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INTERNAL EVALUATION OF USAID ASSISTANCE TO THE RURAL WATER SUPPLY AND SANITATION SECTOR IN ZAIRE

Field Report No. 313
June 1990

WATER AND SANITATION for HEALTH PROJECT

Sponsored by the U.S. Agency for International Development
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WASH Field Report No. 313

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Prepared for the USAID Mission to Zaire
under WASH Task No. 150

by

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and
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ACRONYMS

AIDRZ	*Association Internationale de Développement Rural au Zaire*
CNAEA	*Comité National d'Action de l'Eau et de l'Assainissement*
ECZ	*Eglise du Christ au Zaire*
HPN	Health, Population, and Nutrition Office of USAID/Zaire
GOZ	Government of Zaire
JICA	Japanese international aid organization
NGO	Nongovernmental Organization
O&M	Operations and Maintenance
PVO	Private Voluntary Organization
REGIDESO	*Regie de Distribution d'Eau de la République du Zaire*
RWS	Rural Water Supply
SANRU	*Projet de Soins de Santé Primaires en Milieu Rural* (Basic Rural Health II—Project 660-0107)
SNHR	*Service National d'Hydraulique Rurale* (The national rural water service)
USAID/Zaire	United States Agency for International Development in Zaire
WASH	USAID-financed Water Supply and Sanitation for Health Project
WSS	Water Supply and Sanitation

EXCHANGE RATES[1]

Year	$	Zaires
1983	1	10
1984	1	25
1985	1	50
1986	1	59.68
1987	1	106
1988	1	210
1989	1	400

[1]Exchange rates provided by the Program Office, USAID/Zaire.

EXECUTIVE SUMMARY

USAID/Zaire has financed two projects (Basic Rural Health II and Shaba Refugee Water Supply) that support the installation of water and sanitation systems (e.g., capped-springs, boreholes with India Mark II handpumps, piped-water systems, VIP latrines) and the development of a national institution (Service National d'Hydraulique Rurale) responsible for rural water supply activities.

Outputs of the projects to date indicate that the Shaba project is likely to achieve the objectives defined in the project paper (660-0116). Outputs of the BRH II project are impressive, especially the work of SANRU, the component charged with enhancing the capacity of the rural health zones of Zaire to provide curative, preventive, and 'promotive' care. However, due to shortfalls in GOZ counterpart funding and incomplete execution of its annual work plans, SNHR will not be able to meet established targets. Consequently, the project paper should be amended to reflect experience to date and the accomplishments likely by the end of the project in 1992.

Experience to date offers good data on the cost of interventions. Based on 1989 prices, springs cost $1,100 per system, and boreholes with handpumps cost $6,500 per system. The cost of piped-water systems varies with the length of the line. Data from the projects also suggest that diarrheal incidence decreases in children under five as the number of improved water sources (e.g., capped-springs), the quantity of water, and access to a source of potable water increase. There is also some evidence that increased accessibility to water reduces the amount of time women spend collecting water. Finally, there are indications that communities are better prepared and more motivated to implement other development activities after successfully completing and sustaining a water project.

Chapter 1

INTRODUCTION

1.1 Background to Assignment

At the request of USAID/Zaire, WASH has provided periodic assistance to the water supply and sanitation (WSS) sector in Zaire for the past eight years in national water decade planning and project design, the carrying out of several training of trainers consultancies and, more recently, the definition of operations and maintenance policy.

The present assignment was to evaluate USAID/Zaire's assistance to the rural water supply and sanitation sector through two projects: Basic Rural Health II—BRH II—(Project 660-0107) and Shaba Refugee Water (Project 660-0116). Selected operations of the *Service National d'Hydraulique Rurale* (SNHR), the national rural water service, especially in the Shaba Region, and BRH II also known as SANRU II (*Projet de Soins de Santé Primaires en Milieu Rural*) were to be examined. Recommendations to improve USAID/Zaire's programming and implementation of ongoing WSS projects were requested.

1.2 Members of the Evaluation Team

A two-person WASH team—Phil Roark, water resource engineer on the WASH staff, and John B. Tomaro, of Management Sciences for Health—conducted the evaluation from April 9-May 5, 1990.

1.3 Scope of Work

The scope of work appears in Annex 1.

1.4 Methodology

Before arriving in Zaire on April 9, 1990, the team examined several documents on the water supply and sanitation sector at the WASH Information Center in Washington, DC, and reviewed the scope of work prepared by the Health, Population, and Nutrition Office (HPN) of USAID/Zaire. In Zaire, the team reviewed a list of issues submitted by HPN with input from SNHR and the staff of SANRU II (Annex 2), examined locally available materials relevant to sector operations (Annex 3), interviewed personnel charged with planning, implementing, and monitoring activities (Annex 4), and visited project sites in Bas Zaire (Ngidinga) and Shaba (Sandoa and Kabongo).

Chapter 2

PROJECT IMPLEMENTATION

2.1 Project Rationale

Aware that it cannot respond to all the "vast needs of the country," USAID/Zaire has chosen to place "particular emphasis on agriculture, rural transportation, health and population, and the private sector... [as the most appropriate means] to increase family income and improve access to health care."[2] Whenever possible, it has also decided to support activities designed to secure these objectives in Bandundu, the principal granary of Kinshasa, and Shaba, an agricultural and mining zone in the southeastern area of the country.

