaire and Equateur.

At the same time, the Government of Zaire (GOZ) was in the process of re-vamping the national rural water program. Avenues for collaboration among SANRU, GOZ and PC were explored and established during the preparatory work for the pilot series. Each group sensed that together they could more effectively address the need for training and construction materials to satisfy the constant demands of villagers and health workers for improved water supplies.

## Chapter 1

### INTRODUCTION

In July 1981 Dr. Raymond Isely of the Water and Sanitation for Health Project (WASH) and David Goff, WASH consultant, visited Burundi to evaluate the national spring capping project for the Agency for International Development. Dr. Isely then went to Zaire and developed recommendations for increased spring capping and rainwater harvesting activities in Zaire.

In Togo at the AID health officers conference in November of 1981, Craig Hafner of the WASH Project and Dr. Isely met with Rick Thornton, the Health Officer of the USAID Mission in Zaire after which Thornton met with Dr. Frank Baer, the USAID/SANRU 86 Project Manager, regarding possible water and sanitation components in the project. Baer visited AID and WASH in Washington during January 1982 and discussed water and sanitation training needs. During the spring of 1982 plans for training were formulated and a request was made in May by USAID/Zaire for WASH to provide training services. In June 1982, Hafner again met with Thornton and Baer in Zaire. William Pruitt, the Peace Corps Director, was also consulted regarding the rural water activities in the Peace Corps rural public health programs. These discussions resulted in a formal request from Thornton for WASH services to provide:

- o A Training Program Design in spring capping for SANRU 86
- o Technical Assistance for Peace Corps endorsed by USAID for spring capping training
- o Training of Trainers course for SANRU 86 Zairian nurses.

The training of trainers was done in July by WASH consultant Jocelyn Carlson. The remaining two activities were completed after some delay by WASH consultant David Goff, a sanitary engineer, in October, November, and December and are the subject of this report.

## Chapter 2

### BACKGROUND

#### 2.1 National Rural Water and Sanitation Characteristics

The Government of the Republic of Zaire (GOZ) proclaimed its intention to utilize this vast country's hydrological and potable water resources at the United Nation's Water Decade Conference. When the Zaire River enters the Atlantic it has travelled 4,500 kms and is flowing at 50 million liters per second, thereby discharging nearly 50 percent of the entire continent's surface waters. The nation is over two million square miles, an area as large as the United States east of the Mississippi.

As shown on the map, people in most of the rural areas in Zaire are reported to have access to springs. There were severe water shortages in certain regions during the 1978 drought. In Bas Zaire, Haut Zaire and along the Angolan border people continue to suffer.\* In many of these areas, rainwater is collected and stored. However, tin or tile roofing is expensive and therefore not common on individual homes.

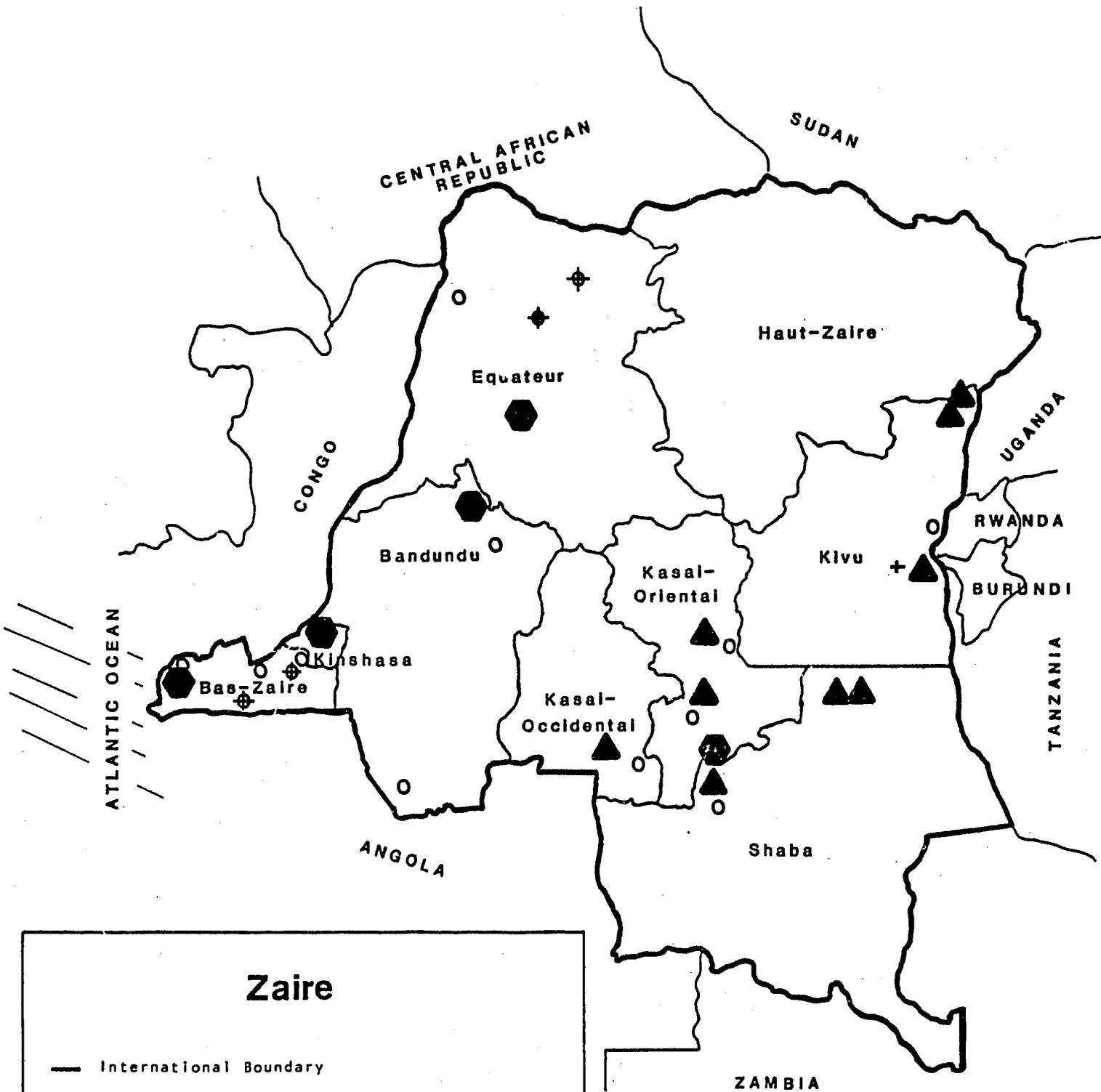
Infrequently, remnants of the Belgian Fonds de Bien-Etre Indigene (FBI) water and sanitation program from 20 years ago may be functioning. FBI hoped to decrease the prevalence of water related disease by helping to improve over 4,000 springs, installing 2,000 pumps, and building several distribution systems.

In the seventies, Belgian aid programs conducted sanitary surveys and recommended that over 1000 springs be capped in rural areas. During recent years, UNICEF has supplied PVC pipe and other materials to GOZ Hydraulique Rurale (HR). USAID, OXFAM, and CIDA have supplied support to the Peace Corps water and sanitation projects.

The recent development of rural water resources in Zaire has come from the regional and local community levels, not from a nationally designed program. Continued cooperation among citizens and strong local leaders, who are often willing to tax themselves to buy materials and do their own labor with minimal technical supervision, is essential for long-term success in rural water and sanitation activities. Without the governmental infrastructure to maintain and operate these simple but important improvements, communities must assume responsibility and ownership. Small committees and organizations must be encouraged and cooperative links must be made between them so they will endure.

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\*The construction of wells will better serve the needs of these people.



## Zaire

- International Boundary
- Region Boundary
- SANRU 86 Rural Hospital Zones (15)
- ▲ Peace Corps Volunteers with Water Training (9)
- ⬢ Regional Rural Water Posts (60?) (5)
- + Pilot Spring Cap Training Courses (5)

0 100 200 Miles  
0 100 200 Kilometers

The traditional "Salongo," half-day Saturday clean up by community, offers frequent opportunities for water and sanitation improvements. Throughout the consultant's travels and meetings, village chiefs and health workers stressed the constant demand for the cement, pipes, and know-how to improve their water supplies. Most villages had pit latrines. The usage, maintenance, and infrastructure to continue their construction, was not within the scope of the consultant's mission.

## 2.2 Available Rural Water and Sanitation Estimates and Projections

The following table provides rough estimates of a typical current year's results (I) and a proposed three year program's results (III). The values are based on a review of regional reports and discussions with the organizations' representatives regarding their plans. The table presents an idea of what might be possible in the short run if all efforts succeed and continue to progress at current levels of support and interest:

Table 1: 1983 Rural Water Supply Estimates and 1986 Projections

ORGANIZATION	SPRINGS		WELLS		RURAL DISTRIBUTION SYSTEMS		TRAINEES ZAIRIAN		PCV	
	I	III	I	III	I	III	I	III	I	III
U.S. Peace Corps	30	150	2	10	0	0	20	150	10	40
Hydraulique Rurale	30	400	20	100	4	18	25	100	0	0
SANRU-86	50	1000	10	300	0	0	100	400	0	5
<b>TOTALS</b>	<b>110</b>	<b>1550</b>	<b>32</b>	<b>410</b>	<b>4</b>	<b>18</b>	<b>145</b>	<b>650</b>	<b>10</b>	<b>45</b>

## 2.3 Training and Rural Water Development

### 2.3.1 Peace Corps/Zaire

Peace Corps/Zaire is one of the largest Peace Corps programs in the world with over 200 volunteers. Jerry Wilkinson is the current Associate Peace Corps Director (APCD) for 40 public health volunteers located throughout most of Zaire. Since 1979 PC/Z has been active in spring capping. Approximately 25 PCVs have been trained by experienced PCVs and occasional experts. In turn, over 90 springs have been capped and 60 Zairian workers trained by these PCVs. The continuing work of those Zairian trainees is not currently known but should be followed. The extent of the PC/Z training and construction effort, often supported by USAID, OXFAM, and other bilateral donors is impressive and

progressing with renewed vigor. Annual water and sanitation training will continue with opportunities during the large summer training program, the public health training program in the spring, and the two-week in-service water program. In addition, many of the PCV water trainees will not only cap springs but also organize and conduct local and regional training courses.

### 2.3.2 SANRU-86/USAID/Church of Christ in Zaire (ECZ)

SANRU-86, supported by USAID funds, is a six year project to improve rural public health in 50 selected rural hospital zones throughout Zaire. Appendix D describes the overall goals of the project.

The map (page 3) shows the five zones which have been selected in Phase I of a three-phase program. The direction and rate of implementing the water and sanitation component of the rural health program into each hospital zone will depend on the evaluation of the training, trainers, and zonal organizations after the four pilot training courses have been completed.

SANRU-86 has funds for training and construction materials, but no funds to support zonal staff coordination of water and sanitation activities. This is one reason SANRU-86 is seeking collaboration with rural programs such as Peace Corps, Hydraulique Rurale, and CE.DE.CO (Centre du Developpement de la Communaute) with available field personnel.

### 2.3.3 Hydraulique Rurale (HR)

Hydraulique Rurale (HR), Government of Zaire, is the rural water division of the GOZ Department of Rural Engineering within the Ministry of Rural Development. HR has most recently been concentrating on improving access to water supplies for small towns (3,000-5,000 population) by constructing gravity distribution systems. HR is currently redesigning its national program for the next three years, with two new directors on its staff (Appendices C and J). HR Director SOWA, a sanitary engineer has broad rural water development experience, has trained Peace Corps volunteers and Zairian students. CIDEP (SANRU consultants) recently trained personnel for a new HR brigade in Bandundu bringing the total to four regional HR brigades who construct and improve springs, wells, pumps, and gravity distribution systems in Zaire (see map). Current plans include similar brigades for the remaining regions of Zaire. REGIDESO, another governmental water and sanitation division, develops only more sophisticated urban systems.

## Chapter 3

### PEACE CORPS SPRING CAPPING WORKSHOP, NYANGESE, OCTOBER, 1982

#### 3.1 Introduction/Goals

Most previous PC water and sanitation training in Zaire has been regional or local. This workshop brought PCVs from distant regions throughout Zaire to develop skills for implementing spring capping projects at their posts during their two-year service. Activities prior to the workshop enabled the trainers to discover expectations of the participants and to organize the training program around the following topics:\*

- project cycle/organization
- community needs/participation
- education in water and sanitation issues
- funding a water and sanitation project
- sanitary survey/site selection
- construction materials
- construction methods
- maintenance and evaluation.

