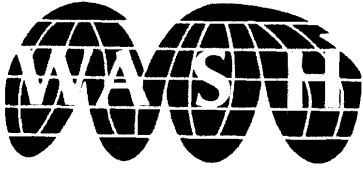


PN-AAT-133

PRELIMINARY PLANNING FOR RURAL WATER SUPPLY ALTERNATIVES IN ZAIRE

WATER AND SANITATION
FOR HEALTH PROJECT



COORDINATION AND
INFORMATION CENTER

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WASH FIELD REPORT NO. 88

JUNE 1983

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

Prepared For:
USAID Mission to the Republic of Zaire
Order of Technical Direction No. 141

WATER AND SANITATION
FOR HEALTH PROJECT



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June 7, 1983

Mr. Richard Podol
Mission Director
USAID Mission
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 Preliminary Planning for Rural Water Supply Alternatives in Zaire.

This is the final report by David Goff and is based on his trip to Zaire from March 14 to March 26, 1983.

This assistance is the result of a request by the Mission on February 2, 1983. The work was undertaken by the WASH Project on March 3, 1983 by means of Order of Technical Direction No. 141, 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

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PRELIMINARY PLANNING FOR RURAL WATER SUPPLY
ALTERNATIVES IN ZAIRE

Prepared for the USAID Mission to the Republic of Zaire
under Order of Technical Direction No. 141

Prepared by:

David Goff

June 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
U.S. Agency for International Development
Washington, DC 20523

TABLE OF CONTENTS

Chapter	Page
ACRONYMS.....	iii
EXECUTIVE SUMMARY.....	iv
1. INTRODUCTION.....	1
2. SANRU-86 NATIONAL CONFERENCE.....	2
3. PROPOSED TRAINING FOR RAINWATER CATCHMENT.....	5
3.1 Training Needs.....	5
3.2 Kasai Training.....	5
3.3 Bas Zaire Training.....	6
4. PILOT SPRING CAP TRAINING PROGRESS.....	9
4.1 Progress.....	9
4.2 Issues.....	9
5. NATIONAL RURAL WATER TRAINING ACTIVITIES.....	11
5.1 UNICEF.....	11
5.2 SANRU-86.....	11
5.3 Peace Corps.....	11
5.4 Hydraulique Rurale.....	12
5.5 CEPAS.....	12
6. RECOMMENDATIONS AND PROPOSED ACTIVITIES.....	14
6.1 Rainwater Catchment Activities.....	14
6.2 Evaluation of Pilot Spring Capping Training....	14
6.3 SANRU-86 Project Development.....	15
6.4 Collaboration of Rural Water Organizations in Zaire.....	15
6.5 Miscellaneous.....	16

	Page
APPENDICES	
A. Order of Technical Direction.....	17
B. Water and Sanitation Officials in Zaire and their Activities.....	21
C. SANRU-86 Soins de Sante Primaire en Milieu Rural Projet USAID No. 660-0086.....	24
D. Organizations Working in Rural Water Supply in Zaire.....	25
E. Zone de Sante Rurale de Kimpese - Enquete sur les Sources d'Eau.....	29
F. Rough Estimate of Financing Required to Support an Average Hydraulique Rural Brigade in Zaire.....	30

ACRONYMS

ADI	Association de Developpement Integral, group supporting Belgian volunteers in Bondaba, near Lisala Equateur. Capped over 100 springs in the area.
CDI	Centre de Developpement Integral, group supporting and implementing a well-drilling program in Equateur.
CEPAS	Centers for Studies of Social Action, found throughout Africa.
CIT	Citoyen, meaning a citizen of the Republic of Zaire; used as Mr. or Monsieur.
EAZ	The Anglican Church of Zaire located in Haut Zaire.
ECZ	Eglise du Christ au Zaire, the Protestant Churches in Zaire.
FOPERDAN	The Father Damian Fund for Leprosy in Haut Zaire.
GOZ	Government of Zaire.
HR	Hydraulique rurale, the Rural Water Department under Rural Enginnering in the Department of Rural Development and Agriculture.
ISDR	Higher Institute for Rural Development, well attended schools found in several locations in Zaire.
PCV	Peace Corps Volunteer.
PVC	Polyvinylchloride, plastic water piping.
RWC	Rainwater catchment; collecting rainwater from roofs or other impermeable surfaces and storing for water supply.
SANRU	SANRU is a rural health project under the administrative direction of ECZ, the Protestant churches of Zaire.
VHW	Village health worker, field agent for rural development.

EXECUTIVE SUMMARY

SANRU-86 (a USAID-funded rural public health project)* organized a national conference for the doctors and representatives of 35 SANRU hospital zones of rural Zaire. The Water and Sanitation for Health (WASH) Project was requested to provide a consultant to make a presentation to the participants on rainwater catchment technology and to determine project training needs.

Through interviews and questionnaires adequate information was obtained to begin long-term project planning for training, construction, and management for spring improvement, rainwater harvesting and wells. Two preliminary training designs were suggested in response to the needs of the rural health zones and to field test the WASH Rainwater Catchment Training Program--the first to develop private systems for hospitals and dispensaries lacking potable water and the second to explore community potable water supplies which originate from tin roofs of houses.

During the consultant's stay, the opportunity was taken to review progress and offer technical support for the SANRU spring capping training program,** and to continue assisting in the organizing of a rural water steering committee for the United Nations Water Decade.

*See Appendix D for project description and goals.

**See WASH Field Report #73.

Chapter 1

INTRODUCTION

WASH involvement with rural water projects in Zaire began in August 1981 when Dr. Raymond Isely of the Water and Sanitation for Health (WASH) Project developed recommendations for increased spring capping and rain water catchment activities. Since that time, Dr. Isely and Craig Hafner of WASH have met on several occasions with Rick Thornton, the Health Officer of the USAID Mission, Dr. Frank Baer, the USAID/ SANRU-86 Project manager, and William Pruitt, the Peace Corps Director. As a result, three consultancies have been organized to address the needs of USAID, SANRU-86*, and Peace Corps/Zaire as follows:

1. Training of Trainers Course for SANRU-86 Zairian nurses completed by WASH consultant Jocelyn Carlson in July 1982.
2. Training program design in spring capping including four pilot training courses for SANRU-86 and technical assistance endorsed by USAID for Peace Corps spring capping training, completed by WASH consultant David Goff in October-December, 1982.**
3. SANRU-86 conference presentation and training program design for rainwater catchment by WASH consultant David Goff in March, 1983.

*See Appendix D for project description and goals.

**In fact, 63 nurses and field agents from nine zones were trained during these four pilot courses. In addition, at least two of these zones have conducted and three others plan to conduct follow-up training for additional participants.