USAID/Zaire's investments in water supply and sanitation are closely associated with its commitment "to reach the bulk of the population with high-impact, market-driven, community-oriented basic health services and to rehabilitate and expand rural infrastructure."[3] Basic Rural Health II and Shaba Refugee Water are the two principal HPN projects that have established essential services in water supply and sanitation in the rural areas of Zaire.

2.1.1 Project Objectives

BRH II, launched in 1986 as a continuation of the very successful, Basic Rural Health Project 660-0086, was designed to expand previous activities—principally strengthening the curative, preventive, and promotional capacity of Zaire's 306 rural health zones (*zones de santé*)—and to support "national planning of water systems [and] intensification of water and sanitation activities."[4] *The Eglise du Christ au Zaire* (ECZ), a federation of Protestant Churches, and the *Service National d'Hydraulique Rurale* (SNHR), the national rural water service established in 1983, were charged with implementing the project. The Shaba Refugee Water Project, begun in 1985, was designed to improve the technical and managerial capacity of the personnel of the SNHR *station* (a French term used to denote a regional bureau of SNHR) at Sandoa established by the project, and to provide potable water to 240,000 rural residents, especially Zairian refugees returning from Angola.

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[2]The United States Economic Assistance Program for the Republic of Zaire, USAID/Zaire, no date, p. 2.

[3]Ibid., pp. 13, 16.

[4]*Projet de Soins de Santé Primaires en Milieu Rural*, USAID/Zaire Project Paper (660-0107), 1985, p. 1.

Although channeled through these two projects, USAID/Zaire's assistance to the WSS sector in Zaire has been treated administratively as three separate but interconnected projects. This report adheres to this arrangement. BRH II, or SANRU, is reviewed as two projects: a WSS infrastructure construction project that includes community participation and health education activities (hereafter referred to as the SANRU project), and an institutional development project focused on SNHR (referred to as the SNHR project). The third project is the Shaba Refugee Water Project (referred to as the Shaba project). The objectives of each project are outlined below.

SANRU Project. The objective of assistance to SANRU is to support the rural health zones (RHZ) and village communities in planning and carrying out water and sanitation activities, specifically in training, primary health care, and construction. The goals of these three activities are:

Training

150 water and sanitation coordinators
3,000 village health workers

Primary Health Care

3,000 village development committees formed and active

Construction

3,000 spring cappings
2,000 ventilated pit latrines

SNHR Project. The objective here is to provide SNHR with technical assistance during and after the implementation of water activities in rural health zones, specifically in:

- establishing 16 additional stations
- capping 3,000 springs
- drilling 880 boreholes and equipping them with India Mark II pumps
- completing 172 piped-water systems
- digging 825 wells
- providing short-term training (20 person/months)

- providing long-term training (36 person/months)

Together, the two projects are expected to provide 1,500,000 people with potable water.

Shaba Project. This project, initiated in 1985 under a program of emergency assistance to Zairian refugees returning from Angola, was intended to improve the potable water systems in the Lualaba subregion of Shaba. The *Association Internationale de Développement Rural au Zaire* (AIDRZ), a Zairian non profit organization, is working closely with SNHR to ensure the long-term sustainability of the systems.

In 1989, the objectives of this project were revised to include:

- capping 503 springs
- drilling 310 boreholes and equipping them with pumps
- completing 11 water system studies
- executing 4 piped-water systems
- serving 240,000 people

2.1.2 Project Inputs

Inputs for the three projects fall into three categories: financial, commodities, and personnel.

Financial. Table 1 shows the funds authorized for the water supply and sanitation components of the three projects.

Commodities. The SNHR project has purchased two drilling rigs and related support equipment and vehicles, and borehole casings and hand pumps for 400 boreholes. The SANRU and Shaba projects have purchased large quantities of cement, pipe, and related materials for spring-capping and piped-water systems.

TABLE 1[5]

AUTHORIZED LIFE-OF-PROJECT FUNDS ($) FOR WSS PROJECTS
(1985-1992)

	BUDGET ESTIMATES		
CATEGORY	SANRU	SNHR	SHABA
TECHNICAL ASSISTANCE	143,000	1,800,000	1,132,000
PARTICIPANT TRAINING	380,000	200,000	0
COMMODITIES	1,600,000	3,000,000	728,000
OTHER		300,000	390,000
SUBTOTAL	2,123,000	5,300,000	2,250,000 [6]
GOZ COUNTERPART	3,282,000	1,456,000	4,800,000
CONTRIBUTIONS			90,000
GRAND TOTAL	5,405,000	6,756,000	7,140,000

Personnel. The SANRU project has focused on supporting community development committees in the rural health zones. At the request of a committee, a rural water coordinator makes resources available for the development of water sources and the construction of latrines. The committee arranges local labor for most of the construction. Arrangements vary with local needs and the type of construction required, but at most of the SANRU sites, construction has been for either spring capping or latrines and SANRU resources have been used to purchase motorcycles and spare parts for Peace Corps volunteers who provide technical expertise. SANRU's primary purpose is to advance the

[5]This information was taken from the project papers for SANRU II and Shaba Refugee Water Supply, dated August 19, 1985 and September 13, 1984 respectively, and the project implementation reports for the projects through the first and second quarters of 1990, prepared on March 31, 1990. Since the Shaba project budget was revised, the most recent estimates are presented. It should also be noted that the SANRU II project budget presents the amounts allocated for SNHR, referred to as MOARD, but does not clearly stipulate the percentage of the health budget to be used for water and sanitation activities. Therefore, 18 percent of the health budget, the actual percentage spent on water and sanitation activities to date, has been allocated.