#### 3.2 Trainers and Participants

Eleven PCV's with an average of two months at their posts and one SANRU missionary participated in the workshop. The average age was 25 and all had a college education. They are working and volunteering in villages throughout Zaire to promote development activities. They were chosen for their particular interest and needs in their villages for water supply improvements. Eight of the participants had received PC public health training. Respective posts of the six men and six women are found on the Map on page 3. Their levels of experience and skills varied considerably, although two had previously capped springs. The trainers, Barry Pollock and Randy Jacunski, both have considerable experience capping springs and training both Zairian villagers and other PCV's but no formal training of trainers. Spring capping training materials were designed by Pollock and Jacunski (available from WASH library). The consultant was requested to provide some technical direction regarding construction and to assist with implementing the workshop.

#### 3.3 Preparations

The two week workshop was conducted from October 11 to 22 at a Catholic mission in Nyangese (see map page 3), about 30 kilometers south of the large PC training center in Bukavu (it accommodates over 100 PCVs). The site was selected for its proximity to various types of capped and unimproved springs; the active community development projects of the host abbeys (which provided motivated villagers to participate), and, of least import, the beautiful

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\*See Appendix E for a more detailed list of trainee expectations.

environment, accommodations, and hot springs. Construction materials purchased and made available locally for the capping of three small springs and demonstration activities during the stage included: cement, PVC pipe, sand, gravel, clay, stone, and a collection of tools similar to the ones shown in Appendix F. A Land Rover was available for the duration to transport materials and participants to and from the three village spring sites which were three to five kilometers from the mission (10-15 minutes drive). Costs are reviewed in Chapter 7.

### 3.4 Methods and Design

Based on previous PC training, the workshop was weighted heavily towards first-hand practice in the field in order to develop skills and confidence in the construction steps required to cap a spring. The field work was complemented with demonstration, group discussion, field surveys and visits, and trainer presentations to encourage participant assimilation of the more theoretical and instructional aspects of the training. The schedule of the training course follows on the next page (Figure 1). The first week each group of one PC trainer and six participants capped one spring under heavy supervision, reviewing daily progress at each others' site. The third spring was capped during the second week by the entire group with the trainers only facilitating from the site evaluation, through design, to completion. See photos of spring site which follow the training schedule (Figure 2).

### 3.5 Results and Evaluation

Although the extensive field work provided ample opportunity for all participants to practice and develop skills in construction, it often caused fatigue and loss of interest in some of the classwork and demonstrations. Thus, some of the training was forfeited to the overriding focus on completing the springs (project vs training oriented). To overcome this in the future, a local construction foreman and workforce should be available to continue the labor once the participants' learning has been maximized. More emphasis should be placed on communication skills and developing confidence in varying type designs, through observation and reflection. Each day's activities should be reviewed by the group and integrated into their own project plans. Time and energy should be reserved for this important activity.

The WASH spring capping training course should be available by Spring 1983 and ready for use in PC training. The WASH course design incorporates most of the modifications discussed above. The PC training activities provided the consultant with an excellent opportunity to field test and compare the WASH course.

The participants were asked to evaluate the training at mid-course and again the end. The method used was to review the goals and expectations generated the first day using the project cycle. Participants were satisfied with the content and activities, even the hard labor. Many requested additional technical references and means for obtaining assistance once they initiated their own projects. A series of questions were developed by the trainers and shared

Figure 1. TRAINING SCHEDULE

U.S. PEACE CORPS SPRING CAP WORKSHOP, NYANGESE, KIVU, ZAIRE

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
Friday Oct. 8	Saturday 9	Monday 11	Tuesday 12	Wednesday 13	Thursday 14
	2 HRS	4 HRS	5 HRS	5 HRS	5 HRS
	Water cycle Spring type Selection criteria	On-site evaluation Introduction to spring capping Sanitary survey	Clean materials, Meet villagers Prepare foundation site	Divert flow Set up forms Mix concrete	Rock and mortar walls Spring flow channel and filter
	2 HRS Tour of springs			Pour	
	2 1/2 HRS	1 HR	Drainage	foundations	Fix pipe
3 HRS Workshop Introduction	Demonstration on concrete and forms Group field practice	Process surveys	(Two springs capped simultaneously by two groups of trainees each led by trainer)		2 HRS Village animation re: springs and participation
					Groups prepare and present plans
Share your project needs and condi- tions Project cycle to develop goals expectation Schedule Handouts			2 HRS Community develop- ment	1 HR PC/Zaire water program	Handout and display of reference materials

-8-



= 41 1/2 HRS spent in field out of total  
62 course hours

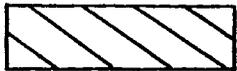
DAY 7	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12
<p>Friday Oct. 15</p> <p>4 HRS</p> <p>Backfill Splash pad and steps Laundry pad Maintenance animation</p> <hr style="border-top: 1px dashed black;"/> <p>Celebration with villagers</p>	<p>Saturday 16</p> <p>2 HRS</p> <p>Mid course evaluation Review project cycle/objectives Develop backhome plans</p> <hr style="border-top: 1px dashed black;"/> <p>FREE</p>	<p>Monday 18</p> <p>1 1/2 HR</p> <p>Village animation by trainees 2 HRS</p> <p>Site survey Material estimation</p> <hr style="border-top: 1px dashed black;"/> <p>(One spring capped by all trainees)</p> <p>1 1/2 HR</p> <p>Design spring cap Group developed and presented designs</p>	<p>Tuesday 19</p> <p>5 HRS</p> <p>Drainage Spring flow investigation Excavation Design and layout</p> <p>-- L U N C H --</p> <p>FREE</p>	<p>Wednesday 20</p> <p>4 HRS</p> <p>Spring flow channel Foundation Infiltration gallery</p> <hr style="border-top: 1px dashed black;"/> <p>1 1/2 HR</p> <p>Funding a water project Writing proposals Identify sources of support Accounting</p>	<p>Thursday 21</p> <p>4 HRS</p> <p>Rock and mortar wall Lay pipe Backfill Animation re: finishing tasks and maintenance</p> <hr style="border-top: 1px dashed black;"/> <p>Celebration 1 1/2 HR</p> <p>Introduction to rainwater catchment Alternative materials</p>
<p>DAY 13</p> <p>Friday A.M. 22</p> <p>3 HRS</p> <p>Participant self-evaluation: Group answers twenty questions Course evaluation Summarizing costs and materials of 3 springs capped Review proposed project guide 1 HR</p> <p>Revisit to first two springs celebration</p>		<p><b>NOTE:</b> 3 Trainers, 1 assistant, 22 trainees</p> <p> = 41 1/2 HRS spent in field out of total 62 course hours</p>			

FIGURE 2



Peace Corps  
Spring Capping  
Training

with the participants which covered most of the skills, knowledge, and attitudes covered in the course. Each participant reflected on the questions, then the answers were discussed. This provided an opportunity for self-evaluation.

### 3.6 Projected Activities

It was estimated that each participant would return to his/her post, perform a thorough sanitary survey, begin to explore avenues for funding, attempt to cap five springs, and conduct a local training course during 1983. Many requests were made for specific technical references and means by which technical assistance could be received via Jerry Wilkinson. The SANRU-86 project was described as one source available for further assistance with training and construction materials.

## Chapter 4

### SANRU-86 WATER AND SANITATION PROGRAM

#### 4.1 Introduction/Goals

The overall project goals of SANRU-86 are summarized in Appendix D. The map (page 3) shows the distribution of SANRU 1982 rural health zones throughout Zaire. The consultant was requested to help design a training course and manual for use in the water and sanitation component of the overall rural public health project. Project funds are allocated to support water and sanitation training programs for at least 400 village health workers and nurses and provide construction materials for inexpensive water supply improvements (see Chapter 7). The project anticipates the manual capping of 1,500 springs and digging 500 wells. Rough estimates for the first phase are given in Appendix G. Latrine construction and use by most villages within the SANRU rural health zones is recognized as essential to improving rural public health but the funds or methods to achieve this goal have not been clearly identified.

#### 4.2 Water and Sanitation Program Organization

Under current plans of SANRU 86 the public health administration, i.e., the project director at each SANRU rural hospital zone, must select a current staff or associated member to coordinate and be responsible for the water and sanitation program. SANRU funds cannot be used for personnel salaries. Zonal water and sanitation activities should require no less than one-third of the coordinator's daily work schedule. A proposed job description is detailed in Appendix H.

The trainees will be selected from those village health workers (all volunteers) and nurses who work through the rural health posts which are supported by the zonal hospital (see map, page 3). The field work by the trainees will not be compensated by SANRU for capping springs or digging wells. It is assumed that SANRU's meeting the present demand for potable water, cement, pipe and expertise will be sufficient motivation for the villagers and trainees to work together and improve water supplies. Other development activities have progressed similarly: often the village health or extension worker is given some produce or in-kind support or lodging in the village(s) he works (to date all trainees are male).

The price of cement and pipes varies regionally, e.g. one sack of cement is Z35\* in Bas Zaire and Z225 in North Kivu. All materials are at present to be purchased zonally and transported to individual trainees' villages, perhaps by mobile health teams.

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\*US\$1.00 = Zaires 5.

### 4.3 Pilot Training Program (Dec. 1982 and Jan. 1983)

After the PC training course in Nyangese, the consultant came to Kinshasa to work with SANRU project director, Frank Baer. The water and sanitation component of SANRU has barely begun. Funds have been allocated for training and construction materials, and estimates have been made for Phase I hospital zones regarding springs, wells and latrines to be completed (Appendix G). Assistance was requested by SANRU to determine how to best train and support village health and extension workers in the initiation, construction and maintenance of simple spring capping and well improvements and, where possible, to continue the transfer of these skills to others.

Four pilot training workshops were organized by the WASH consultant at SANRU zones in Bas Zaire and Equateur (see map). The consultant was able to participate in the implementation of the entire first training course at Kimpese in Bas Zaire. The following discussion is based on that experience.

#### 4.3.1 Skills to Transfer

Using as background the experience gained in the 1981 Burundi spring capping program evaluation, the WASH spring capping training course design, and the PC training course in Nyangese, the SANRU training program was to develop skills in sanitary survey, construction of springs, project organization, community participation, maintaining potable water systems, and reporting. Training and supervisory skill development through group leadership and demonstration activities were emphasized. The Kimpese workshop demonstrated the need for wells training in areas where springs had dried up since the drought of 1978.

#### 4.3.2 Participants

Each of the pilot workshops anticipated 15 to 20 participants. At Kimpese two zones, Nsona Mpangu and Kimpese, were represented by a total of 22 participants who received attestations (Appendix I). However, the number swelled and dropped during the 13 days. The levels of experience and skills varied considerably from village health workers (VHW) to agriculture extension workers to nurses who worked at the rural health centers and the main hospital, as well as the census director who received approval from the chef de la collectivite to work half time on springs and wells for villages in need.

The division of labor during construction was complicated by the differing degrees to which participants, e.g. the nurses and the VHW's they supervise, were willing to participate in the actual physical labor. However, the import of this training and SANRU construction material funds was obvious as many of the participants were continually asking questions and meeting in small groups to discuss the reference texts both before breakfast and after dinner. An element of competition did surface between the two zones represented.

### 4.3.3 Trainers

Trainers were contracted through SANRU for the duration. The staff consisted of the same two PC trainers, Pollock and Jacunski, together with Cit. Kalala, director of the hydrology department of CIDEP/EUS, and his staff who are the GOZ trainers for Hydraulique Rurale and REGIDESO. None of these trainers had participated in a training of trainers workshop. Their training skills had been acquired through experience.

Since the PC trainers had strong "hands-on" participation training styles, one of these was paired with a CIDEP trainer and his assistant, who were more accustomed to supervising construction training activities. Both groups would benefit from development of their training skills, especially for improving comprehension and participation, during classroom and demonstration activities.