Chapter 2

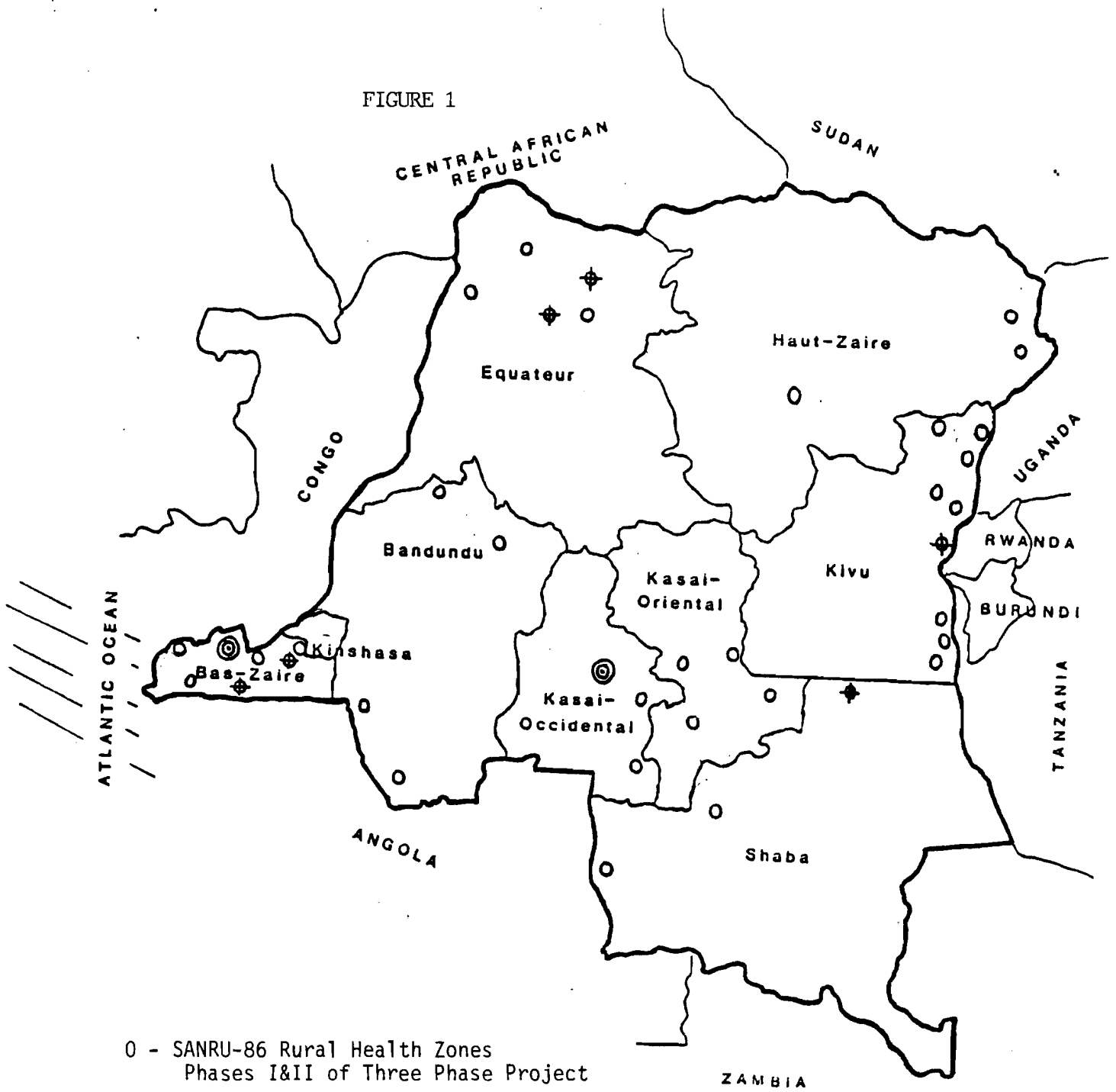
SANRU-86 NATIONAL CONFERENCE

The SANRU-86 Project has three phases. Phase I (1981) involved 20 hospitals; Phase II (1982) 15 hospitals, and Phase III (the final) will focus on establishing or improving rural public health delivery systems. In March 1983, SANRU-86 convened doctors and representatives from the Phase I and II hospital zones to develop plans for many of the basic project goals, e.g. immunization, traditional birth assistance, family planning, etc. Phase I zones shared their project experience to date with Phase II who continued, during the second week, to develop their overall zone plans in more detail.

During the first week, the WASH consultant gave a brief presentation of how rainwater catchment and spring capping technologies could improve potable water in rural zones. Following a discussion period, a short questionnaire was developed and distributed for completion by all participants.

The following map was developed after receiving the responses to the questionnaires and after holding individual sessions with over 20 of the participants. Most of the participants had little firsthand knowledge of rural water conditions and systems throughout their zones. Therefore, this map provides only a first estimate of overall project training needs. This may well be revised after zonal conditions are better assessed. The chart below tabulates the survey results of training which interested the SANRU zonal representatives.

FIGURE 1



○ - SANRU-86 Rural Health Zones
Phases I&II of Three Phase Project

⊙ - Proposed Rainwater Catchment
Training Zones(2)

⊕ - Locations where Spring Cap Training
has occurred(6)

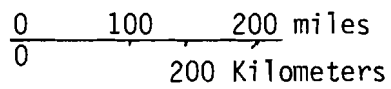


Table 1. Results of Survey of Participants of SANRU-86 National Conference

S A N R U - 86
PROJECT USAID No. 660-0086
BUREAU MEDICAL DE L'ECZ
B.P. 3555
KINSHASA/GOMBE

35 SANRU 86 ZONES
PHASES I & II

KEY: RWC - Rainwater catchment
SC - Spring Capping
W - Hand dug wells
O - expressed interest in training for these techniques in survey.
X - has participated in spring capping training.