[6]According to the officer responsible for the project, this amount should be reduced by $455,000, representing funds that were spent but did not reach the project.

public health system of Zaire. Developing water and sanitation facilities in the rural health zones is only one of its important activities.[7]

The SNHR project supports the national office and, presently, the operations of 14 regional field stations in selected zones of Zaire. The national office is divided into administrative, technical, and logistic sections, each staffed by managers, engineers, technicians, and secretarial and accounting personnel. The staffing level at most stations is about 15. Two stations (Sandoa and Kabongo) have a drilling crew and related staff of 20 in addition. In total, SNHR employs 280 people and is assisted by a national planner and a well-driller financed by USAID/Zaire and a Belgian engineer.

The Shaba project supports the activities of a core staff, drilling team, and technical assistants, operating at the Sandoa station.

2.1.3 Key Implementation Activities

Institutional Development. The responsibility for implementing water supply and sanitation is shared. The activities of SNHR are supported through both the SANRU II and Shaba Refugee Water projects. The SNHR project meets a significant portion of the recurrent expenses of its headquarters and station operations, but SANRU finances its capital costs—spring-cappings, borehole drilling, piped-water systems—in the health zones. SANRU supports the activities related to the establishment and operation of the community development committees as instruments for fostering the development and execution of health-related projects at the village level. In the context of water supply and sanitation, these projects include spring-capping, well construction, pipelines, rooftop catchments, latrines, and hygiene education. Peace Corps volunteers provide the committees with technical assistance.

The Shaba project supports the activities of SNHR and a technical assistance team from AIDRZ. From the station at Sandoa, SNHR has set about improving the rural water infrastructure in the region, giving primary attention to spring-capping and borehole drilling, but also establishing piped-water systems, organizing water committees, and inducing the local population to participate in and contribute funds to the execution and maintenance of the projects.

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[7]In addition to its work in the rural health zones, SANRU supports annual seminars and training sessions for the national rural water and sanitation training team (*Equipe Nationale de Formateurs en Eau et Assainissement*), regular regional training-of-trainers (TOTs) workshops for rural water coordinators, and the design, testing, and distribution of community-level O&M and sanitation materials.

Service National d'Hydraulique Rurale (SNHR). While a number of organizations are involved in aspects of rural water supply and sanitation, SNHR is solely responsible for the development of rural water. Established in September 1983 by the Department of Rural Development, it was intended to furnish potable water to rural communities with fewer than 5,000 people, although it is currently serving communities with significantly larger populations. SNHR and its predecessor organization completed the following facilities in rural areas in the period 1977-1988:

spring-cappings	2,054
wells and boreholes	494
piped-water systems	51

These facilities serve more than 1.8 million people in 74 of the 306 rural health zones of Zaire.[8] This translates into an annual average over the twelve-year period of 171 springs, 41 wells and boreholes, and 4 piped-water systems serving 150,000 people.

SNHR has a national directorate of 33 people in Kinshasa organized in three divisions: technical, administration and finance, and logistics. At the end of 1989, this directorate was responsible for coordinating and supporting the activities of 14 stations (Annex 5). Projects are presented by the stations for review and approval by headquarters, which generally endorses those that comply with the national plan, organizes the necessary financial, administrative, and logistical support, and maintains regular contact with the donors financing them.

The 14 stations have more than 250 employees and are based in ten of the 11 administrative regions of Zaire. Each station has a technical and administrative division and is responsible for collecting data to develop projects, implementing projects, (e.g., installing pumps), and establishing and maintaining contact with the local communities, especially the personnel of the rural health zones. The station is generally located in the most densely populated area of the region and has a radius of service of approximately 115 km.

[8]These data are taken from *Etude Sectorielle: Eau et Assainissement*, Comité National d'Action de l'Eau et de l'Assainissement, August 1989, p. 102, and *Rapport Annuel—1988*, Service National d'Hydraulique Rurale, January 1989, p. 1.

The sources and amounts of financial support received by the SNHR in the five-year period 1984-1988 are shown in Table 2.

TABLE 2

FINANCIAL SUPPORT TO SNHR, 1984-1988[9]
($ THOUSANDS)

SOURCE	1984	1985	1986	1987	1988	TOTAL	%
CONSEIL EXECUTIF	80	32	117	241	589	1,059	16
USAID	24	216	1,381	1,958	422[10]	4,001	63
UNICEF	144	410	188	43	—	785	12
BENEFICIARIES	23	60	151	202	—	436	7
SELF-FINANCED	—	—	80	—	24	104	2
TOTAL	271	718	1,917	2,444	1,035	6,385	100

Table 2 clearly indicates the extent to which SNHR operations are dependent on donor assistance. During the most recent five-year period, 75 percent of its operating budget came from donors and 63 percent from USAID/Zaire alone. The GOZ provided only 16 percent, an amount significantly less than 1 percent of total government expenditures during the period.[11] As noted, USAID/Zaire has played the decisive role in facilitating the viability of SNHR, a national institution charged with carrying out important development interventions. Without the assistance of USAID/Zaire and other donors, SNHR operations would have been negligible.[12]

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[9]Figures for 1984-1987 were taken from *Etude Sectorielle: Eau et Assainissement*, CNAEA, August 1989, p. 99. Figures for 1988 were taken from *Rapport Annuel—1988*, SNHR, January 1989, p. 53.