Upon completion and evaluation of the four pilot courses, SANRU and CIDEP will determine their annual level of collaboration, needs for modification of the training course and the water and sanitation program. Overall, the consultant was very satisfied with the cooperation, long hours, level of experience, technical and supervisory skills, and results achieved by the trainers under the intense organization and implementation schedule required for the first of four pilot workshops "back to back" for two months and right through the holidays.

## 4.4 The Kimpese/Nsona-Mpangu Pilot Training Course: Dec. 5-17, 1982

The schedule of training activities is presented below. After initial discussions with participants it was discovered that parts of the Kimpese and Nsona Mpangu zones had suffered severe water shortages since their springs had disappeared after the drought of 1978. Thus they needed training in shallow wells improvement and construction in addition to springs and an introduction to rainwater catchment and cistern building. Addressing these needs, a large spring (70 liters per minute) was capped the first week and a shallow well dug the second week. Although there were springs throughout the training site area, there were fewer capped or different type springs available for demonstration than at the other three pilot course sites.

### 4.4.1 Preparations

Two weeks prior to the workshop, the consultant, one PC trainer, and the CIDEP director spent three days on-site to explain the goals and needs for the training, to select the participants, and to arrange accommodations with the zonal public health administration and water and sanitation coordinator. Possible spring sites were visited and the availability of cement, pipe, sand, gravel, rock, clay, transport, tools and community participation requirements was discussed so it could be determined what needed to be purchased in Kinshasa. Following Kimpese we travelled to Sona-Bata to make some initial preparations. The consultant then travelled to Equateur for one week to make similar presentations to zonal administrations and to organize and prepare for the two other workshops.

Upon return to Kinshasa, further design and material preparations were developed with the trainers prior to their arrival at Kimpese for an additional three days' preparation before the course began.

#### 4.4.2 Methods and Design

Following the schedule (Figure 3), the trainers Pollock and Kalala along with two assistants and the consultant mixed field work with individual and group demonstrations and classwork activities. For certain more technical theory, the participants were divided into one French speaking and another Lingala-speaking group to insure that the village level participants, who really have no practical need for French, were comprehending the material and were more comfortable. Because of the language difficulty, it was important for trainer presentations of technical information to be succinct on one or two related points, and to take less than ten minutes. However, this was difficult to control, and it would be good to develop such trainer skills.

As the schedule demonstrates, practicing skills at the construction site was emphasized. The dependency of the training activities upon construction activities brings up several issues:

- The necessity of properly completing the demonstration capping of a village spring because an existing water supply has been interrupted and must be put back in service.
- The difficulty of managing a construction project with village participation while effectively conducting a training course.
- The importance of trainees' participating in all stages of construction.
- The constraints related to construction techniques, e.g. the need for concrete to cure for several days in the middle of construction.

Under these conditions the workshop tends to become very project oriented, causing training objectives and methods to be sacrificed. To avoid this and to preserve the learning environment and goals of training, three principles should be emphasized:

- o The necessity of maintaining an effective learning cycle or process which consists of:
  - technical theory and preparation for construction prior to
  - participation in construction, followed by
  - reflection and generalization by the trainees, then
  - integration into trainee's experience or workplans.

Figure 3. TRAINING SCHEDULE

FIRST PILOT COURSE FOR SANRU-86 WATER AND SANITATION PROGRAM, KIMPESE, BAS ZAIRE

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
Sunday Dec. 5	Monday 6 2 1/2 HRS	Tuesday 7	Wednesday 8	Thursday 9	Friday 10
	Use project cycle to develop goals and expectations* SANRU Project Introduction to springs and spring capping	Preparation to begin construction 1 hr.  3 HRS Selection criteria Investigate spring flow Lay out and excavation Drainage	Preparation to begin construction 1/2 hr.  3 HRS Clean and measure materials Divert spring flow Set up forms	3 HRS Water cycle Water, rocks, soil Design for different spring types Tools	6 1/2 HRS Rock and mortar wall Sealing with clay Spring flow channels
	Preparation 1/2 hr.  2 1/2 HRS Tour of springs and wells Sanitary survey by teams	3 1/2 HRS Meeting with chief and villagers Tools & materials Division of labor Dig foundation	LUNCH  3 1/2 HRS Reinforcement Mixing concrete Conserving cement Pour foundation Begin curing	3 HRS Introduction to rain water catchment Mortar jar construction by trainees	Lay pipe Backfill Steps Drainage Control and maintenance
2 HRS Workshop introduction Share experiences Hand out questionnaire Course schedule		1/2 HR Review steps in construction	SUPPER	1 HR SANRU program coordination and issues	

-16-



= 38 hours spent in field out of total 61 course hours.

DAY 7	DAY 8	DAY 9	DAY 10	DAY 11
Saturday Dec. 11 3 HRS Village participation Midcourse evaluation Finish mortar jars	Monday 12 2 HRS Well construction Tools 1 HR Prepare for begin construction	Tuesday 13 1/2 HR preparation 6 1/2 HRS Diversion of surface water Clay for sealing	Wednesday 14 3 HRS Block and mortar curb and well margin Cleaning well for use	Thursday 15 2 1/2 HRS Review of well construction Review of project cycle Official closure certification
FREE	3 1/2 HRS Layout and choice of site Selection of materials Digging begins Individual field	Suction pump to empty during digging Animation village and chiefs Reinforcement of well walls with block and mortar Sessions in	3 HRS Field trip Spring and distribution system site	2 1/2 HRS Steps to repair a spring Evaluation
			LUNCH	
				SUPPER

NOTE: 3 trainers, 12 trainees

\* Annex Q



= 38 hours spent in field out of total 61 course hours.

- o The necessity of recognizing that a trainee's learning stops while participating in labor, that practice and observation develop skills, and that hard labor tires the trainees and raises issues of status and education.
- o The necessity of making optimal use of a trainer's time and skills in light of the fact that village participation is not always dependable and local construction foreman and a labor force could be hired and function as part of the training staff.

#### 4.4.3 Implementation

Use of a vehicle for transport of materials, participants, and unexpected developments is essential. Village participation will vary markedly as it did in Kimpese. There was an army (see photos, Figure 4) of villagers with strong preconceptions regarding design and use of concrete at the spring site. For example, countering agreed-upon instructions, the villagers removed the forms after one day to construct two additional useless side walls of reinforced concrete, risking the integrity of the foundation and wasting four sacks of concrete which they had purchased themselves. At the well site, the villagers, having less time to organize, provided a fairly steady stream of gravel, block and sand from one or two kilometers away, but provided little help with digging. Thus, after the first day, a suction pump and operator were rented to enable the participants to complete the shallow well. The projected budget of Z30,000, was reasonable. The most expensive element was accomodation at Z50-60 (US\$ 10 to 12) per trainee per day.

The participants were asked to evaluate and comment on the training course at three points: at the beginning, half way through and at the end. The project cycle, expectations and goals were reviewed. The participants constantly requested assurance that they would receive follow-up technical and administrative assistance, logistic support, and materials. The CIDEP and PC trainers will provide an evaluation and recommendations following the four pilot workshops.

The monitoring of skill and knowledge transfer during the workshop will be difficult. Participants must be encouraged to raise questions and doubts. Their confidence levels must be reinforced so they will try until they succeed in their water and sanitation activities. The ability to determine if an agent can in fact supervise spring construction activities effectively will depend on the observation of the trainer and gumption of the trainees.

Constant demands relating to possible funds and materials available from SANRU often thwarted training efforts (i.e., who is getting what, how much, when, where?) but provided important insights into program implementation problems for SANRU to address, as discussed in the recommendations below.

FIGURE 4



SANRU Spring  
Capping Training



#### 4.4.4 Results and Evaluation

The most important factors in the spring capping training course are:

- one trainer per 5-10 trainees, generally with two co-trainers and 15-20 trainees.
- a healthy balance of field and class work in which all trainees participate
- a construction foreman and labor force to relieve participants from working when their learning stops
- a thorough development of each participant's first spring project just after each major session of the course
- an experiential learning cycle which encompasses class theory, field practice, processing of learning experience, and application
- individual session for each trainee with one of the trainers at least at the beginning and before the end to encourage participation and provide an avenue for communication
- skill inventory and evaluation by each participant to determine progress during training
- development of a detailed activity plan for the trainees' village spring project and an overview of the remaining month's spring project implementation
- inclusion of funds or materials for each participant's first spring project in the training budget
- a sample sanitary survey, a participant sample questionnaire, and a project reporting form were developed (available from WASH library).

#### 4.5 Analyses of SANRU-86 Program Budget

SANRU budget projections are based on ten training courses per year for a total of 150 trainees and 450 springs capped for a total water and sanitation budget of Z583,000. This would comprise 23 percent of those total SANRU budget items that could apply to the water and sanitation program, and only 14 percent of a total 1983 SANRU budget of Z4,300,000.

By 1986, SANRU hopes to have completed its goal of 1,500 springs and a roughly estimated 400 to 500 trainees which, if computed at the projected rates, would require an additional Z2,000,000. These figures do not include the development of currently unknown program elements. For example, the cost of local training and retraining events and training of trainers for CIDEP and possibly zonal water and sanitation coordinators will dramatically affect the progress and permanence of the SANRU-86 project.

## Chapter 5

### COLLABORATION FOR NATIONAL RURAL WATER AND SANITATION ACTIVITIES

#### 5.1 Summary

All three programs, SANRU-86, Peace Corps and Hydraulique Rurale are in the formative stages of developing more active water and sanitation programs. The timing is ripe for cross-fertilization: SANRU is looking for regional personnel; PC is looking for construction materials; HR is conducting regional surveys for the national plan, and all are training. Through collaborative efforts, a more permanent and progressive national rural water and sanitation infrastructure and program will emerge and international funding agencies will be more likely to support water and sanitation activities.

#### 5.2 Training

The SANRU/CIDEP trainers have had training experience as recently as this past year when they trained 23 men of various levels for the new Bandundu HR brigade. HR has trained PCVs, has experience in well construction and training, and is interested in the SANRU and PC spring capping training. SANRU and PC are training together and each is training village health and extension workers in spring capping.

#### 5.3 Field Surveys

Each of the HR brigades is at present conducting regional surveys to determine the type of water and sanitation improvements needed and where they should work during the next three years. The first activity for the SANRU trainees is to conduct sanitary surveys of the villages in their zone and forward the data to Kinshasa for filing by SANRU. Peace Corps is considering developing a sanitary survey or a general community survey, to be completed by public health PCVs and centrally filed. Thus survey efforts and results could be shared and programs planned collaboratively based on respective expertise and resources.

#### 5.4 Construction Materials and Equipment

SANRU-86 is supplying cement, PVC pipe, and rebar to zones with water and sanitation programs for spring capping and wells construction. Average costs are reviewed in Chapter 7. The supply of tools has not yet been determined. However, funds (Z100) for each participant to purchase what s/he lacks locally, and funds for more expensive or less frequently used equipment to be stored for zonal use at the hospital seems minimally appropriate. PCVs within SANRU zones will benefit from the same source of materials if they construct water and sanitation improvements. PCVs often receive funding from other sources such as the USAID Self Help fund, OXFAM, and CIDA thus providing additional resources for national water and sanitation programs. HR has construction equipment for use in slightly more sophisticated systems (such as wells, gravity distribution, and pumps) which might be made available to the other groups in regions where they collaborate.

SANRU, through periodic evaluation of water and sanitation activities, may change the types or quantities of materials it supplies to different zones, e.g. wells, springs, and rain water systems. Also if SANRU wants to meet its goals regarding latrines and sanitation, it must develop methods and materials to address this program component.

#### 5.5. Construction Activities and Technical Assistance

If efforts are made to collaborate in planning regional water and sanitation activities, then SANRU and PC could devote their work to the simpler, smaller improvements of spring capping and shallow well digging. HR could then focus on the more complex improvements involving pumps, distribution, storage, or heavier equipment and respond to requests for supervision and technical assistance.

## Chapter 6

### TECHNICAL NOTES

#### 5.1 Springs

There were two basic types of springs encountered during the field work: those situated on a slope which would allow for a wall of sufficient height for the collection vessel to fit underneath the water pipe and those without sufficient slope for proper drainage, situated in a flat area bubbling up into a pond. The latter is remedied, where adequate water pressure exists, by enclosing the source (e.g. with a barrel) to raise the level of water enough to permit collection and drainage. Either type may require infiltration galleries to collect the majority of the spring's flow.