<u>RWC</u>	<u>SC</u>	<u>W</u>	<u>REGION</u>	<u>ZONE</u>	<u>HOSPITAL</u>	<u>PHASE</u>
0		0	BAS-ZAIRE	TSHELA	KINKONZI	I
0	X	0	BAS-ZAIRE	SONGOLOLO	NSOMA-MPANGU	I
0	X		BAS-ZAIRE	KASANGULU	SONA-BATA ET RASANGULU	I
0	X		BAS-ZAIRE	MBANZA-NGUNGU	I.M.E. - KIMPESE	I
			BAS-ZAIRE	LUKULA(no show)	LUKULA	II
		0	BANDUNDU	BULUNGU	VANGA	I
0			BANDUNDU	MAHEMBA	KAJIMI	I
			BANDUNDU	KASONGO-LUNDA	KASONGO-LUNDA	II
			BANDUNDU	KUTU(no show)	BOSOBE	II
	X		EQUATEUR	GEMENA	TANDALA	I
	X		EQUATEUR	BUSINGA	I.M.E.-LOKO	I
	X		EQUATEUR	BUJALA	KARAWA	I
	X		EQUATEUR	BUSINGA	BUSINGA	II
	0		EQUATEUR	BOSOBOLO	BOSOBOLO	II
0	0		KASAI-OCCIDENTAL	TSHIKAPA	KALONDA	I
	0		KASAI-OCCIDENTAL	KANANGA(no show)	I.M.C.K.-TSHIPAJI	I
	0		KASAI-OCCIDENTAL	MWEKA	BULAPE/MUSHENGE	II
0	0		KASAI-ORIENTAL	KATAKO-KOMBE	WEMBO-NYAMA	I
0	0		KASAI-ORIENTAL	MBUJI-MAYI	BIBANGA	I
0	0		KASAI-ORIENTAL	KOLE	KOLE	II
0	0		KASAI-ORIENTAL	SENTERY	LUBAO	II
	0	0	HAUT-ZAIRE	IRUMU	C.M.E.-NYANKUNDE	I
	0		HAUT-ZAIRE	DJUGU	DRODRO	II
	0		HAUT-ZAIRE	ISANGI	YAKUSU	II
	0	0	KIVU	BENI	OICHA	I
	0		KIVU	WALUNGU	KAZIBA	II
	X		KIVU	RUTSHURU	RWANGUBA/RUTSHURU	II
	0		KIVU	LUBERO	MUSIENENE	II
	0		KIVU	MASISI	KIROTSHE	II
	0	0	KIVU	FIZI	NUNDU	II
	0		KIVU	LUBERO	KATWA	II
	0	0	KIVU	UVIRA	UVIRA	II
	0		KIVU	DJUMA	--	II
			SHABA	KAPANGA	KAPANGA	II
	X	0	SHABA	KONGOLO	KONGOLO	II
0	0		SHABA	KANIAMA	KANIAMA	II

SUMMARIZING: -Eleven (11) zones interested in rainwater catchment training.

-Thirty (30) zones interested in, and nine of those having already participated in, spring cap training.

-Seven (7) zones interested in hand-dug wells training.

Chapter 3

PROPOSED TRAINING FOR RAINWATER CATCHMENT

3.1 Training Needs

The survey of conference participants indicated a desire and a need for training in rainwater catchment (RWC) to address the following conditions:

- o Many of the hospitals and dispensaries are without an adequate potable water supply, especially during the dry season. Missions are often situated on hilltops with good views but with water supply problems.
- o Many villages in the dryer zones of Bas Zaire, Bandundu, and the Kasais, continue suffering from the 1978 drought. Their springs have dried up and, without technical assistance, they are forced to drink from the many "rivers of bilharzia." There is a significant demand for potable water supplied from wells and rainwater catchment.

Two training courses in rainwater catchment are proposed based upon training needs, the availability of adequate training sites, and technical resources.

3.2 Kasai Training

The first site, Mweka/Bulape in Kasai Oriental, has been tentatively selected to address the need for hospital RWC systems, for the following reasons:

- o There are examples of in-ground ten cubic meter RWC cisterns, recently constructed by a Presbyterian short-term technical team.
- o There is a competent Zairian labor force locally available and trained by the Presbyterian team.
- o A public health Peace Corps volunteer trained in water and sanitation (especially spring capping) is posted in Bulape and will assist in preparation and training.
- o Construction materials for training projects are locally available in stockpiles.
- o Accomodations for training are available during summer vacation for nursing students.
- o Bulape is centrally located for most of the zones which will participate.

Several problems must be resolved in order for this training to be successful, including:

- o The participating zones should select a delegate who will not only have adequate work time to follow through with the hospital RWC construction project but who will also be able to transfer the skills to others.
- o As a result of project funds being cut by 20 percent, SANRU-86 has recently informed the rural health zones that they must demonstrate some means to assist in the support of future training activities. These conditions have yet to be arranged.
- o By contract, SANRU-86 cannot provide construction materials to hospitals for private water supply systems which do not serve the community. UNICEF/Zaire has indicated the possibility of providing materials. However, this must be followed up and developed officially.
- o This training should address the development of management strategies for Bulape's population to more effectively use the subsidized RWC systems presently being installed beside private homes with tin roofs.
- o Sanitary access to stored water must be insured. For this purpose, the light weight PVC Malawi handpump or a locally available handpump could be installed.

The following rural health zones have indicated interest in the proposed Mweka-Bulape two-week training course: Lubao, Kole, Kalonda, Kaniama, Wembo Nyama, Bibanga, Tschikaji, Kajiji, and Kasongo. Lunda may also be an appropriate zone to include. Citoyen Kasonga, chief of the Hydraulique Rurale (HR) brigade in Ngandajika and the chief of the Mbuji-Mayi HR project would be good for technical collaborators, as HR has constructed 20 100 cubic meter underground cement block cisterns for small gravity distribution systems.

3.3 Bas Zaire Training

The second site, Nsona-Mpangu, Bas Zaire, has been tentatively selected for training in village potable water supplies from well, and rainwater catchment for the following reasons:

- o Four Nsona-Mpangu representatives at the spring capping training in December 1982 were very hard-working, interested and cooperative. Since that time they have conducted a follow-up training for twenty other nurses and village health workers.

- o They have expressed a definite need for alternative water supplies such as wells and rainwater catchment because many of their springs have gone dry.
- o This site is centrally located for the other Bas Zaire zones, Kinkonzi and Lukala, which have similar water supply problems.
- o The nursery school is available during the students' summer vacation.
- o There are two Peace Corps volunteers working with the Mission hospital who can assist.
- o Many of the Bas Zaire villages have at least four or five houses with tin roofs.
- o Citoyen Luboti, chief of the HR brigade in Nsioni, is close by and experienced in cistern and well construction.

For this training course to be successful, several problems must be resolved as follows:

- o The WASH RWC training course must be revised to incorporate a short course on hand-dug wells. A difficult task which could require an additional three to five days training period.
- o The use of tin roofs of private houses for a public village water supply.
- o Determining if "ground" catchment or cheaper, locally-made roof surfaces, are viable alternatives in villages without tin roofs.
- o Determining what contributions can be made by the rural health zones and USAID to assist in supporting this training.
- o Review of the consultant's proposed design to feed water stored in several three cubic meter cisterns under private roofs via PVC pipes into a central village cistern constructed as a hand-dug lined and protected well.
- o At least two issues with the above problem are: Will the required piping costs be more than the costs for additional catchment surface and three cubic meter cisterns? Will the hand-dug well hold the stored rain or feed directly into the ground during the dry, depressed water table period?
- o Access to stored or well water could be improved with the Malawi or locally available handpump.