[10]Only counterpart funds received in 1988 are recorded in the Rapport Annuel - 1988, p. 54.

[11]Although government contributions have increased since 1985, they are usually late. For example, the contribution for 1989 did not arrive until the last quarter of the year. In addition, because of the rapid decline in the exchange rate, the contributions converted to dollars shows only a modest increase in actual purchasing power. For example, the GOZ contribution of 27 million Zaires in 1987 was equivalent to $241,000. The 1988 contribution of 123.7 million Zaires, a more than fourfold increase, was equivalent to $492,000, slightly more than a twofold increase. (See Memorandum of Chris McDermott to Ray Martin, March 20, 1990.)

[12]The figure for 1988 reflects only counterpart funds. If the dollar contribution was added, the percentage of USAID/Zaire support would be even larger.

Table 3 shows the total contributions by donors and the GOZ from 1983 to 1989, as reported by SNHR.

TABLE 3

CONTRIBUTIONS TO SNHR, 1983-1989

($ MILLIONS)

SOURCE	AMOUNT	PERCENTAGE
USAID	7.2	34.7
UNICEF	1.7	8.3
JICA (JAPANESE)	8.7	41.6
COOPERATION BELGE	0.2	0.7
AFRICAN DEV. BANK	2.4	11.5
CONSEIL EXECUTIF	0.7	3.2

When reviewing this table, several points should be emphasized. First, it presents figures through 1989, unlike Table 2. Second, the JICA contribution of $8.7 million is the budgeted amount for work to be carried out in Bas Zaire over a two- to three-year period. Unlike the others listed, it is not the amount contributed to date. If this amount is subtracted from the total, USAID's contribution is 60 percent for the period, as noted in Table 2, and the GOZ contribution is approximately 6 percent, significantly below the amount reported by CNAEA. The difference in the Conseil Executif contribution, as reported by *Comité National d'Action de l'Eau et de l'Assainissement* (CNAEA) and SNHR, is noteworthy and should be examined further. Third, only USAID and the GOZ contributed core support to SNHR. Other funds were restricted to equipment purchase or the execution of work at specific sites.

Operations and Maintenance. At the beginning, the emphasis in the WSS projects was on construction designed to expand the coverage of water systems in selected regions. Now that many of the systems are several years old and beginning to break down, project management has come to realize that proper operations and maintenance (O&M) is the key to sustainability.

WASH has been asked to collaborate with SNHR in recommending a national O&M policy. WASH consultants developed an O&M plan for the Shaba region in 1987, and in 1989 WASH began a three-phase activity that is expected to lead to the adoption and implementation of a national policy. The first phase was an assessment of existing conditions and resulted in a seminar that adopted preliminary approaches to O&M. In the second phase, currently underway, these approaches are being implemented and monitored in selected regions to ascertain their effectiveness. The third phase will culminate in the adoption of a national policy.

The key elements of this policy are emerging. First, ownership of the WSS systems and responsibility for maintaining them must belong to the communities who benefit from their use. At many locations, project staff have assisted the communities in forming development committees to manage the systems, defined the responsibilities of the communities to construct and maintain them, and emphasized the health benefits that will accrue from using them. Communities are expected to meet the full costs of O&M and to establish a fund for this purpose before construction of the water system begins. Second, as the national rural water authority, SNHR should be responsible for training private sector regional repairmen who will be hired by the communities to maintain and repair the systems. Third, at least initially, SNHR should also be responsible for maintaining a supply of spare parts and for performing repairs beyond the capacity of the community. An adequate supply of spare parts for the India Mark II handpumps will require special attention; consideration is being given to the local manufacture, storage, and distribution of these parts.

2.1.4 Project Outputs[13]

Outputs for the three projects, as compared with objectives, are set forth in Tables 4-6.

TABLE 4

OUTPUTS FOR SANRU PROJECT

OUTPUT	RESULTS TO DATE	% PLANNED TO DATE	% COMPLETED TO DATE
150 WATER AND SANITATION COORDINATORS	176	64	117
3,000 VILLAGE HEALTH WORKERS	2,244	64	75
3,000 VILLAGE DEVELOPMENT COMMITTEES	1,500	64	50
3,000 SPRINGS CAPPED	2,768	64	92
2,000 PIT LATRINES CONSTRUCTED	832	64	42

The results of the SANRU project offer several interesting conclusions. The number of rural water coordinators trained is above the level projected, primarily because several have left the project and have had to be replaced.

The formation of village development committees is below expectations. This is an area of concern, since these committees are the foundation upon which much of the development process depends. But it appears that some villages prefer to make one or more community members, rather than a committee, responsible for O&M. As long as the village accepts

[13]The information in Tables 4-6 was taken from the project implementation reports for the first and second quarters of 1990, prepared on March 31, 1990.

responsibility for operating and maintaining the system, it may not be necessary to establish a formal committee. SANRU may have some experience that suggests villages without a development committee have accepted this important responsibility. This should be recorded.