The design selected for most training demonstrations was the simplest and least expensive. A concrete foundation, rock and mortar wall, flat rock splash plate, and PVC pipe were installed instead of constructing a spring box. The latter requires more experience with forming and concrete and is more useful when storage is required.

The costs for capping springs increased with the flow and use of concrete vs. rock masonry. Flows varied from one liter per minute (lpm) to over 100 lpm. Concrete usage varied from one sack, using rock and mortar for a flow of seven lpm, to eight sacks, using reinforced concrete for a spring flow of 70 lpm. For costs see Chapter 7.

#### 6.2 Wells

Many of the people in areas still suffering from the drought take their water directly from rivers which are breeding grounds for bilharzia infected snails. Training for those village health workers should include simple and clear, step by step, instructions for finding groundwater using a hand auger and digging, lining, and protecting shallow wells.

There are many difficult initial steps which must be overcome by the agents such as:

- selecting the most suitable well site and striking water
- reaching the true water table which is uncontaminated, not just a reservoir of surface water without filtration
- involving villagers in assessment, the possibility of failure, maintenance, operation, safety, and focussing on the importance of a sanitary water cycle.

### 6.3 Rainwater Catchment

Many areas could benefit from storing rainwater for use during the dry season. However, the cost of tin and tile roofing is normally prohibitive for individual habitations. Innovative designs for inexpensive, suitable roofing, or impermeable catchment surfaces would be useful. Following are some suggestions.

#### 6.3.1 Small Mortar Jars

Various methods for cistern construction were reviewed by the trainers for inclusion in the training. Small mortar jars (a Thailand design) were built successfully at Kimpese. However, the base thickness should be doubled to three centimeters for adequate strength to support the jar walls.

#### 6.3.2 Cisterns

A Presbyterian Mission in Bulape, Kasai, has initiated a cistern construction project. A team of seven Zairian masons was trained by a U.S. missionary team at project start-up and is continuing to construct new cisterns, up to 10m<sup>3</sup> in size, very efficiently. They are built alongside a house wall and foundation and in the ground, concrete lined and covered with corrugated tin roofing. Under optimum conditions, the team can complete one cistern, previously excavated, in one or two days, for a subsidized cost to the landowner of Z3 as to Z500.

### 6.4 Locally Manufactured Tools

The SANRU project has access to a forge and is trying to identify the best model for a simple posthole type digger. In addition, bits for hand augers, trowels, and other tools could be fabricated and distributed to zonal water and sanitation trainers.

### 6.5 Latrines

As mentioned before, the process by which 90 percent of the villages in the rural health zones (see SANRU Goals, Appendix D) will have adequate latrines and use them has not yet been determined. Of the villages visited throughout Zaire, many had latrines 20 years out of date but which were still in operation. They were mud brick enclosures with doors, dirt floors over wooden bracing, and occasional lids.

The organization for maintenance varies. There are few public latrine systems in any of the rural villages or towns. Many of the latrine structures are family owned and clustered in groups of 20 at the edge of the village, with little thought of effects on groundwater but often odorless and clean.

## Chapter 7

### COSTS

The cost of concrete varies remarkably within Zaire, from Z35-225 per sack (US\$ 7 to 45). Thus the costs of capped springs might vary from under \$20 to over \$300 depending on the flow, construction method, and materials. Emphasis during training on conservation of cement will enable more springs to be capped with the SANRU funds designated for construction materials. Although the costs of cement and pipe were often the prohibitive factors in many villages visited in Zaire, the average costs (\$1 to 5) per person for spring capping falls well below the generally accepted costs (\$20 to 50) per person for effective water supply improvements (see Table 2).

Many factors contribute to make these lower costs possible.

- o No heavy or expensive equipment is required.
- o Generally, spring flow comes directly from protected, underground reservoirs in rock and soil strata which filter and purify water. Thus only protection from surface contamination is required and no treatment.
- o There are no moving parts which require replacement or upkeep in a spring capping system. The spring flow is trapped, contained, and covered, and it continually flows through a pipe to the user. The water normally flows and drains away by gravity.
- o Use of local sand, gravel, rock, clay, tools, and labor accounts for more than half of the costs.
- o Cement and pipe can be readily conserved using rock and mortar walls and short lengths of PVC iron or bamboo pipe.

The cost for 50 mm of PVC pipe was Z150/6m. Reinforcement rods of iron or rebar were Z10/m. The costs for sand, gravel and rock, where it must be bought, was from Z100-300/m<sup>3</sup>. The rough cost of six days labor for 20 persons is estimated to be Z1,000.

Table 2:

Sample Costs of Materials, Tools and Labor for Four Spring  
Varying in Size from 12 to 75 Liters per Minute, Serving 150 to 1500 Villagers Are Listed Below

Spring	Persons Served	Spring Flow (l/m) Usage	PURCHASE PRICE (\$1 = Z5)				VILLAGE PARTICIPATION					Cost Per User	Field Work Days
			Cement	PVC Pipe	Rebar	Total	Rock	Gravel	Sand	Labor	Total		
	(#)	(l/p/d)	(Z)/Sacs	(Z)	(Z)	(Z)/(\$)	(Z)	(Z)	(Z)	(Z)	(Z)/(\$)	\$/p	(#)
CIRIMBI	150	$\frac{12}{16}$	$\frac{450}{3}$	50	30	$\frac{530}{106}$	400	400	150	600	$\frac{2480}{496}$	3	7
CHIGOGO	600	$\frac{40}{15}$	$\frac{600}{4}$	100	60	$\frac{760}{152}$	500	500	200	1000	$\frac{2920}{592}$	1	6
NGOMA	350	$\frac{20}{17}$	$\frac{300}{2}$	75	20	$\frac{395}{79}$	300	300	100	600	$\frac{1695}{365}$	1	6
LANOV 1	1000	$\frac{75}{13}$	$\frac{400}{10}$	125	100	$\frac{625}{125}$	600	400	400	1500 785	$\frac{3925}{785}$	1	7
STANDARD	300	$\frac{20}{15}$	$\frac{600}{4}$	100	50	$\frac{750}{110}$	500	400	200	1000	$\frac{2850}{570}$	2	7

## Chapter 8

### CONCLUSIONS AND SUMMARY OF RECOMMENDATIONS

The most important elements of water and sanitation programs and their potential for development are described below. The recommendations have been divided into the categories of organization, training, development of materials, and evaluation since many of these apply to all the respective programs of Hydraulique Rurale, Peace Corps and SANRU (ECZ/USAID). The water and sanitation officials contacted and their activities list (Appendix C) should prove valuable for water and sanitation work in Zaire.

#### 8.1 Conclusions

The potential for progress in rural water and sanitation development activities is particularly acute. At this time the GOZ Rural Water Department is planning a new program and a three-year plan under new department and division direction. At the same time, SANRU/USAID and Peace Corps are gearing up for significant training and implementation activities in water and sanitation.

It will be critical for the Peace Corps to continue expanding their water and sanitation training and development activities, collaborating with SANRU to provide technical assistance, working with the rural health zone water and sanitation coordinators, and reporting on water and sanitation and development surveys of their posts.

Although the water and sanitation program is only a fraction of the SANRU 86 project, it is of sufficient size to have significant impact on a portion of the zone's rural population. Three issues seem critical: 1) the regional or SANRU zonal water and sanitation coordinators must be carefully selected and provided with adequate support and training; 2) the Kinshasa based SANRU/Church of Christ in Zaire (ECZ) project should allocate staff or resources capable of providing effective coordination, logistics, and impetus to insure water and sanitation program goals, trainee mobilization and organizational collaboration are achieved; 3) CIDEP and other technical training staff should participate in training of trainer's courses in order to more aptly prepare them to transfer their skills and knowledge to the hundreds of extension workers who will be trained.

Important considerations for at least the SANRU water and sanitation training program are:

- o Hire foreman to supervise the local labor force and take responsibility for smooth, dependable construction activities responsive to the training needs of the trainers and participants.
- o Augment confidence level(s) so that trainees will be motivated to initiate water and sanitation projects by:
  - devoting enough workshop time to trainee development of actual first project plans;

- including funds for materials for trainee's first water and sanitation project in each workshop budget, and
  - insuring that the zonal coordinator is available for technical assistance to trainees following the workshop.
- o Modify training over the life of the project to address problems of wells, rainwater harvesting, storage, sanitation, and access.

The regional approach to rural development centers around the existing infrastructure for mission and GOZ hospitals' health extension services. This is one of the few plausible pathways to reach over 90 percent of the rural population who drink from unprotected water supplies. Transportation and communications are so difficult in this vast country that centralized management of a national development program is nearly impossible. Success will depend upon continued encouragement of community participation in locally initiated development activities.

The training activities during this visit demonstrated the need to maintain the development of the WASH spring capping training course at the most basic level. The text should be free of technical language and easily translatable. The course design should insure trainees' confidence in basic skills and generation of actual plans and adequate construction materials for implementation of each participant's first spring capping project. The course length should be no more than two weeks with 10 to 15 trainees participating in a balanced design of field, classroom demonstration, and project planning activities. The outstanding need for training in water and sanitation throughout Zaire is good evidence for completion and distribution of the spring capping, rainwater harvesting, latrine and handump training materials being developed this year for the USAID Office of Health.

The simplest method of capping springs, described in 6.1 is also one of the cheapest water supply improvements available. The cost per person served varied from \$1 to \$5 (see Chapter 7).

## 8.2 Summary of Recommendations

### 8.2.1 Organization

- o Coordinate placement of PCV's within Rural Health Zones; actively support local training of Zairians. Establish a formal mechanism for PCVs to receive SANRU construction materials and, when necessary, training assistance from CIDEP. Require effective reporting and accounting by PCVs.
- o Develop expeditious channels through which materials (cement, pipes, and reinforcement) can be purchased, transported, stockpiled, and distributed by each rural health zone.
- o Insure that a responsible coordinator has been selected who will have adequate time to devote to water and sanitation--approximately one third of a person year.

- o Provide coordinator with adequate materials and training, for hospital administration to recognize significance of program and allocate adequate support, such as transportation, for his/her work to be effectively accomplished.
- o Coordinate training, regional survey data, and water improvements with regional brigades of Hydraulique Rurale and their recently proposed national five-year program.
- o Further explore the means by which SANRU can collaborate with CDI (Centre de Developpement Integral) which supports the Bwamanda/Equateur well-drilling program (see Appendix D).
- o CIDEP and PCV trainers should develop a detailed report on preliminary preparations and planning requirements for a water and sanitation training course.
- o Develop and distribute reporting forms for field work and maintain files at the central bureau of SANRU; provide supplemental technical and other information to participants through a newsletter.
- o Hold periodic meetings with those organizations with related water and sanitation projects.

#### 8.2.2 Training

- o Following the evaluation and modification of the pilot training series for SANRU in Bas Zaire and Equateur, an annual training budget for water and sanitation should be allocated (sufficient for eight to ten training programs per year at Z35,000 a session).
- o Funds should be available to subsidize regional training sessions, organized and conducted by those who were trained by SANRU.
- o An opportunity should be sought for the CIDEP trainers to receive training and to participate in TOT courses offered by another USAID project.
- o After some of the initial problems are resolved, the coordinators of the pilot series rural health zones should meet to discuss and plan organization, distribution, purchase, reporting, transport, etc. Training and job descriptions for coordinators should be reviewed.
- o Periodically, retraining will be necessary to reinforce skills and, if required, to develop new skills, e.g., gravity distribution systems, hydrorams, handpumps/wells. (For these purposes, correspondence courses may be very appropriate and cost-effective.)
- o Mechanisms for responding to requests from the field for technical assistance must be developed, e.g., CIDEP, Hydraulique Rurale, and other collaborators.

- o The Peace Corps summer water training program field visit in Bukavu and the public health water training program should be encouraged so that their active training and spring development program will continue. SANRU should explore ways to participate and provide technical or other assistance.
- o Establish regional training centers and local training capabilities.
- o Course length should be two weeks and there should be about 15 participants; arrangements should be made to hire local labor to free participants and trainers for other activities during construction.