- o Can the same team which field tests the RWC course in Kasai go on to Bas Zaire and spend at least two weeks to develop and then conduct two three-week courses to meet SANRU needs for well and village RWC training?

Chapter 4

PILOT SPRING CAP TRAINING PROGRESS

The interviews with representatives from all of the zones who participated in the pilot spring cap training courses (see WASH Field Report No. 73) demonstrated that progress has been made. Several important issues have surfaced which must be addressed for effective long-term project implementation.

4.1 Progress

Although the training was held in just four zones, representatives from nine zones participated. Of these nine zones, two have conducted follow-up training for other agents within their zones, and three more zones are planning similar events later this year.

Most of the actual capping of new springs is planned for the dry season, November-March. In several zones, sanitary survey work has begun to determine the reliability of spring flows, their use, problems, design, and alternatives. Most zones are forming village health committees. Early sensitization of villagers to project process, planning, and construction will orient them to their roles with regard to labor, funds, materials, and ownership.

4.2 Issues

Project management of water improvements will depend significantly on the interest, responsibility, and capacities of the designated zonal coordinator.

Agents will need technical assistance in site selection and design of their initial springs.

Availability and transport of construction materials will continue to be problems and must be planned well in advance and managed effectively. For example, the price of cement increased from \$9 to \$14 per sack in the most remote region, Haut Zaire, during the first two months of 1983.

The ability of zones to conduct follow-up training also varies significantly among zones. Those with nursing schools are generally more equipped and prepared to train others. The modification of the initial pilot training design has varied from the theoretical and training only for sanitary survey and community participation.

The reference documents prepared by the trainers who conducted the pilot courses have yet to be distributed to the SANRU zones. Many zones need training aids in local languages; e.g., Imeloko and Karawa need Lingala. The first springs to be capped should be situated at the simplest and most likely location to succeed, rather than those most needed. For example, six newly trained agents in Businga want to tackle the town spring which supplies 10,000 persons. The zonal coordinator, who wasn't trained, has requested technical assistance.

Chapter 5

NATIONAL RURAL WATER TRAINING ACTIVITIES

The following are tentative plans for training activities by the various organizations* participating in rural water improvements. The data were gathered from meetings and the review of draft organizational documents.

5.1 UNICEF

UNICEF has tentatively programmed two general training courses in rural water for the Kasai Oriental region. The first, in May, will be for the Hydraulique Rurale brigade. The second (June) session will be for village health workers (VHW). In July, North Kivu VHW's will be trained in spring capping.

5.2 SANRU-86

SANRU-86 has already trained 60 VHWS and nurses in spring capping. One of these zones, Nsona Mpangu, conducted their own training of another 20 VHWS after the initial course. SANRU should at least support another two spring capping training courses. The first will be conducted in May by experienced Peace Corps Volunteers in Kongolo. SANRU-86 is interested in two rainwater catchment courses before September, and at least one on wells by the end of the year.

5.3 Peace Corps

Peace Corps continues to train their volunteers and many Zairians. Their activities were previously reported in WASH Field Report No. 73. In April of 1983, Sarah Ford will train six other PCVs in spring capping for one week during the Bukavu pre-service training. With Ed Wilson (PCV) she will then train another volunteer and 20 Zairian VHWS in spring capping during May at Kongolo where 30 springs have already been capped. Two additional courses will probably be conducted during the fall.

*REGIDESO has participated over the years in rural water training for nationals. However, the emphasis was on more sophisticated improvements for larger "rural" towns, e.g. gravity fed distribution systems. Although REGIDESO is primarily concerned with urban systems, technical expertise is limited in Zaire and collaboration must be prudently explored while maintaining support for a separate national rural water infrastructure.

5.4 Hydraulique Rurale

Hydraulique Rurale (GOZ) has also been active in rural water training over the years, but funds for personal salaries have been lacking recently. Their reports demonstrate both a need and a desire to conduct at least the training courses shown in Table 2 below. The first is scheduled in Bukavu to train VHWS in spring capping, and the second will train another group of Kasai Oriental VHWS in spring capping. The hand-dug well experience of Hydraulique Rurale should be tapped to continue such training.

5.5 CEPAS

CEPAS has been and will hopefully continue to be supported by USAID for appropriate technology projects. In May they will conduct a spring capping course for VHWS in Kikwit. Later on they plan to bring a Kenyan expert into Zaire for a training series on Ghala basket cistern construction.

Table 2:

Tentative Schedule for 1983 Rural Water Training in Zaire

<u>1983 Month</u>	<u>UNICEF</u>	<u>SANRU-86</u>	<u>PEACE CORPS</u>	<u>HYDRAULIQUE RURAL (HR)</u>	<u>CEPAS</u>	
April						
May	14 S,P		6 S		15 S	
June	20 G	20 S	3 S			
July	25 S,P,D	15 R		30 S		
August		15 R,W				
September						
October			20 S		50 R	
November		50 S				
December			20 S	10 S,W,P,D		
TOTALS	59	100	49	40	65	= 313
	39 S 30 R	70 S 20 G	49 S	40 S 50 R	15 S	= 213 S = 100 R

Note: These numbers represent the number of proposed participants for training.

Key: S = spring cap training
R = rainwater catchment training
W = hand-dug wells training
P = handpump training
D = gravity distribution systems training
G = general water and sanitation training

Chapter 6

RECOMMENDATIONS AND PROPOSED ACTIVITIES

6.1 Rainwater Catchment Activities

- o Develop lists of participants, identify co-trainers, confirm lodging, and identify technical support, labor force and training project sites for two courses later this year in Bas Zaire and Kasai Occidentale.
- o Select co-trainers who will fully participate with the trainers and train others in the future.
- o Plan adequate preparation time for trainers and technical support to organize training, project site, and resources allowing at least ten days in advance and four days for evaluation and organization for follow-up training with co-trainers.

6.2 Evaluation of Pilot Spring Capping Training

- o Plan to evaluate progress regarding number of springs capped, technical skills, and additional training needs by regional coordinators and other needs.
- o Continue to support requests coming in from the hospital zones, PCVs, and other groups regarding spring capping construction materials and training.
- o Continue to design the training to include familiarization of participants with their own springs, individual planning guides, available construction materials, and technical assistance from coordinator directly after training.
- o Send a questionnaire to those who participated in the four pilot trainings to ask for progress, determine problems, and provide an evaluation of the training.
- o Village health committees should continue to be established and requested to assist in assessing contributions from villagers for water supply improvements.
- o Request/require SANRU-86 zones to share in funding for training and construction materials to insure responsible involvement, requests for training, and delegation of appropriate resources, and also, to address the 20 percent budget cut in most USAID projects.