The construction of water sources, primarily spring-capping, is well above expectations and is an indicator of the communities' desire to have improved water sources. The construction of latrines is below planned levels but the deficiency is probably the result of unrealistic objectives. In the opinion of the evaluation team, experience in other countries suggests that the latrine construction outputs are above reasonable expectations.[14]

TABLE 5

OUTPUTS FOR SNHR PROJECT

OUTPUTS	RESULTS TO DATE	% PLANNED TO DATE	% COMPLETED TO DATE
16 ADDITIONAL STATIONS	6	60	38
3,000 SPRINGS	1,380	70	46
880 BOREHOLES	157	30	18
172 PIPED SYSTEMS	37	45	22
825 WELLS[15]	330	45	40
SHORT-TERM TRAINING (20 PERSON/MONTHS)	15.5	85	78
LONG-TERM TRAINING (36 PERSON/MONTHS)	36	100	100

The outputs to date for the SNHR project are significantly below those planned. Two factors serve to explain this at least partially. The process of institution building, which is not reflected in these outputs, has taken considerable time and energy and has doubtlessly detracted from construction efforts. Developing SNHR into a viable organization will require persistent effort.

A second factor which has reduced outputs is the tardy arrival, or reduced supply, of equipment, fuel, and financial (counterpart funds) resources. These factors are examined more fully in later sections.

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[14]Many of the latrines have been constructed at the hospitals, dispensaries, schools, and government offices in the health zones where SANRU is operating. Latrines may not be as common in households.

[15]The distinction between boreholes and wells is unclear. It appears that there may be some duplication in the results reported by SNHR and SANRU.

The figures in Tables 4 and 5 for the numbers of springs capped by the two projects suggest that there may have been some duplication. It is not clear how these figures were compiled. But the combined efforts of the two projects have provided more than 1.2 million people with improved water sources, which is 80 percent of the target.

TABLE 6

OUTPUTS FOR SHABA REFUGEE WATER

OUTPUTS	RESULTS TO DATE	% PLANNED TO DATE	% COMPLETED TO DATE
503 SPRINGS CAPPED	496	100	99
310 BOREHOLES WITH PUMPS	190	79	61
11 WATER SYSTEM STUDIES	11	100	100
4 PIPED-WATER SYSTEMS			
MUSUMBA	1	100	100
KASAJI 1	1	100	98
KASAJI 2	1	100	63
SANDOA	ONGOING	83	33
240,000 PEOPLE SERVED	202,000	83	84

As the project approaches its termination date of September 30, 1990, results are about as expected, with two exceptions. The number of boreholes completed has been less than projected, primarily because of the late arrival of needed drilling accessories. Recent drilling progress has been good. The Sandoa piped-water system is behind schedule but is expected to be completed before project closure.

The total estimated expenditures on WSS activities through December 1989 was $12.3 million, including GOZ counterpart funds. The breakdown by project appears in Table 7.

TABLE 7

ESTIMATED EXPENDITURES
ON WATER SUPPLY AND SANITATION ACTIVITIES
THROUGH DECEMBER 1989
($ THOUSANDS)[16]

	SANRU	SNHR	SHABA
US$	1,004	2,433	1,801
GOZ counterpart	1,700	1,627	3,740
Total	2,704	4,060	5,541

[16]This information was taken or extrapolated from the data contained in the project implementation reports for the first and second quarters of 1990, prepared on March 31, 1990.

Chapter 3

FINDINGS

3.1 Efficiency and Effectiveness of Institutions in the Sector

It is important to evaluate the efficiency and effectiveness of the completed WSS installations and of the institutions supporting their construction and continued operation and maintenance. Project outputs alone are an insufficient indicator of the value of the initial investment.

3.1.1 Institutions

Two institutions are responsible for ensuring that rural populations have access to potable water and understand the importance of effective sanitation practices. The first is the Service National d'Hydraulique Rurale (SNHR), the national rural water service. The second is the development committee or the water committee, composed of locally elected representatives in each rural community. Since national and local institutions are the base on which effective development rests, the managerial, financial, and technical skills of these institutions will determine the extent to which they are viable and capable of sustaining operations.

SNHR: Station Operations. A thorough review of the plans, operations, and deficiencies of SNHR, supplemented by visits to two SNHR stations, allows some conclusions to be drawn about the efficiency and effectiveness of its organizational structure. But it is important to remember that SNHR is less than 10 years old and needs more time to become well established.

The reports on the 13 SNHR stations operating in 1988, the most recent year for which a summary of operations is available, indicate that some stations are better managed and more productive than others. For example, the stations at Mweka and Luputa in Kasai Oriental, Misele in Bandundu, Masisi in Nord-Kivu, and Sandoa in Shaba, came close to or exceeded the targets for production and population served. Other stations, like Bikoro in Equateur, were significantly below the expected level of performance. Table 8 indicates the percentage of the target population covered by all works (capped-springs, drilled wells, and piped-water systems) by station, and the cost of operations (excluding the cost of the works) for 1988.