### 8.2.3 Development of Materials

- o Clear and simple steps explaining construction of shallow wells and large cisterns should be developed for future training sessions.
- o Survey, questionnaire and reporting forms should be standardized after the completion of pilot training series.
- o Texts used in training should be translated into local languages.
- o The appropriateness of developing a correspondence course based on the training sessions should be explored.
- o The trainees have expressed a need for training materials so they can train others. The Cameroon flip-chart on water should be modified to include simple steps for construction of springs, rainwater catchment, and possibly cisterns and wells.
- o A posthole digger should be designed for local fabrication and distributed with hand augers to hospital zones.
- o A water and sanitation survey form should be designed for completion by PCV's upon arrival at their posts and centrally filed.
- o Photocopies of local maps should be made available for use by trainees in their villages.

### 8.2.4 Evaluation

- o An evaluation of the training should be made by each trainee after improvement of the first water source. A common questionnaire should be mailed via the zone coordinator and the responses used to modify the training course.
- o CIDEP and PCV trainers should provide a thorough evaluation of the pilot training series.
- o Regional survey data, materials used, and field reports of water improvements completed should be summarized every six months to evaluate progress of the program and devise new methods of encouragement.

- o Collaborating organizations should be requested to review progress reports and be notified of program developments and needs for outside cooperation through a newsletter.

APPENDIX A

WATER AND SANITATION FOR HEALTH (WASH) PROJECT  
ORDER OF TECHNICAL DIRECTION (OTD) NUMBER 100  
June 29, 1982

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

FROM: Victor W.R. Wehman, Jr., P.E., R.S.  
A.I.D. WASH Project Manager  
A.I.D./S&T/H/WS

SUBJECT: Provision of Technical Assistance Under WASH Project Scope of Work  
for U.S. A.I.D./Zaire

REF: A) Kinshasa 6622 dated 14 June 82  
B) Kinshasa 6419 dated 9 June 82  
C) Kinshasa 4953 dated 6 May 82

Camp. Director & M&A. Inc.  
WASH CONTRACT  
JUN 1 1982

*VWW*

1. WASH contractor requested to provide technical assistance to U.S. A.I.D./Zaire as per Reference A (paragraph 2.A and 2.B.).
2. WASH contractor/subcontractor/consultants authorized to expend up to 90 (ninety) person days of effort over a five (5) month period to accomplish this technical assistance effort.
3. Contractor authorized up to 72 (seventy-two) person days of international and/or domestic per diem to accomplish this effort.
4. Contractor to coordinate with AFR/TR/HNP (J. Shepperd), Zaire Desk Officer, AFR/TR/ENGR (J. Snead) and AFR/PD (Zaire) projects officer and should provide copies of this OTD along with periodic progress reports and ETA of personnel as requested by S&T/H/WS and Africa Bureau or Mission personnel.
5. Contractor authorized to provide up to two (2) international round trips from consultants' home base through Washington, D.C. (for WASH briefings) to Zaire and return to home base through Washington, D.C. (for WASH debriefing) during life of OTD.
6. Contractor authorized local travel within Zaire as necessary and appropriate to accomplish this technical assistance effort NTE \$1,200 (one thousand two hundred) without written A.I.D. WASH project manager approval.
7. Contractor authorized to obtain secretarial, graphics or reproduction services in Zaire as necessary and appropriate to accomplish tasks outlined in Reference A, paragraphs 2.A-2.B. These services NTE \$800 (eight hundred) without prior written approval of A.I.D. WASH Project Manager.
8. Contractor authorized to expend up to \$2,200 (two thousand two hundred) for the training materials (models, documents, graphic presentations, slides, etc.) for the development and/or printing/support services associated with Reference A, paragraph 2.A.-2.B.

9. Contractor authorized to provide for car rental, taxi rental or vehicular rental to accomplish this technical assistance effort.
10. Contractor to take portable (manual) typewriter for consultant's use in the field.
11. Contractor to fabricate simple flow measurement equipment in Zaire in such a way as to allow replication of equipment by Zairians.
12. WASH contractor is authorized to install up to three (3) simple spring caps and train locals in installation, operation and maintenance of facilities. Each spring cap NTE \$400 (four hundred) from WASH project in terms of materials (cement, reinforcing bar, wooden forms, braces, tools, sand, aggregate, etc.). U.S. A.I.D./Zaire or Zairian Government to provide any additional resources for training/site development.
13. WASH contractor will adhere to normal established administrative and financial controls as established for WASH mechanism in WASH contract.
14. WASH contractor should definitely be prepared to administratively or technically backstop field consultants and subcontractors.
15. Contractor to prepare or provide draft written report before consultants leave field Mission. The final report is due within 30 (thirty) days of consultants' returning from technical assistance effort.
16. Mission and coordination points in paragraph 4 above should be contacted immediately and technical assistance initiated in conjunction with timing requirements of U.S. A.I.D./Zaire.
14. Appreciate your prompt attention to this matter. Good luck!

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Department of State

INCOMING  
TELEGRAM

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ACTION AID-35

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TO SECSTATE WASHDC 7378

UNCLAS KINSHASA 06622

AIDAC  
FOR S&T/HEA

E.O. 12065 W/A  
SUBJECT: WASH TECHNICAL ASSISTANCE

1. PLEASE PASS THIS MESSAGE TO: WASH PROJECT; PEACE CORPS  
JIM BELL, O.P.D.; AND PEACE CORPS DESK OFFICER FOR INFO.

2. FOLLOWING DISCUSSIONS WITH HAFNER, FRANKLIN BAER AND  
ECZ STAFF, WILLIAM PRUITT AND P.C. STAFF, MISSION REQUESTS  
THE FOLLOWING CONSULTANT ASSISTANCE:

A. TRAINING OF TRAINERS (TOT) CONSULTANT:

- TO CONDUCT 2 WEEK TRAINING OF TRAINERS (TOT) FOR 15  
PUBLIC HEALTH NURSE SUPERVISORS ATTENDING A MONTH TRAINING  
AT UNIVERSITY OF KINSHASA FROM JULY 5 - AUG. 5  
SPONSORED BY BASIC RURAL HEALTH PROJECT, 860-0086;
- TO ARRIVE NLT JULY 15 FOR 4 WEEKS - WITH JULY 15-25  
FOR DESIGN AND PREPARATION, JULY 26-AUG. 5 TRAINING, AND  
AUG. 6-13 FOR REPORT PREPARATION;
- SCOPE OF WORK (SOW) TO INCLUDE:
- PREPARE PRELIMINARY DESIGN IN U.S. IN CONSULTATION  
WITH WASH.

SUBJECTS INCLUDED IN TOT:

- ADULT LEARNING
- DEFINING AND WRITING OF TRAINING OBJECTIVES BASED ON:
- METHODS FOR APPROACHING AND RELATING TO VILLAGE HEALTH  
COMMITTEES
- PLANNING TRAINING SESSIONS
- PRACTICE TRAINING SESSIONS
- INTRO TO INNOVATIVE HEALTH ED. APPROACHES;
- INTERVIEW PARTICIPANTS AND FINALIZE TRAINING DESIGN  
IN CONSULTATION WITH ECZ STAFF;
- IMPLEMENT TRAINING SESSION;
- PREPARE DRAFT INSTRUCTIONAL MATERIALS AND DESIGN TO  
BE LEFT WITH ECZ STAFF;
- ASSIST ENGINEER TRAINER (SEE BELOW) IN PRODUCING DRAFT  
SPRING CAPPING INSTRUCTIONAL MATERIALS;
- TRAINER QUALIFICATIONS: FRENCH FSI-3, MINIMUM 4 YEARS  
PROFESSIONAL TRAINING EXPERIENCE WITH THIRD WORLD NATIONALS  
AT SUPERVISORY LEVEL.
- TRAINEES CHARACTERISTICS: MEDICAL ASSISTANT DIPLOMA-  
NURSE (A2) AND AUXILIARY NURSE (A3), ALL MALE, AGE LATE  
20'S, 30'S. FRENCH PLUS ZAIRIAN VERNACULAR LANGUAGE,  
RESPONSIBILITIES INCLUDE SUPERVISION OF CURATIVE AND  
PUBLIC HEALTH WORK IN AREA SURROUNDING REFERENCE HOSPITAL.

B. SANITARY ENGINEER TRAINER CONSULTANT:

- TO ASSIST IN SPRING CAPPING IN-SERVICE TRAINING OF  
10-12 PCVS JULY 15-30, IN MVENE DITU, E. KASAÏ REGION.  
TRAINING TO EMPHASIZE PRACTICAL DESIGN AND CONSTRUCTION  
SKILL, FLOW MEASUREMENT AND SITE ASSESSMENT;
- TO PREPARE DRAFT SPRING CAPPING INSTRUCTIONAL MATERIALS  
FOR 2 WEEK TRAINING COURSE IN COLLABORATION WITH P.C.,  
ECZ STAFF, AND TOT CONSULTANT;

- TO ADVISE ECZ STAFF ON PLANNING AND PREPARING FOR 2  
WEEK SPRING CAPPING TRAINING PROGRAM LATER THIS YEAR;
- TO ADVISE PCVS AND ZAIRIANS ON POTENTIAL SOLUTIONS TO  
WATERFLOW, DRAINAGE, AND DESIGN PROBLEMS OF EXISTING  
SPRING BOXES AND WILLS IN MVENE DITU AND KONGOLO AREAS;
- PROPOSED SCHEDULE 4-5 WEEKS BEGINNING NLT JULY 12;
- CONSULTANT QUALIFICATIONS:
- PRACTICAL FIELD ENGINEER OR TECHNICIAN WITH MINIMUM 5  
YEARS RURAL AFRICA OR SIMILAR EXPERIENCE;
- EXPERIENCED CONSTRUCTION SKILL TRAINER;
- ABLE TO WORK AND LIVE UNDER SPARSE CONDITIONS;
- DESIRABLE, BUT NOT REQUIRED: PEACE CORPS TRAINING,  
INSTRUCTIONAL MATERIAL PREPARATION EXPERIENCE, FRENCH NOT  
CRITICAL SINCE TRAINING AND SITE VISITS WILL BE WITH  
PCVS.

3. NOTE THAT HAFNER WILL HANDCARRY SPECIFIC PROJECT  
INFO BACK TO U.S. AND WILL BRIEF CONSULTANTS PRIOR TO  
THEIR DEPARTURE. MCNAMARA

Received st/H (Wehman) 6-18-82  
Passed to WASH 6-18-82

McJunkin  
Austin  
Wehman

UNCLASSIFIED

Scope of Work  
For  
Training of Trainers Consultant

- 1) Conduct a needs assessment including interviewing of participants, ECZ staff, and appropriate AID and GOZ officials. July 13 - 25, 1982.
- 2) Prepare a design for a training of trainers (TOT) for 15 public health nurse supervisors as part of the last two weeks of a 5 week course conducted by ECZ project staff at the University of Kinshasa, July 5 - Aug. 5, 1982. (July 13 -26, 1982). Subjects should include but not be limited to:
  - a) adult learning theory
  - b) defining and writing of training objectives based on task analysis
  - c) methods for approaching and relating to village health committees
  - d) designing training sessions
  - e) selecting appropriate training methods
  - f) stand up practice of training sessions
  - g) innovative health education approaches

Problems and examples used during the training should be in the area of environmental health.

- 3) Conduct the two week training session. July 26 - Aug 5, 1982.
- 4) Prepare draft report including a description of the workshop and materials used and leave with ECZ. Aug. 6 - 9, 1982.
- 5) Assist Sanitation Engineer Consultant in producing a draft spring capping instructional manual. Aug 6 - 14, 1982.
- 6) Prepare final report for assignment in U.S.
- 7) Conduct a debriefing at the WASH office on the assignment.

Scope of Work  
For  
Sanitary Engineer Trainer Consultant-OTD 100

- 1) To assist a Peace Corps Volunteer trainer in a spring capping in-service training of up to 12 Peace Corps Volunteers, July 15 - 30, 1982 in and near Mwene Ditu, E. Kasai Region of Zaire. The training should emphasize practical design and construction skills, flow measurement, and site assessment.
- 2) To advise PCV'S and Zairians on potential solutions to waterflow, drainage, and design problems of existing spring boxes and wells in the Mwene Ditu as well as the Kongolo areas, July 31 - Aug. 5, 1982.
- 3) To advise Dr. Frank Baer and the ECZ staff in Kinshasa on planning and preparing for a two week spring capping training program tentatively scheduled for later this year. A set of guidelines and recommendations regarding sites, logistics, staff, supplies and equipment should be prepared for ECZ. Aug. 6 - 9, 1982.
- 4) To prepare a draft spring capping instructional manual, in French if possible, for a two week training course in collaboration with the Peace Corps, ECZ staff and with the assistance of the WASH training of trainers consultant. Aug. 6 - 14, 1982 in Zaire. Draft to be left for P.C. and ECZ.