6.3 SANRU-86 Project Development

- o Process and schedule the springs, wells, and rainwater catchment requests from the 35 rural health zones which developed during the March conference.
- o Appoint at least a part-time administrative/technical coordinator for the water and sanitation component of the project.
- o Request rural zones to survey for water and sanitation needs. Provide a sanitary survey form such as the Kimpese revision for this activity (see Appendix E).
- o Request update on placement of new Peace Corps volunteers working in public health/water and their training schedules. Verify with Associate Peace Corps Director Wilkenson the presence of any PCVs in SANRU zones, their progress, their needs, and capabilities for participation in water supply improvements and training.
- o Incorporate methods for encouraging and evaluating progress in rural water supply and sanitation improvements; e.g. newsletters and technical reference updates to all zones.

6.4 Collaboration of Rural Water Organizations in Zaire

- o Request assistance from Hydraulique Rurale for hand-dug wells training during the rainwater catchment course in Bas Zaire.
- o Using the tentative schedule of country-wide training (Table 2) supported by various groups, work to reduce expenses and train each others' participants regionally.
- o Follow-up on UNICEF Administrator Abeje's suggestion that if SANRU trained for rainwater catchment at hospitals and dispensaries, UNICEF might possibly find funds for the construction materials.
- o Establish regular meetings to promote collaboration among as many rural water working organizations as possible. This is extremely important. Funds and capabilities must be identified, and implementation schedules must be developed. This is especially so if the permanent infrastructure at Hydraulique Rurale is to be continued and adequately supported. Too much emphasis is being directed towards urban/periurban projects under the U.N. Water Decade which has millions to support a national secretariat. A sub- or steering committee for advocating rural water supplies should be formed.

- o Establish permanent regional training competence and capabilities for all types of appropriate water and sanitation technologies.

6.5 Miscellaneous

- o Experiment with two alternatives for the "Cameroon flip-chart on water" revision through cooperation between OXFAM, SANRU/AID, WASH/AID and CEPAS. It is to be used in the field by health workers and agents.
- o Determine the relative costs of rainwater catchment systems, spring capping, and hand-dug wells with and without handpumps.
- o Cost estimates should be developed for infrastructure to support long-term national rural water supply improvement programs including training.
- o AID should participate more enthusiastically with national UNICEF, Peace Corps, and U.N. Water Decade Programs.
- o In many areas, spring flows vary with the rains. Since there is no record of the lowest flows for many springs, these zones should begin their first spring capping in the dry season and survey the flows for those springs which, if possible, they will continue to cap throughout the year.
- o In some manner, the springs that are initially selected to be capped by the newly trained must be similar to those capped during the training and of small to moderate size, e.g., not as in Businga, where the spring to be capped by six new trainees is so large that it serves the town's population of several thousand persons.
- o Trainees should be encouraged to explain their activities to the villagers and get them to share in the risks and responsibilities involved in capping springs.

APPENDIX A

WATER AND SANITATION FOR HEALTH (WASH) PROJECT
ORDER OF TECHNICAL DIRECTION (OTD) NUMBER 141
March 3, 1983

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

FROM: Mr. Victor W.R. Wehman Jr., P.E., R.S. *WV*
AID WASH Project Manager

SUBJECT: Provision of Technical Assistance Under WASH Project
Scope of Work for USAID/Zaire

REFERENCES: A) Kinshasa 01475, dated 4 Feb 1983

1. WASH contractor requested to provide technical assistance to USAID/ZAIRE as per Ref A, para 1-2.
2. WASH contractor/subcontractor/consultants authorized to expend up to 16 person days of effort over a three (3) month period to accomplish this technical assistance effort.
3. Contractor authorized to expend up to 11 person days of international/domestic per diem to accomplish this effort.
4. Contractor to coordinate with AFR/TR/HN (J. Shepperd), AFR/TR/ENG (J. Snead), AID Zaire desk officer and should provide copies of OTD No. 141 along with periodic progress reports or coordination cables as requested by AFR Bureau or S&T/H staff.
5. Contractor authorized to provide up to one (1) international round trip from consultants home base through Washington (for briefing) to Kinshasa, Zaire and return to home base through Washington (for debriefing and report preparation) during life of this OTD.
6. Contractor authorized local travel within Zaire as necessary and appropriate to accomplish this technical assistance NTE \$400 without the prior written approval of the AID WASH Project Manager.
7. Contractor authorized to obtain local secretarial, graphics or reproduction services in Zaire as appropriate and necessary to accomplish tasks NTE \$800 without the prior written approval of the AID WASH Project Manager. These services are in addition to the level of effort specified in para 2 and 3 above.
8. Contractor authorized to provide for car or taxi rental if necessary and appropriate to facilitate effort. USAID/Zaire is encouraged to provide mission vehicles to consultant if available and appropriate and to support consultant in field if possible.

9. Contractor authorized to develop training aid, or training materials (seminar materials) as appropriate and necessary to carry out the scope of work in Ref A, para 2.A.-2.D. NTE \$ 300 without the prior written approval of the AID WASH Project Manager.
10. WASH contractor will adhere to normal established administrative and financial controls as established for WASH mechanism in WASH contract.
11. WASH contractor should definitely be prepared to administratively or technically backstop field consultants and subcontractors.
12. New procedures regarding subcontractor cost estimates and justification of contractors/subcontractors selection of consultants remains in effect.
13. Contractor to report on technical assistance effort. Consultant to provide coordinated draft report to USAID/Zaire before leaving Zaire. Final report to be due to USAID/Zaire and S&T/H within 30 days of return of consultant to the U.S. Final report to be prepared in English, single-spaced. Contractor should be prepared to translate final report into French upon direction from S&T/H/WS with concurrence and request to do so by USAID/Zaire.
14. USAID/Zaire and other coordination points identified in para 4 above should be contacted immediately and technical assistance initiated as soon as possible or convenient with USAID/Zaire.
15. Appreciate your prompt attention to this matter. Good luck.

ACTION
COPY

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Department of State

INCOMING
TELEGRAM

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ACTION AID-00

WASH
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ACTION OFFICE STHE-01
INFO AFEM-01 AFCW-03 AFCA-03 STAG-02 SAST-01 ENGR 01 STFA-01
RELO-01 STHP-01 MAST-01 AFPM-01 019 A4 707

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INFO AMEMBASSY ABIDJAN
AMEMBASSY BRAZZAVILLE

UNCLAS KINSHASA 01475

AIDAC
FOR S&T/H FOR PASS TO WASH, TELE. NO. (703) 243-8200

E. O. 12356 N/A
SUBJECT: TDY OF WASH CONSULTANT DAVID GOFF TO ANNUAL
HEALTH CONFERENCE OF BASIC RURAL HEALTH, 660-0086

1. ANNUAL HEALTH CONFERENCE OF BASIC RURAL HEALTH
PROJECT 660-0086, TO BE HELD MARCH 14-19, 1983 IN
KINSHASA. PARTICIPANTS TO INCLUDE 35 MEDICAL DIRECTORS
AND 30 HEALTH TRAINERS OF THE 35 RURAL HEALTH ZONES (RHZ)
INCLUDED IN PHASE I AND II OF PROJECT. FOCUS OF CONFERENCE
IS DISCUSSION AND PLANNING OF TRAINING STRATEGIES FOR
PRIMARY HEALTH CARE WORKERS, I. E., NURSES, VILLAGE HEALTH
WORKERS (VHW), AND TRADITIONAL BIRTH ATTENDANTS (TBA).