TABLE 8

SNHR STATIONS: PERCENTAGE OF TARGET POPULATION COVERED BY ALL WORKS, AND OPERATIONAL EXPENSES FOR 1988[17]

STATION	POPULATION COVERED BY ALL WORKS (PERCENTAGE)	OPERATIONAL EXPENSES ($ THOUSANDS)
KAHEMBA	55.6	11.7
MISELE	141.7	13.5
N'SIONI	22.0	17.9
BIKORO	19.7	15.1
BUNIA	15.9	16.6
MWEKA	121.9	10.2
GANDAJIKA	123.6	6.8
LUPUTA	74.4	18.3
LUSAMBO	104.6	16.2
MASISI	25.2	18.5
RUTSHURU	23.1	16.1
SANDOA	59.1	500.0
BARAKA	25.9	14.7
TOTAL		675.6

With the exception of the figure for Sandoa, which includes expenditures for works as well as operations, these figures reflect only funds from SNHR's headquarters to cover operational expenses. Almost all the stations received support from other sources, e.g., CIDA and EEC at Rutshuru, to cover the costs of the works. With the exception of Sandoa, therefore, the amounts shown are the costs of maintaining the station. At the 1988 exchange rate of $1 to 210 Zaires, the average annual operational costs for each station are approximately $14,000.[18]

Table 9 lists the springs capped and the cost of operations in 1988 for each of the stations where spring-capping was the principal activity.[19]

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[17]Taken from *Rapport Annuel 1988*, SNHR, January 1989.

[18]This figure has been calculated by subtracting the Sandoa expenses and dividing the balance by the number of stations.

[19]The average cost per spring capped was calculated by dividing the cost of annual operations by the number of springs completed per station. It should be noted that activities apart from construction, e.g., studies and site prospecting, are included in these costs, making actual construction costs somewhat lower.

TABLE 9

SELECTED SNHR STATIONS: ESTIMATED COST OF SPRING-CAPPING IN 1988[20]

STATION	NUMBER OF SPRINGS CAPPED	TOTAL COST ($)	COST/SPRING ($)
KAHEMBA	8	11,671	1,459
MISELE	40	13,533	338
NSIONI	16	17,923	1,120
MWEKA	20	10,257	513
LUPUTA	90	18,329	204
LUSAMBO	40	16,209	405

On the basis of these data, the average cost per spring was $673 and the cost per person served ranged from $0.80 (Luputa) to $5.70 (Kahemba). When these costs are compared with those of SANRU and AIDRZ (Table 14), it is clear that the expenditures of some SNHR stations are very reasonable.

A review of Tables 8 and 9 prompts several conclusions about the operations of the stations in 1988. First, without visiting them and carefully examining their operations, it is difficult to establish any definitive performance trends, although data from Kahemba and Nsioni suggest that efficiency could be improved. Without information on the cost of operations before or after 1988, it is not possible to assess how well or poorly an individual station is operating over time.[21]

In addition, there appears to be no significant relationship between the level of expenditure and the population served. For example, Gandajika spent 1.42 million Zaires ($6,800) and served almost 67,000 people, while Masisi spent almost 4 million Zaires ($18,500) and served fewer than 11,000 people. Although the amounts are not recorded, both received significant assistance from donors. Undoubtedly coverage is related to the support from sources operating in the area of the station. Also, some stations, probably the older ones (e.g., Luputa, established in 1984), are better at setting and reaching realistic targets and controlling expenses.

[20]At Baraka, Bikoro, Bunia, Gandajika, Masisi, Rutshuru, and Sandoa, spring-capping was a small proportion of the work completed; well-drilling and piped-water systems were the major activities in 1988.

[21]SNHR's Rapport Annuel - 1988 (p. 2) notes that the average population served was 29,400, a 15 percent increase over 1987.

Without comparable figures that include all revenues and expenses by station, it is not possible to quantify the efficiency and effectiveness of the SNHR stations. However, some material in the reports and information from interviews do allow qualitative judgments to be made.

Almost all stations report the same problems: a lack of spare parts and construction materials, inadequate transportation, poor roads, poorly trained staff, and inadequate operational support. This suggests that the revenues and other resources (e.g., vehicles) available to the stations are insufficient for maximum operational efficiency and effectiveness.

The estimated amount needed to support a station that caps 80-90 springs per year serving 25-30,000 people and completes 100 *prospections* is $50,000. A station primarily using piped-water systems would require $390,000, which would cover the cost of six studies and six piped-water systems, each 10 km in length and serving 25-30,000 people. Stations emphasizing well-drilling would require the most support: an estimated $400,000 per drill rig capable of completing 100 wells per year.[22]

Table 10 shows the estimated annual costs of supporting eight SNHR stations: four emphasizing spring-capping, two featuring piped-water systems, and two focusing on well-drilling.

TABLE 10

ESTIMATED ANNUAL COST OF OPERATIONS
FOR EIGHT SNHR STATIONS

SPRING-CAPPING	WELL DRILLING	PIPED WATER	COSTS ($ THOUSANDS)
MISELE			50
LUPUTA			50
LUSAMBO			50
MWEKA			50
	SANDOA		390
	KABONGO		390
		KIROTSHE	400
		RUTSHURU	400
		TOTAL	1,780

[22]These estimates have been prepared by the technical adviser of SNHR and reflect the staffing levels listed in Table 10.