WATER AND SANITATION FOR HEALTH (WASH) PROJECT  
ORDER OF TECHNICAL DIRECTION (OTD) NUMBER 100  
AMENDMENT NUMBER 1  
December 10, 1982

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

FROM: Victor W.R. Wehman, Jr., P.E., R.S. *QJWW*  
A.I.D. WASH Project Manager  
A.I.D./S&T/H/WS

SUBJECT: Provision of Technical Assistance Under WASH Project  
Scope of Work for U.S. A.I.D./Zaire

REFERENCE: (A) Kinshasa 13558 Nov. 30, 1982  
(B) Kinshasa 12885 Nov. 12, 1982  
(C) State 341873 Dec. 08, 1982  
(D) OTD #100 dated June 29, 1982

1. Paragraph 2 of subject OTD #100 Ref. D. is cancelled. New paragraph 2 of OTD #100 is now to read as follows:

"2. WASH contractor/subcontractor/consultants authorized to expend up to 120 (one hundred and twenty) person days of effort over a six (6) month period to accomplish this technical assistance effort."

2. Paragraph 3 of subject OTD Ref. D is cancelled. New paragraph 3 of OTD 100 is now to read as follows:

"3. Contractor authorized up to 105 (one hundred and five) person days of international and/or domestic per diem to accomplish this effort."

3. Nothing follows.

JHA/ddc

Camp, Dresser & McKee, Inc.  
WASH PROJECT

DEC 15 1982

APPENDIX B

Itinerary

Washington, D.C.	September 29, 1982
Paris/Brussels	September 30
Bujumbura, Burundi	October 1
Bukavu, Kivu, Zaire	October 3
Nyangese, Kivu	October 8
Kinshasa	October 26
Kimpese, Bas Zaire	November 13
Sonabata, Bas Zaire	November 15
Kinshasa	November 17
I.M.E. - Loko, Equateur	November 21
Karawa, Equateur	November 25
Gemená, Equateur	November 27
Kinshasa	November 28
Kimpese, Bas Zaire	December 6
Sonabata, Bas Zaire	December 16
Kinshasa	December 17
Paris	December 22

## APPENDIX C

### Water and Sanitation Officials in Zaire and their Activities

#### USAID/Zaire

Richard Thornton, Director, Public Health Office  
Frank Baer, Project Director, SANRU-86/ECZ

#### U.S. Peace Corps/Zaire

Bill Pruitt, Director  
\*Jerry Wilkinson, Associate Director for Public Health  
Barry Pollock, Spring Cap Trainer for PC and SANRU, former PCV  
Randy Jacunski, Spring Cap Trainer for PC and SANRU, former PCV  
Cit. Mohetu, Artist and Clerk at PC Office  
Abbess Matandiko and Jean Marie, our hosts at Catholic Mission training site in Nyangese, actively involved in many community development projects.

#### Government of Republic of Zaire (GOZ)

Ministry of Education: Centre Interdisciplinaire Developpement Education Permanent/Enseignement Universitaire et Secondaire, CIDEP/EUS (Trainers from the hydrology department for SANRU.)  
Cit. Kalala Muamba, Director, Hydrologist  
Cit. Kalonji, Meteorologist  
Cits. Molemba and Mwanza, Training Assistants

Ministry of Rural Development: Hydraulique Rurale/Genie Rural, HR/GR (Rural Water is a division of engineering)  
Cit. Kena, new Director of GR  
Cit. Sowa, new Director of HR, Sanitary Engineer with training course and construction experience in spring capping; presently developing national 3 year plan; former chief of Haute Kivu HR brigade in Rutshuru.  
Cit. Luboti, Chief of Bas Zaire HR brigade in Scione  
\*\*Cit. Saula, Chief of Kasai HR brigade in Gandejika  
\*\*Cit. Bolabonde, Chief of Equateur HR project in Betale  
Cit. (not appointed), Chief of Bandundu HR brigade in Bandundu  
Cit. Lunda Mpongo, Agent Sanitaire with SOWA.

\*Contact for location and activities of all PCV's doing water and sanitation work

\*\*Not contacted

## SANRU-86 Rural Health Zones

### Kimpese, Bas Zaire: 1st pilot training (Dec. 5-17, 1982)

Dr. Tswakata, M. Co-Director, Public Health Program  
Norman Abell, M.D., Co-Director, Public Health Program  
Cit. Vumi, Nurse, Zonal Water and Sanitation Coordinator  
Dr. Nlandu M., Director, Public Health Program  
Cit. Kimbembe, Agronome, Zonal Water and Sanitation for Nsona Mpangu  
Cit. Longo, Director, Vulgarization for CE.DE.CO.  
Cit. Mata, Agronome, Zonal Coordinator for CE.DE.CO.  
The Prefet and professors at the CE.CO training site, a secondary science and agriculture school.

### Sona-Bata, Bas Zaire: 2nd pilot training (Dec. 19-30)

Dr. Minuku K., Director Public Health Program  
Cit. Itoko, Nurse, Zonal Water and Sanitation Coordinator with training course and construction experience in spring capping.  
Dr. Mpanzu H., Director, Public Health Program at Kasangulu

### Ime-Loko, Equateur: 3rd pilot training (Jan. 5-21, 1983)

Paul Noren, Missionary trained at Bukavu, Zonal Water and Sanitation Coordinator/Trainer  
Bill Mix, M.D., Director, Public Health Program  
Cit. Dote, Nurse, Zonal Co-ordinator

### Karawa, Equateur: 4th pilot training (Jan 24-Feb. 5, 1983)

Dr. Duale S., Director Public Health Program  
Elsie Carlson, Nurse, Present Coordinator Water and Sanitation  
Len Hallock, retired Civil Engineer, constructing hydrodam for mission with manual labor.  
Dr. and Dr. Francis, Directors, Public Health Program at Tandala  
Leo Lanoies, M.D.  
Roger Thorpe, M.D. Tandala

## Representatives from Other Organizations

Dr. Pierre Mazars, Steve and Trish Cavell of OXFAM, B.P. 70, Kananga, Kasai have funded several water and sanitation projects and are interested in further development and printing, for Zaire, of Cameroonian flipchart, "L'eau."  
OXFAM has other field offices in Bandundu and Bas Zaire.

Pere Quanten and Johann Six of Centre de Developpement Integral, C.D.I.Bwamanda, B.P. II, Gemena, Equateur, who have two active rigs drilling hundreds of deep wells in Equateur above the Zaire River, one of their trainees in handpump maintenance will attend Karawa workshop; good linkage for water and sanitation development.

Dr. J.L. Lamboray, Fometro, B.P. 41, Kinshasa I, experience with springs in Bas Zaire; referred me to Cit. Mampasi M.Z. at mission hospital in Kisantu where they have capped springs.

Ted and Nancy McGill, Presbyterian Mission in Bulape, Kasai where they have trained seven member Zairian team to construct cisterns (10m<sup>3</sup>) and photo-documented the construction phases.

Don Roos, experienced sanitary/civil engineer with ECZ, English protestant churches of Zaire in Haut-Kivu; was invited but could not attend Nyangese PCV spring cap training in October.

Carol and Francois Charron, in Gemena, working with research center for goiter and leprosy; explored further development of sketchwork into animation flipcharts for goiter prevention.

Lorenza Phillips in Gemena with Habitat for Humanity.

Organizations To Be Contacted:

Institut Superieur de Developpement Rural, ISDR, in Bukavu, and Cubumbaski. They train students and develop publications in appropriate technology including water and sanitation. Students could do summer projects with SANRU.

UNICEF - develop linkage for they have supported many water and sanitation projects with cement and PVC pipe; as previously in Burundi with Claude Masser's spring project.

CEDI - mission publishing, A/V house in Kinshasa

CEPAS - may be involved in water and sanitation or training activities, on Baer's SANRU board.

INADES - in Abidjan, their agriculture correspondence course; similar prototype for water and sanitation could work well.

The Swedish, Canadian, Belgian and other bilateral development agencies.

APPENDIX D  
S A N R U - 86  
SOINS DE SANTE PRIMAIRE EN MILIEU RURAL  
PROJET USAID N° 660-0086

---

A. Exécutant du projet : Bureau Médical de l'Eglise du Christ au Zaïre  
Avenue de la Justice  
B.P. 3555  
KINSHASA/GOMBE.-

B. Equipe administrative :

- |                                       |   |
|---------------------------------------|---|
| - Citoyen NLABA-NSONA                 | - Directeur                               |
| - Dr. MIATUDILA KALONGA               | - Représentant du Gouvernement<br>zaïrois |
| - Dr. FRANKLIN C. BAER                | - Project Manager                         |
| - Rév. RALPH GALLOWAY                 | - Planning Coordinateur                   |
| - M <sup>me</sup> . FLORENCE GALLOWAY | - Training Coordinatrice                  |
| - Cit. BAKAJIKA MALASA                | - Administrateur Assistant                |
| - Cit. DIANZOLA LUFWAKASI             | - Secrétaire.                             |

C. But du Projet : Conformément au Plan d'Action Sanitaire 1982 - 1986 du Département de la Santé Publique, le Projet SANRU-86 assistera à l'établissement de 50 zones de santé rurales au Zaïre. Chaque ZSR aura l'appui de la communauté, sera auto-suffisant et se composera d'un système décentralisé des éléments suivants :

- Hôpital de Référence
- Centres de Santé
- Postes de Santé
- Comités de Santé de Village
- Agents volontaires de santé de Village.

D. Extrants du Projet :

1. - Etablissement d'un système de statistique et de diffusion d'information.
2. - 250 postes de santé et centres de santé avec :
  - Equipement de base
  - Stock initial de 15 médicaments de base
  - Petit moyen de déplacement
  - Formation du personnel.
3. - Formation du personnel de santé publique au niveau de :
  - Village, 1.500 agents de santé  
400 sage-femmes traditionnelles
  - Poste de santé 750 infirmiers/ères
  - Centre de santé 50 superviseurs
  - Hôpital 30 planificateurs  
50 médecins.
4. - Promouvoir les activités des Soins de Santé Primaires au niveau du village:
  - 3.000 Comité de Santé
  - 2.000 Aménagement des sources d'eau
  - 1.000 Programmes de vaccination
  - 1.000 Agents de santé avec boîtes de secours
  - 25.000 Latrines construites
  - 150.000 Accepteurs de Planning Familial.

## APPENDIX E

### Goals and Expectations/Peace Corps Volunteers/Nyangese Spring Course

- List which trainees came up with, of subjects they wished to cover during the training session

#### I. Community needs and support

- Identify appropriate leaders and workers (masons, laborers)
- Identify different factions within community and involve entire community
- How to determine priority of any one site? Sites that need development more than others, where and why to start.
- How to present (sell) program to community
- Will community assist in obtaining transport of materials and monetary needs.
- Money, funding, cost of development vs. ability to pay.
- realistic work expectations

#### II. Source evaluation

- Reliability - water during all seasons (villagers may describe/define different than you)
- How do you fit the type of source to the site
- How to determine if flow rate is good enough for community needs
- factors one considers when evaluating a site
- how to train others to do source evaluation - possible sites to develop
- How do you know water is potable?
- How to design site survey
- Likelihood of success (and followup)

#### III. Material needs and funds

- Alternative materials
- how to assess costs of project
- Where do you get the funds
- How do you work towards handing over a project if you as a "foreigner" have been getting the dollars?
- form of the grant proposal
- how to get cement at low costs
- how much and what types of equipment are needed
- how do you deal with a project failure where you've wasted a village's resources
- transport
- type of pipe, rust, durability, availability

#### IV. Project Structuring, programming

- Counterparts, animators
- Program aiming for auto-financement
- Working waterwork into existing health services - making sure its considered part of health
- animation education about water borne diseases
- water source development as function of GOZ or as it relates to GOZ
- organization of personal, definition of roles, scheduling of work.