2. MISSION REQUESTS TDY MAR. 15-26 FOR WASH CONSULTANT
DAVID GOFF AT THIS CONFERENCE TO PROVIDE INPUT FOR THE VHW
WORKSHOP. SCOPE OF WORK TO INCLUDE:

- (A) DISCUSS WITH PARTICIPANTS THEIR NEEDS FOR SPRING
CAPPING, RAIN WATER HARVESTING AND WELLS CONSTRUCTION
AS PART OF THEIR RHZ PROGRAM;
- (B) PRESENT/DISCUSS TRAINING STRATEGIES TO MEET THE ASSESSED
NEEDS OF EACH RHZ;
- (C) PLAN REGIONAL WATER RELATED SEMINARS FOR 1983-84;
- (D) IDENTIFY AND PLAN WITH TWO RHZS FOR RAINWATER HARVEST-
ING SEMINARS PROPOSED FOR JULY-AUGUST IN COLLABORATION
WITH WASH ASSISTANCE.

MISSION CITES GOFF'S RECENT EXPERIENCE IN CONDUCTING
AND ORGANIZING WATER RELATED SEMINARS IN ZAIRE FOR
THE BRH PROJECT AS RATIONALE FOR REQUESTING THIS PARTI-
CULAR CONSULTANT. IT IS ALSO NOTED THAT GOFF PLANS
TO BE IN TOGO FOR FEB. 17 - MARCH 13 FOR TRAINING
ACTIVITIES AND WOULD BE ABLE TO ADD ZAIRE TO HIS ITINERARY
AT LITTLE ADDITIONAL COST. MISSION PLEASED WITH WASH
RESPONSIVENESS TO NEEDS OF BRH PROJECT AND ENCOURAGES
CONTINUED COLLABORATION. PLEASE ADVISE. CONSTABLE

Mc Junkin
Austin
Witten
~~Wehman~~
UWW

Received STH/WS (Wehman) 2-8-83
Passed to WASH 2-8-83

UNCLASSIFIED

1753

WATER AND SANITATION FOR HEALTH (WASH) PROJECT
ORDER OF TECHNICAL DIRECTION (OTD) NUMBER 141
AMENDMENT NO. 1
10 May 1983

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

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

SUBJECT: Provision of Technical Assistance Under WASH Project
Scope of Work for USAID/Zaire

REFERENCES: OTD # 141, dated 3 March 1983

1. Para 2 of subject OTD # 141 (Ref A) is cancelled. New para 2 to subject OTD # 141 (Ref A) is now to read as follows:

"2. WASH contractor/subcontractor/consultants authorized to expend up to 24 person days of effort over a four (4) month period to accomplish this technical assistance effort."
2. Para 3 of subject OTD # 141 (Ref A) is cancelled. New para 3 to subject OTD # 141 (Ref A) is now to read as follows:

"3. Contractor authorized to expend up to 15 person days of international/domestic per diem to accomplish this effort."
3. New para 5.A. to subject OTD # 141 (Ref A) is to read as follows:

"5.A. Contractor authorized to provide up to one (1) domestic round trip from consultants home base in U.S. to Washington D.C. (for debriefing and report preparation) and return to consultants home base."
4. Nothing follows.

APPENDIX B

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 Cameroonain 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 have₃ trained seven member Zairian team to construct cisterns (10m³) 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.

APPENDIX C

S A N R U - 86
SOINS DE SANTE PRIMAIRE EN MILIEU RURAL
PROJET USAID No 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 MALONGA - Représentant du Gouvernement zaïrois
- Dr. FRANKLIN C. BAER - Project Manager
- Rév. RALPH GALLOWAY - Planning Coordinateur
- Mrs. FLORENCE GALLOWAY - Training Coordinatrice
- Cit. BAKAJIKA MALASA - Administrateur Assistant
- Cit. DIANZOLA LUFWALASI - 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 D

Organizations Working in Rural Water Supply in Zaire

1. Genie Rural (Department of Agriculture)
Citoyen Kena, Director

Direction Administration Generale des Projets
M. Obels, Conseiller Technique
2. Hydraulique Rurale (HR) (Department of Agriculture)
Citoyen Sowa, Chief

Project Maraicage et Pisciculture
M. Pue, Ingenieur

Les Brigades:

- Nsioni, Citoyen Luboti
- Ngandagika, Citoyen Kasonga
- Rutshuru, Citoyen
- Bandundu, not yet functioning
- Bukavu (Projet Antibakwa)
- Befale, Projet

3. Centre d'Etudes pour l'Action Sociale (CEPAS)

Pere Didier de Failly
Citoyen Lungela, Ingenieur
Citoyenne Brigitte, Secretaire
Bibliotheque et librairie

Plus de support est attendu d'USAID pour la deuxieme partie du projet qui s'occupera (technologies appropriees):

- catalogue et exemplaires de references
- formation/amenagement des sources a Kikwit avec l'aide de l'ingenieur Pue d'un projet PMP a Kin (Fish and Wetland Project).
- formations pour faire les jarres de Ghala. Une personne venant du Kenya aidera a la formation.
- series d'aides audio-visuelles utilisant des photos, des diapositives, une video et Radio Candip qui a deja participe a trois programmes sur l'eau potable.

Beaucoup de references sont disponibles, telles que "Un Premier Inventaire de Technologies Appropriees au Zaire", AGRIPROMO, #s 35, 37, 339, "L'Eau et la Sante".

4. USAID/Energy

USAID/Zaire: Bureau de Braddock Williams, Mulambo, supportant les petits projets des trois beliers a Kinkonzi, Bas-Zaire et trois projets de micro-turbines a Rethy (pres de Buna), Tshikadji et Kerawa.

USAID/Burundi: Claude Massar et un ingénieur Burundian du gouvernement supportent un projet national pour l'aménagement des sources.

5. Eglise Anglicane au Zaire (EAZ)

Don Roos, engineer building gravity water distribution system in Haut Zaire.

6. JTR (protestant) et Projet Rural (catholique)

One or two springs capped a month. Bernard Nipper or Manos Sneldon working with Hydraulique Rurale. Village participation increased from 20% to 67%.