A comparison of this cost with USAID Zaire's contribution of $1,650,700 to SNHR in 1989 shows that the amount required to operate this limited number of stations efficiently exceeds the resources available.[23] Also, these estimates only consider the cost of supporting selected stations; nothing is included for headquarters operations. In light of the anticipated reduction in counterpart funds for 1990 and beyond, USAID/Zaire is likely to be able to support somewhat less than this level of activity.

Several stations are reportedly better managed, more experienced, and more appropriately staffed than others. The cost-effectiveness of spring-capping at Misele, Luputa, and Lusambo is noteworthy. Still, there may be no correlation between staff size and apparent operational effectiveness.

Table 11 lists the stations by year of establishment and size of staff.

TABLE 11

SNHR STATIONS BY YEAR
OF ESTABLISHMENT AND SIZE OF STAFF[24]

STATION	YEAR ESTABLISHED	STAFF SIZE
KAHEMBA	1988	16
MISELE	1984	24
NSIONI	1978(?)	19
BIKORO	1984	17
BUNIA	1984	20
MWEKA	1988	15
GANDAJIKA	1972(?)	16
LUPUTA	1984	20
LUSAMBO	1984	18
MASISI	1984	22
RUTSHURU	1978(?)	21
SANDOA	1986	74[25]
BARAKA	1984	20

[23]This estimate of the resources available to SNHR in 1989 does not include counterpart funds for the Shaba Refugee Water project because this project ends in September 1990. Only the counterpart funds transferred through the SANRU project ($598,180 for health and $552,500 for water) and an estimate of the dollar amount available (approximately $500,000) have been used to project the total.

[24]*Rapport Annuel—1988*, SNHR, January 1989.

[25]At the Sandoa station there are 71 SNHR and 3 AIDRZ employees.

Excluding Sandoa, the number of employees ranges from 15 to 24 and averages 19 per station. A range of 14 to 16 has been suggested as appropriate. USAID/Zaire is prepared to support the complement listed in Table 12.[26]

TABLE 12

PROPOSED SNHR STATION STAFFING LEVEL

CHIEF OF STATION	1
CHIEF OF TECHNICAL SERVICE	1
SECRETARY/ACCOUNTANT/RADIO OPERATOR	1
SECRETARY/CASHIER	1
STOCK-KEEPER	1
WATCHMEN	3
DRIVERS	2
MECHANIC—VEHICLES[27]	1
PLUMBER	1
SPRING-CAPPER	1
ANIMATEUR	1
TOTAL	14

There does appear to be some relationship between the number of years a station has been in operation, its staff size, and its productivity. Table 13 presents the number of springs capped by station from 1985 to 1988. When assessing this information, it is important to keep in mind that some areas of Zaire do not lend themselves to spring-capping, that several stations emphasize drilling and piped-water systems, and that Sandoa had considerably more resources than the other stations.

There is some correlation between the stations described as well managed and efficient, namely Luputa and Sandoa, and length of time in operation. However, while the first is among the earliest SNHR stations, Sandoa was not established until 1986. In effect, other factors—perhaps community support, technical assistance, and motivated leadership—must be used to explain the record of performance.

[26]A slightly higher staffing level (16) has been proposed by the *conseiller technique* to SNHR and AIDRZ.

[27]In addition to the staff noted, each station should have one or two four-wheel drive vehicles and three motorcycles. Teams for well-drilling and completing piped-water systems are separate from the base staff of the station.

TABLE 13

SPRINGS CAPPED BY SNHR STATIONS
AND POPULATION SERVED, 1985-1988

	No of Springs Capped				Population served (thousands)[28]			
Station	'85	'86	'87	'88	'85	'86	'87	'88
Baraka	6	20	1	4	1.3	4.3	0.2	0.8
Bikoro			3	10			0.6	2.1
Bunia	5		11	13	1.0		2.4	2.8
Gandajika	42	30	40	41	8.9	6.4	8.5	8.7
Kahemba				8				1.7
Luputa	32	58	88	55	6.8	12.4	18.8	11.8
Lusambo			34	40			7.2	8.6
Masisi			3				0.6	
Misele	4	17	23	40	0.8	8.6	4.9	8.6
Mweka								
Nsioni	7	2	12	16	1.5	0.4	2.6	2.8
Rutshuru		5	9	4		1.1	1.9	0.8
Sandoa		113	140	133		24.2	30.0	28.5
Total	96	245	364	364	20.3	57.4	77.5	77.2

TOTAL NUMBER OF SPRINGS: 1,069
TOTAL POPULATION SERVED: 232,400
AVERAGE NUMBER SERVED PER SPRING: 217[29]

SNHR: Headquarters Operations. At SNHR headquarters in Kinshasa, there are 33 staff members operating in very cramped space. Although the director is articulate, dynamic, and determined to build a national organization capable of supplying water to rural residents, his ability to define and implement a program is severely constrained by his self-acknowledged inexperience as a manager, the absence of well-trained subordinates who can lead the organization during his frequent absences, and the organization's weakness in dealing with donors whose resources and directives set its operational agenda.

SNHR does not have a completely free hand in selecting the areas in which it operates or the projects it executes. Wholly dependent on assistance from the GOZ and especially international donors like USAID/Zaire, it has limited ability to set priorities. But the top

[28]The population served has been calculated by multiplying the number of springs capped by 215, the number of people served per source according to a study completed at Sandoa by AIDRZ. Sandoa may not be representative, however. The populations of the villages served by other stations are reportedly larger.