#### V. Technical Knowledge

- Capping Artesian or saepaga sources
- Barrel type sources
- Rainwater catchment
- A.T. How to be able and sure to explain why simple sources better than big ones
- Soil sciences/geological problems
- Upgrading existing sources/repair
- Laundry rocks or pads and other intervention
- Masonry
- How to transfer technical knowledge to counterparts

**VI. Evaluation and Maintenance**

- What does it involve, how do you plan for it and how much money
- Have the right people been trained to maintain the source (women)
- Funding a counterpart
- Typical problems
- Evaluation model - checklist or other type
- Repairs

**VII. Animation and Health Needs**

- Develop water source formation program for training Zairians to do and teach source work. At what level?
- Do people really understand why
- Channels through which animators can do the teaching
- How to link water animation to related health problems
- How to involve whole village - men, women and children
- Follow up of maintenance of source
- What is animator for? Pre construction questionnaire, man for construction, woman hygiene
- Emphasize role of women.

**VIII. Other**

- How to decide which type source is appropriate and convince community of your decision
- Will I be able to pass information I learn here on, in a class
- Develop communications network between Water volunteers.
- Library of technical information and PCV Case studies.

APPENDIX F

UNICEF - LETA Y'UBURUNDI

UNICEF - GOUVERNEMENT DU BURUNDI

Poroje yubaka amasoko ya rusengo mu gihugu hagati

Projet d'Aménagement des sources et Alimentation en eau des Dispensaires

Ruraux.

Nom du fontainier:

Commune :

Izina ry'umukozi :

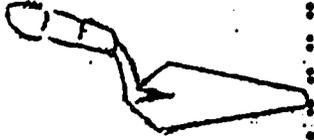
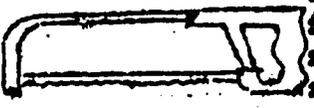
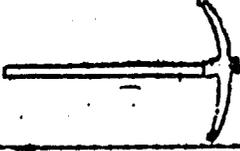
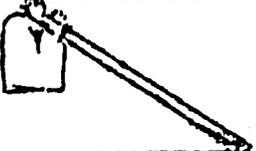
Komine :

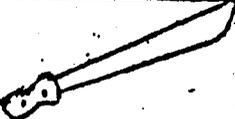
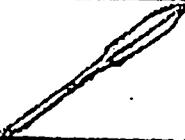
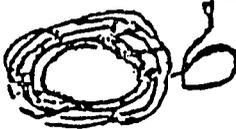
Province :

Provensi :

Equipement du fontainier

Ibikoresho vyo kubaka amasoko ya rusengo

OBJET	IBIKORESHO	DESSIN ISHUSHANYO	NOMBRE IGITIGIRI	DATE ITARIKI	SIGNATURE UNUKONO
Truelle	Umwika				
Niveau	Inivo				
Mètre	Inetero				
Scie à métaux + lame	Umusumeno				
Pelle	Igipawa				
Pic	Isipiri				
Houe	Isuka				

OBJETS	IBIKORESHO	DESSIN ISHUSHANYO	NOMBRE IGITIGIRI	DATE ITARIKI	SIGNATURE
Machette	Umupanga				
Bottes	Ibirato				
Barre à mine	Umutarimbo				
Marteau	Inyundo				
Corde de maçon	Umugozi				
Bic	Ikaramu				

Signature du magasinier

Umukono w'uwashinzwe ivyo bikoresho

**FICHE DE DEMANDE DE TRAVAIL - LISTE YO GUSABA IKORWESHO**

Nom du fontainier:

Umukoti

Nombre de Sources qui

réalisés avec ce

matériau

à

réaliser

seront

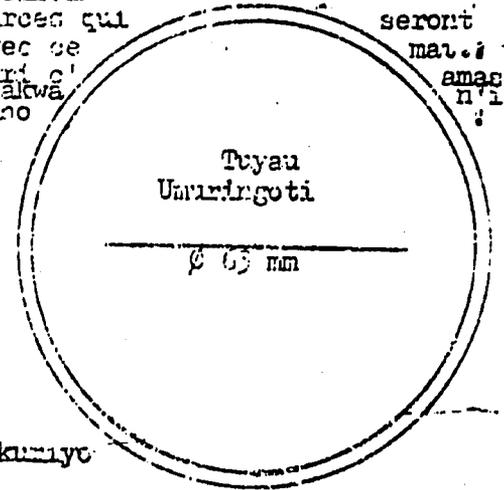
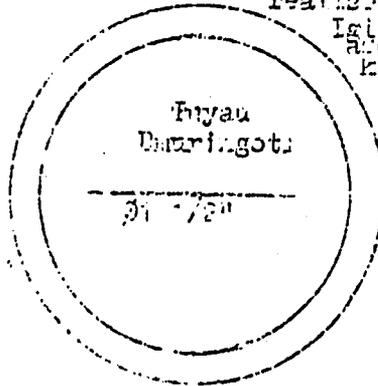
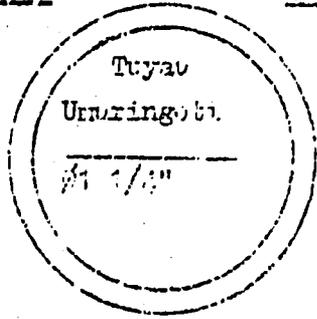
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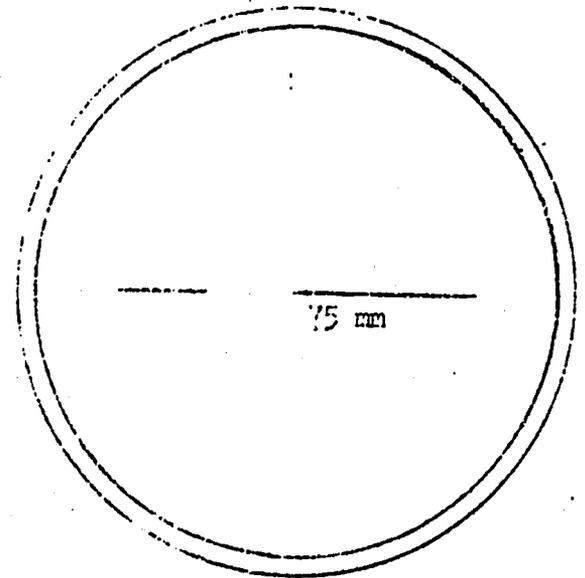
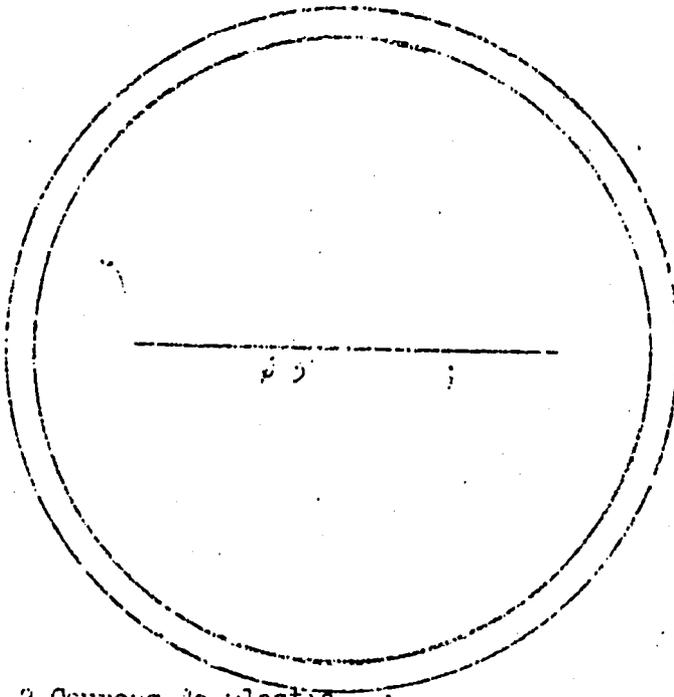
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Province

Canton

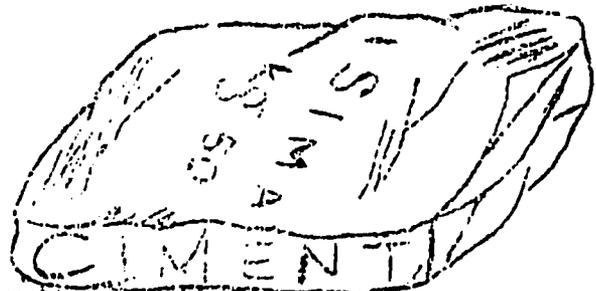
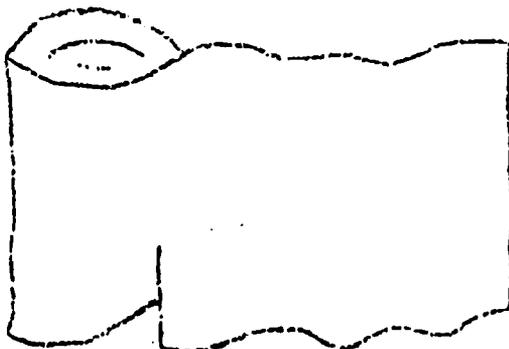


\* Ubwaguke bwa umuringoti buhandutswe kuriyo



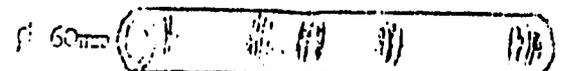
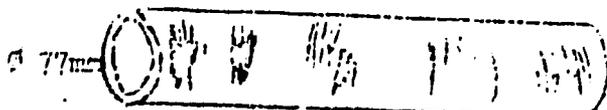
2. Coupons de plastique :  
Igipande gikomeye

Ciment(s) : Sac(s) :  
Isina : Umufuko :



3. Gaine en acier galvanisé - Ihinyu vy'umuringoti y'ama.

\* Ihinyu gikoresha mu muringoti w'ubwaguke bwa 63 mm



Signature:  
Umurororo

Date :

Iki naco gikoresha mu muringoti w'ubwaguke buhandutswe kuriyo na 1 1/4" na 1 1/2"

## APPENDIX G :

W/S Activities Proposed in 1981 for SANRU 86 Phase I Zones

<u>Zone</u>	<u>Pop. (1000)</u>	<u># Villages</u>	<u># Health Agents</u>	<u># Springs to Cap</u>	<u># Wells to construct</u>	<u># Latrines to construct</u>
I.M.E. LOKO	100	200	50-75	300	25	7500
TANDALA	200	200	100	50	--	--
KARAWA	112	224	150	50	20	1000
VANGA	250	420	614	200	(450)	1000
KAJIJI	30	120	15	-- (cisterns/rain water catchment)		
MEMBO NYAMA	62	116	60	100	--	10,000
TSHIKAJI	100	94	20	75	--	--
NYANKUNDE	132	150	60	40	--	15,000
OICHA	294	100	20	12	8	2000
SOMA BATA KASAMBULU	71	291	200	50	--	6000
KIMPESE	91	225	225	--	--	--
KINKONZI	80	300	50	30	20	2000
NSOMA MPANHU	120	128	240	50	30	500
<u>TOTALS</u> (approx.)	<u>1,600,000</u>	<u>2500</u>	<u>2600</u>	<u>1000</u>	<u>550</u>	<u>47,000</u>

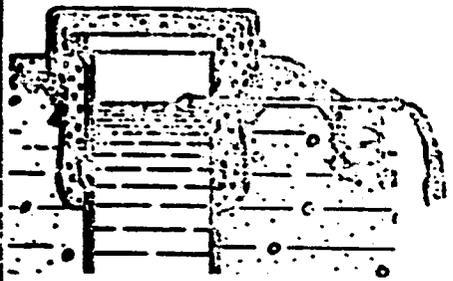
(BIBANGA - KASAI  
KALONDA No RESPONSE)

## APPENDIX H

### Proposed Job Description

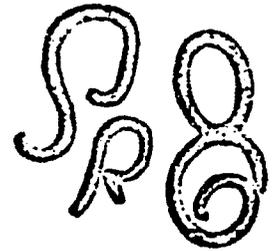
#### SANRU-86 Zonal Water and Sanitation Coordinator:

- Selection of participants for water and sanitation training, health workers, nurses, etc;
- Assisting in preparation and implementation of training;
- Zonal administration of water and sanitation program: responding to field requests for construction materials, accounting, logistics, stockage;
- Providing on-site technical assistance and construction supervision to those trained to improve water supplies in the zone;
- Developing opportunities for retraining and more training in the zone or region;
- Keeping files of field work accomplished and reporting to SANRU/Kinshasa;
- Assisting field in methods to motivate villagers to contribute labor and materials for spring capping and/or wells; in-kind or cotisation (assessment);
- Exploring methods to encourage latrine construction and use by villages in the zone.