French Technical Assistance in Department of Agriculture and Rurale Development:

- M. Jacques Obels, technical consultant
- Director, Administration Generale des Projets
- M. Jacques Pue, engineer with Fish and Wetlands Project, PMP.

APPENDIX D (Continued): From Technologies Appropriées au Zaïre: Un Premier Inventaire,
Didier de Failly S.J., CEPAS, Kinshasa, Zaïre.

— La Faculté Polytechnique de l'Université de Kinshasa a effectué des essais d'armature du béton avec du bambou.

Contact: B.P. 127, Kinshasa XI.

— Le procédé de cuisson des briques était autrefois très utilisé dans les missions catholiques pour la construction de leurs propres bâtiments (résidences, hôpitaux, écoles, etc). Il a été ensuite adopté dans les villages: on en voit beaucoup d'exemples au Bas-Zaïre (Kimpese, Mayombe), et ailleurs dans le pays.

— Les briques adobes sont également produites localement en divers endroits du pays, avec de grandes variations de qualité en fonction des caractéristiques du matériau et de l'équipement employés. Des presses CINVA sont utilisées par exemple par le programme "Habitat pour l'Humanité" à Tondo et dans 17 autres villages autour du lac Tumba (Équateur). Une dizaine d'autres presses CINVA, importées de Cali (Colombie), fonctionnent autour de Songololo au Bas-Zaïre.

Contact: (Tondo) Habitat for Humanity,
c/o ECZ, B.P. 3094, Kinshasa-Gombe.

(Songololo) R.P. Karl AMPE,
B.P. 134, Mbanza-Ngungu (Bas-Zaïre).

— La couverture des toits par des tuiles a été autrefois fort répandue. Leur emploi s'est raréfié ensuite à la faveur de la diffusion des tôles galvanisées, mais connaît depuis peu un regain d'intérêt devant le renchérissement du prix des tôles.

— Signalons les programmes d'amélioration de l'habitat à Tondo et à Pawa.

Contact: (Tondo) Habitat for Humanity,
c/o ECZ, B.P. 3094, Kinshasa-Gombe.

(Pawa) R.P. Piero MANCA,
B.P. 40, Wamba ou B.P. 326, Isiro (Haut-Zaïre)

— Le Frère René ROGGEMAN, du Secrétariat Général de la Conférence Episcopale (Catholique) du Zaïre, a déjà installé près de 120 unités photo-voltaïques de 12 volts (valeur 60.000 FB) pour l'éclairage des maisons, le fonctionnement de frigos (chaînes du froid: conservation des vaccins), et d'émetteurs-radio, etc... souvent en collaboration avec le FOMETRO (Fonds Médical Tropical).

Contact: — Frère René ROGGEMAN, Centre Interdiocésain,
B.P. 3258, Kinshasa-Gombe.

— FOMETRO, B.P. 7779, Kinshasa I.

— On peut également voir une installation de chauffe-eau solaire au Centre Interdiocésain à Kinshasa. Ce procédé intéresse particulièrement les services de pédiatrie des hôpitaux situés dans les régions montagneuses du Kivu et les hauts-plateaux du Shaba.

Contact: R.F. René ROGGEMAN, Centre Interdiocésain,
B.P. 3258, Kinshasa-Gombe.

— On peut en voir une autre à Kabinda, qui sert à pomper l'eau.

Contact: Mission Catholique Kabinda, c/o B.P. 400, Mbuji-Mayi.

1.7. ENERGIE HYDRAULIQUE MECANIQUE

— Autour de KARAWA (Équateur) fonctionnent 4 roues à eau qui animent des pompes à eau pour les villages. Fabriquées en bois, ces roues de 3 m de diamètre font 16 rotations par minute et sont couplées à des différentiels récupérés sur des épaves de véhicules. Capacité de pompage journalier: environ 64 m³. On envisage de les utiliser pour actionner des décortiqueuses de café et des marteaux-pilons de forge.

Contact: Mr. Bob THORNBLOOM, CEUM/IME-Karawa, B.P. 140,
Gemena (Équateur).

— A Kankule, à proximité de Lwiro (Kivu), un meunier, ancien mécanicien, a remplacé le vieux moteur diesel qui entraînait son moulin à manioc par une roue à aubes, couplée par un cardan double à une boîte à vitesses de récupération. La démultiplication est assurée par un système de poulies, pour atteindre 1.200 tours/minute. Ce meunier travaille 24h. sur 24h. avec quatre ouvriers meuniers. L'ENDA/Dakar a publié une note technique décrivant ce système (disponible au Service de Promotion des Technologies Appropriées du CEPAS).

Contact: Cit. KUNGA Djuma, c/o R.P. A. LACOSTE, B.P. 480, Bukavu (Kivu).

— Un "moteur à eau" a été mis au point à Kolwezi: un fût accumule 200 litres d'eau et libère brusquement cette quantité d'eau sur des roues à eau qui mettent des bielles en mouvement (voir description dans le bulletin de l'AZAP, 30 septembre 1981).

Ce procédé est protégé par le brevet n. 2400 bis/79 délivré le 15 décembre 1979.

Contact: Cit. LUMAMI Kitamba Munyembo, Directeur de l'École Primaire "MUSONIEO", Kolwezi.

— Plusieurs autres roues hydrauliques fonctionnent depuis des années dans des plantations, des missions, etc. pour l'alimentation en eau. Signalons à titre d'exemples les missions catholiques de:

— Lemfu (au Sud de Kisantu) et de Mawanga au Kwango.

Contact: c/o B.P. 3064, Kinshasa-Gombe.

— Kasanza et Gungu au Kwilu. Contact: c/o B.P. 144, Kikwit.

— Murhesa et Bagera au Kivu. Contact: c/o B.P. 162, Bukavu.

N.B. Le système hydraulique de Murhesa a connu des difficultés en 1980 quand on a remplacé l'ancienne roue par une plus grande: les pignons de transmission ont cassé.

— De même existent en divers endroits des béliers hydrauliques, souvent de fabrication allemande. Le Projet d'Hydraulique Rurale du Nord-Est du Zaïre à Rutshuru étudie leur fabrication sur place selon un modèle mis au point par VITA (Volunteers in Technical Assistance, Arlington, Virginia, USA).

Contact: Igr. SOWA Lukono

Projet Hydraulique Rurale, B.P. 77, Rutshuru (Kivu).

La plupart des opérations de développement rural intégré poursuivent un programme d'assainissement de l'eau. On ne citera donc ici que quelques exemples.

L'Institut de Développement Rural (ISDR) de Bukavu assure des sessions de formation pour l'assainissement de marais et de bas-fonds, l'aménagement de sources et le creusement de puits.

Contact: ISDR, B.P. 2849, Bukavu (Kivu).

Un équipement d'assainissement de l'eau, fonctionnant selon le procédé de la chloration, est actuellement en train d'être testé dans une mission catholique du Haut-Zaïre: 1.000 litres par minute, sans activation électrique.