# ATTESTATION

N° .....



**SANRU 86**

Nous soussignés, reconnaissons par le présente que

\_\_\_\_\_

a suivi le cours de formation en  
L'AMENAGEMENT DES SOURCES D'EAU POTABLE DU

\_\_\_\_\_

pour la Zone de Santé Rurale de

\_\_\_\_\_

En foi de quoi le présent ATTESTATION lui est délivré

POUR LA DIRECTION DE  
L'EQUIPE FORMATRICE

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POUR LA DIRECTION DU  
ZONE DE SANTE RURALE

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POUR LA DIRECTION DU  
PROJET SANRU 86

*Franklin C. Baer*

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REPUBLIQUE DU ZAIRE  
DEPARTEMENT DE L'AGRICULTURE ET DU  
DEVELOPPEMENT RURAL

DIRECTION DU GENIE RURAL  
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PROGRAMME D'HYDRAULIQUE

DU DEPARTEMENT.

Les objectifs poursuivis par le département dans le domaine de l'approvisionnement en eau des milieux ruraux est d'arriver:

- 1° - Lutter contre les maladies d'origines hydriques
- 2° - Libérer la femme Zairoise de la corvée de l'eau
- 3° - Stabiliser les populations du monde rural  
en fournissant un service de base

Localisation : Pour le moment les actions du Département sont localisées dans les Zones d'opérations de ces trois brigades d'hydrauliques existantes.

Asavoir : - Rutshuru et Luberizi dans le Kivu  
- Naioni dans le Bas-Zaïre  
- Ngandajika dans le Kasai oriental

Les unités composées des Ingénieurs, Techniciens et ouvriers spécialisés exécutent des ouvrages hydrauliques ayant comme objectifs fournir une eau potable aux paysans.

Type de Travaux : Depuis le démarrage du programme d'hydraulique au sein du département nous avons centré nos activités sur

- 1° - Les captages de sources
- 2° - Le creusement des puits
- 3° - Equipements des puits en pompes manuelles et réparations des anciennes pompes
- 4° - Construction des adductions d'eau pour des agglomérations des populations assez concentrées.

Encadrement : Depuis quelques temps le département a élargi ses activités à l'encadrement des fontainiers du village en organisant quelques sessions de formations.

Programme 82 : Pour l'année en cours chaque brigade établit son programme et l'exécute en fonction des moyens dont ils dispose. Cependant la réforme en cours vise à créer un programme national d'hydraulique et capable de définir les objectifs et quantifier les ouvrages à réaliser.

Collaboration : Le département étant l'organe du Conseil Exécutif chargé des actions de développement en milieu rural établit la collaboration avec toutes les organisations non gouvernementales qui oeuvrent dans le domaine de l'eau potable.

Préparé le 20 Décembre  
P. S. O. A.

APPENDIX K

I. Introduction

The SANRU 86 Primary Health Care Public Health Project, USAID Project no. 660-0086, working through the ECZ infrastructure, has as one of its multiple goals the improvement of Water and Sanitation, in its 50 targeted Rural Health Zones, specifically the proposed construction of 1500 Spring Boxes 500 wells, and 25000 latrines by 1986. To this end in late 1982 (Nov. - Dec.) the planning, organizing and initial implementation of 2 training sessions in water source construction took place, these first two sessions being in Bas-Zaire, in the Rural Health Zones of Kimpese and Kasangulu.

The sessions were modeled after a Peace Corps Zaire training session for Peace Corps volunteers which took place in October 1982, in Niangezi, Kivu, run by two Peace Corps volunteers, Barry Pollock and Randy Jacunski. A USAID-WASH consultant, David Goff, attended the October Peace Corps training and helped in the planning for the initial ECZ training in December. In addition, Barry Pollock acted as training coordinator for the first two sessions. He was assisted by several Zairian trainers working for the CIDEF Hydrologie, a Zairian training organization.

II. Goals of the Training Sessions

The goal of the ECZ training sessions was to help the respective Rural Health Zones to set up programs whereby they would be capable of organizing the building of protected water sources. To this end, Village Health Workers (Animators), Rural Dispensary Nurses, government representatives and other Rural Development Agents were selected to participate in the sessions. The following topics were studied:

1. Water - its origins and functions
2. Health Education and animation techniques
3. Community Organization
4. Specific construction techniques for protecting water sources and shallow wells
5. Small Water Storage systems
6. Rainwater Catchment

Construction techniques were studied and implemented in two on-site construction interventions at each training session.

A training manual on these subjects was developed and tested at the two sessions and is in the process of being modified to meet the actual needs of the trainees, for future training sessions.

III. Set-up of Sessions

The two training sessions were coordinated by former Peace Corps Volunteer Barry Pollock. 3 trainers from CIDEF - Hydrologie were present at each session: Citoyens Kalala Mwamba, Kalonji Nsenga and Malemba \_\_\_\_\_ at the first (Kimpese) session, and Citoyen Mwanja replacing Malemba at the second (Sona-Bata, Zone of Kasangulu) session.

23 participants completed the Kimpese course, 8 the Sona Bata. Most of the trainees were nurses at Rural Dispensaries or animators of villages. In addition, several others attended - a representative of the Collectivity at Kimpese, several agricultural workers, representatives of a Rural Development organization, CEDECO at Kimpese. Four trainees from the Rural Health Zone of Sona Pangu also attended the training session at Kimpese.

The training took place at CECO at Kimpese and the Sona Bata Protestant Mission. Training was divided into two main parts - classroom discussion sessions and

on site construction . At Kimpese, one water source, one shallow well and one masonry water storage jar were successfully built. At Sona Bata, two water sources and one jar were completed.

In addition, sufficient materials (cement, pipe and rebar) were left to allow each participant to complete one intervention (source or well) upon return to their respective villages, in the upcoming several months.

#### IV. Summary of Classes

The following classes were presented:

1. Introduction - goals of training - The participants introduced themselves and gave a brief summary of the water and sanitation situation in their specific areas; types of sources encountered, problems with water and sanitation, their needs in terms of technical knowledge, materials. A questionnaire was filled out by each trainee to gather further information on their individual situations.
2. Steps in building a Water source - By asking the trainees the question "What do you think are all the steps involved in achieving a successful intervention in building a water source?", they came up with a list of all the stages-steps involved in a communities building a source or well. This list was used as the basis for the in-class part of the training session.
3. The Water Cycle in Nature - A brief introduction on the cycle of water- rain, surface water, ground water, wells, springs, percolation, natural filtration of soil, recharge and discharge for springs.
4. Different types of Springs - How to identify different sorts of springs (i.e. artesian, gravity, seepage). Different geological, topographical, soil conditions which effect the flow, reliability, purity, and adaptability of springs to being protected by construction.
5. How to select a site for spring development - (Site Surveys) - The conditions necessary and sufficient for a spring to be successfully protected from contamination by construction of a spring box or dam-type source. A standard survey was presented and several springs were visited and surveyed, with the results analysed and discussed back in the classroom.
6. Construction techniques - In class presentation of basic construction techniques - concrete, masonry work - use of forms, rebar reinforcement - foundations, walls - placement of delivery and overflow pipes. This class was followed up by in the field construction practice sessions.
7. Community Organization - Discussion on how to get the community involved in an intervention - animation techniques - contacts with villagers, chiefs - village health and development committees. How to use the Rural Health Zone hospitals as a support system. Tools and material - what's necessary, how to get them. Who pays, who does the work?
8. Review - Of all steps involved in working on a source - After the first source had been worked on for several days (near completion) the trainees came up with a list of all the steps involved in building a source. Each point was discussed (why and how they were done).

9. Disease Cycle - how water acts as a vector for disease - different diseases transmitted by water - importance of protected water sources and latrines to break the cycle of disease transmission. Animating and teaching villagers about the importance of clean, potable water.

10. Rainwater Catchment - how to collect rain water off roofs - how to calculate the quantity of water that can be collected in a given period of time, for a known roof area and rainfall measure.

11. Masonry jar water storage container - the techniques for building a simple water storage container out of a sand-cement mortar mix, using a sack filled with sand as the form, were presented, and a 200 liter masonry jar was built by the trainees.

12. Individual Sessions with trainees - the trainers talked individually with each trainee (using the questionnaires filled out by the trainees at the first session as a guide) about their particular situation - what kinds of sources they had back in their villages, how large an area they would be willing to work in, how much time they'd be willing to spend working on water sources, problems they foresaw, etc.

13. Closing session on first intervention in the village - how to go about organizing and implementing the first intervention upon return to their villages, using what they'd learned in the training - reporting on their work, to their base hospital and to SANRU Kinshasa, all surveys done, reporting on work accomplished, problems encountered - how to use the base hospital as a support system.

#### V. In field Work Experiences

The emphasis of both training sessions was on hands on construction experience on the building of protected water sources (dam-type spring boxes, shallow wells) and a small masonry jar storage container. At Kimpese, the first week a dam-type spring box was built, the second week a shallow well dug and lined with cement block. At Sona-Bata, two dam type springs were built, and a masonry jar. It took an average of 3 complete work days to finish each of these constructions. Villages were selected before the training began and necessary materials (such as sand, stone and gravel) were collected by the villagers. During the actual construction the villagers were asked to help with the digging, cement-mixing, etc. while the trainees did most of the skilled construction, to give them the confidence needed when they were to return to their villages to attempt the same kind of constructions.

The trainees proved surprisingly energetic and hard working - several of the work days extended from 8:00 in the morning to 3:00 in the afternoon with no break for lunch, and they worked enthusiastically and uncomplainingly.

#### VI. Organization of Post - Training Interventions

A major part of the training coordinators job was to set up a system so that the trainees, upon return to their villages and health posts, would be able to use this training to actually organize their communities and build protected water sources. Much time was spent in discussion with hospital administration on how the hospitals could help with logistical and other support. As previously mentioned enough materials (cement, pipe and rebar) were left at the Hospitals so each trainee would be able to build at least one protected source after returning to their villages. (see attachment for detailed report on materials left, who is responsible for their distribution, etc.)

Both hospitals have extensive rural health outreach programs, making regular visits to their rural health centers and posts. Both are equipped with USAID supplied Chevy Pickups, and they agreed to use these vehicles to help supply materials to the different villages and trainees as needed

A standardized reporting form on materials used, sources surveyed, projects completed will be sent to each hospital to be completed every 3 months.

VII. Problems encountered during training

Several unforeseen problems were encountered during the two training sessions.

1. Not enough time was spent before the training preparing the villages where work was to be done. Thus, during the actual training, not enough materials had been gathered at several of the sites, slowing down the work progress. It is suggested that for future training, the trainers be given at least 1 week before the training starts to visit work sites, organize the material gathering, etc.

2. Per diem for trainees - Room and board was paid for by SANRU, but no per diem was previewed in the original budget. However, after several days of each training, many of the trainees began to ask for pocket money for the time spent away from home and work. As the training went on the requests became more adamant, and we finally decided to give each trainee 100 Zaires for per diem. This should be a part of the budget in the future.

3. Length of sessions - The Sona Bata session was only 10 days, as it had to be completed during the Christmas Break while no students were present. This was too short a time and consequently the trainees were overworked, trying to complete each source in 3 days or less. It is recommended to have a complete two week period, which would also leave more time for personal contact between trainers and trainees, which is one of the more effective ways of exchanging information.

4. Teaching techniques of trainers - The CIDEF trainers are used to University level, sophisticated training sessions, where they use primarily an exposition - lecture type method of teaching. At these Water Source training sessions, with village animators and nurses, it was necessary to present materials in as simple a way as possible. The CIDEF trainers were not used to this kind of teaching, and tended to lecture at a level too difficult for the trainees. By the end of the second session they had adjusted somewhat, however I would still recommend that they be given some kind of additional instruction in non formal education techniques if they are to be used in subsequent training sessions.