2.1. AMENAGEMENT DE SOURCES

— Par exemple l'action de la Fondation Père Damien (FOPERDA) à Wamba, qui a mené un programme de réfection ou de construction de 20 captages à Pawa, 40 à Legu et 40 à Bafwabaka.

Contact: — Dr. Jacques DEVERCHIN, FOPERDA, B.P. 84, Isiro (Haut-Zaïre).

— R.P. Piero MANCA, Commission Diocésaine de Développement de Wamba, B.P. 40, Wamba ou B.P. 436, Isiro (Haut-

Zaire).

- A Lusanga et à Kikongo P.L.Z., près de Kikwit (Bandundu) fonctionnent des puits artésiens, qui utilisent la force de jaillissement des nappes phréatiques.

2.2. CREUSEMENT ET FORAGE DE PUIITS

-- L'Association de Développement Intégral, basée à Bondaba (ADI-Bondaba) a poursuivi depuis plusieurs années un programme de creusement de puits. Les opérations sont manuelles; le puits est ensuite cimenté à l'aide de coffrages circulaires métalliques, construits à Kinshasa par la société MOBIMETAL (2e-Rue, Limete).

Contact: ADI-Bondaba, B.P. 49, Lisala (Equateur).

-- Le Centre de Développement Intégral de Bwamanda (CDI-Bwamanda) mène un programme de forage de plusieurs centaines de puits en Ubangi, à l'aide d'une puissante plate-forme de forage tractée.

Contact: CDI-Bwamanda, B.P. 11, Gemena (Equateur).

2.3. INSTALLATION DE POMPES

-- Le Fonds du Bien-Etre Indigène (FBI) avait installé autrefois des centaines de pompes manuelles rotatives dans les villages. La plupart se sont ensablées par manque d'entretien. Certaines fonctionnent cependant encore, comme à Gandajika au Kasai Oriental ou à Kasenye en Ituri. L'UNICEF poursuit un programme de réhabilitation de pompes anciennes et d'installation de pompes nouvelles, importées de l'Inde (INDIA MARK II), en collaboration avec des équipes d'hydrauliciens du Département du Développement Rural.

Signalons l'installation de 43 pompes dans la sous-région des Cataractes au Bas-Zaire, et d'une vingtaine dans la sous-région du Nord-Kivu (où 122 pompes ont été fournies au Projet d'Hydraulique Rurale de Rutshuru).

Contact: UNICEF, B.P. 7248, Kinshasa I, ou B.P. 39, Boma (Bas-Zaire)
ou B.P. 864, Bukavu (Kivu).

2.4. ADDUCTIONS GRAVITAIRES D'EAU

Plusieurs paroisses et hôpitaux s'alimentent en eau en la captant en des endroits plus élevés que leur propre site, et en la canalisant, selon le principe de Paqueduc utilisé depuis l'antiquité. Le Projet d'Hydraulique Rurale de Rutshuru a repris ce système, avec l'aide de l'UNICEF, pour installer des bornes-fontaines et des douches publiques dans plusieurs villages du Nord-Kivu: en octobre 1980, il avait réfectionné une adduction de 9.500 m alimentant 6 douches et 10 bornes-fontaines, et installé une adduction de 4.450 m alimentant une douche de 10 bornes fontaines, et une autre de 2.417 m avec 3 bornes fontaines. La population bénéficiaire (environ 30.000 personnes) a participé largement aux travaux.

Contact: Projet d'Hydraulique Rurale
B.P. 77, Rutshuru (Kivu).

-- Pareils systèmes fonctionnent aussi à Kavumu (Kivu), à Kikombo et à Kigungunji (Kwilu).

APPENDIX E

ZONE DE SANTE RURALE DE KIMPESE
ENQUETE SUR LES SOURCES D'EAU

Nom du village/hameau _____

Groupe ment _____ Collectivité locale _____

Zone _____ S/Région _____ Région _____

Noms des notables
 Chef de village _____ Duc _____
 Chef de terrain _____ Dirigeant _____

Nombre de foyers _____ Population résidante _____

Nom de la source _____ Distance du village _____
 (au verso - croquis de la situation géographique : source, cours d'eau, hameaux/villages, pistes, avec indication de distance, pente etc.)

Débit _____ litres par minute (mesuré ou estimé). Population qui utilise cette source _____

Utilisation de cette eau _____
 (Préciser l'activité et les distances entre les points)

Description : Pente et écoulement _____

Accès _____

Contamination (cause) _____
 Peut-on éviter ou contrôler la contamination? Comment? _____

Sol (argile, sable, pierres etc.) _____

Résumé de la situation de cette source _____

Travail déjà fait pour aménager cette source (par qui, quoi, résultat) _____

Proposition d'aménagement _____

Qui peut diriger le travail? _____

Matériaux nécessaires	Quantité approx.	Disponible à quelle distance	Moyen de transport	Pop'n peut contribuer
Pierres	_____	_____	_____	_____
Gravier	_____	_____	_____	_____
Sable	_____	_____	_____	_____
Ciment	_____	_____	_____	_____
Fer à béton	_____	_____	_____	_____
Tuyau	_____	_____	_____	_____
Autre	_____	_____	_____	_____

Estimation de travail (Hommes/jours) _____

Description et plan de travail, problèmes envisagés et solutions possibles au verso

Fait à _____ le | | par _____

APPENDIX F

ROUGH ESTIMATE OF FINANCING REQUIRED TO SUPPORT
AN AVERAGE HYDRAULIQUE RURALE BRIGADE IN ZAIRE

An average brigade located in a rural region of Zaire would include the following personnel and facilities. It is assumed that existing buildings will be used. Presently, three brigades in Rutshuru, KIVU; Gandejika, KASAI ORIENTAL; and Nsioni, BAS ZAIRE and two project staffs in Befale, EQUATEUR and Mbuji Mayi, KASAI ORIENTAL are operative. Funds for personnel salaries have at times been delinquent for eight months. Current efforts are being made to reinforce the significance of this national rural water supply infrastructure. Each Brigade covers five or six rural political zones, and may accomplish 20-30 spring cappings, maintenance and installment of as many handpumps and perhaps two small gravity distribution systems. All of the estimates given in this appendix are extremely rough around the edges.

PERSONNEL: one(1) hydraulic engineer

two technical assistants, 1 mapmaker and draftsman
1 construction supervisor

six(6) plumbers one(1) secretary one(1) accountant

six(6) masons one(1) stock clerk 10-20 laborers

two(2) chauffeurs

EQUIPMENT: one(1) truck one(1) car and other less capital intensive
supplies for the office and field

FINANCING: Z800,000-1,000,000 or \$200,000(by the official Z5/\$)

per year

per year