[29]The difference between this figure and the figure in footnote 28 is due to rounding.

management of SNHR is committed and motivated to perform well, although it lacks some basic skills and an understanding of the principles of organizational development.

The current policy of SNHR, as well as of CNAEA, affirms that rural residents can and must pay the recurrent costs of operating their own water systems.[30] The evidence suggests that this policy is well founded. However, it is important for SNHR to keep in mind that as economic hardships increase for rural communities (because of inflation and other financial demands imposed by the GOZ), residents will have to choose which expenditures will be made. It is already clear that an increasing number of Zairians are "moving to the margin" and are unable to contribute.[31] Water may not be a service that many community members can continue to afford. If economic burdens increase, rural residents may be forced to accept health risks from unimproved water sources.

SNHR currently operates without a multiyear master plan that defines the priorities and costs associated with rural water development, although the African Development Bank is financing a study for a master plan and the initial work is underway.[32] With a long-term plan in hand and increased management capability, SNHR could approach the government and international donors with confidence for the assistance to develop rural water resources in an orderly and comprehensive manner. It is in the interest of USAID/Zaire, as well as other donors involved in the water supply and sanitation sector, to support the development and implementation of a master plan. Without it, SNHR will be perennially subject to donor directives.

USAID/Zaire has already invested in training SNHR staff. Two have been sent abroad for long-term and four for short-term training. Several have attended brief stages in Zaire. However, the type, amount, and cost of training required by SNHR can be determined only after an organizational assessment, perhaps through a technical assistance contract, and a

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[30]An AIDRZ study estimates the cost at $0.10 per household per month (or $1.20 per year). See *Estimation des Revenues des menages villageois du Lualaba (Methodologie)*, AIDRZ, January 1989, p. 4. See also *Rapport sur quelques données secondaires pour une étude de base des projets 660-0114, 660-0115, 660-116*, AIDRZ, June 1989.

[31]X. deBethune et al., "The influence of an abrupt price increase on health service utilization: evidence from Zaire," Health Policy and Planning, vol. 4, No. 1, March 1989, 75-81. From interviews with members of the village water committee in Tshimbalanga (Sandoa), the evaluation team learned that some members of the community who cannot pay, e.g., the very old and the very sick, are being allowed to use the newly installed pump. For others, the poor and those likely to be farthest from the source and most at risk for illness, benefits are denied if contributions are not forthcoming.

[32]The *Plan de l'Hydraulique et l'Assainissement en milieu rural: 1986-1991*, prepared by the CNAEA in 1986, was never supported or implemented as proposed. (See especially pp. 121-128, where the committee estimated budgetary needs of $149 million, and compare with Table 2.) Still, this plan should be reviewed and updated in the context of the experience gained over the last five years.

master plan that defines the skills required to achieve a hierarchy of objectives with different levels of resources. If concerted efforts are not made quickly to hire and train personnel skilled in such areas as finance, management, planning, contracting, and supervising, SNHR can only be expected to perform at less than optimum efficiency.[33]

Community Water Committees and Community Development Committees. As in the case of SNHR, USAID/Zaire, through SANRU, and other donors have provided training, animation (outreach activities), and supplies (equipment and medication) for community water committees and community development committees. In the SANRU-assisted health zones, such as Ngidinga which the evaluation team visited, a community development committee usually has a subcommittee of one or two persons responsible for water. In areas where SANRU is not operating, e.g., Tshimbalanga, but SNHR has developed sites, only a water committee may exist. Like all institutions, these committees have a mandate, personnel, financial resources, and equipment. However, only limited external financial support and equipment are available to them, and almost all members serve without compensation.

The development committees or water committees are at the base of the decentralized health system in Zaire, and their effective operation is keyed to village-level contributions of labor, material, and funds. In theory, at least, they are independent of outside direction and support.

After some training and technical assistance perhaps in spring-capping and latrine construction, and after receiving some basic supplies, the committees are responsible for taking over the maintenance of the systems installed. They must raise the revenues to purchase the spare parts and other materials, select a person to be trained in operations and maintenance, and convince the local population of the health benefits of water and sanitation.

As of December 31, 1989, there were reportedly 1,500 village development committees or water committees in the zones where projects financed by USAID/Zaire were operating. The results of a survey of 50 villages in 20 health zones, conducted by SANRU in 1989, emphasized the importance that villages attach to water. In response to a request to list the *problèmes prioritaires*, 27 of the 50 villages (57 percent) indicated *problèmes d'eau*

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[33]While this evaluation was underway, a team financed by UNDP was in Zaire to assess the training needs of organizations working in rural water supply and sanitation. Reportedly, $3 million will be made available to train managers and technicians, many of whom will be with SNHR. It is expected that USAID/Zaire will have an opportunity to review this needs assessment and the proposed training plan.

potable. The need for a windmill was the highest priority for 16 of the villages (32 percent).[34]

According to the staff of SANRU II, the cost of establishing a development committee in a village of 300 inhabitants, capping two springs, and building 83 latrines was approximately $5,800 in 1988.[35] The cost components were: a portion of the time of the water and sanitation coordinator or the animateur, the fuel to transport him or her to a given village, a portion of the amortized cost of the vehicle used to get to and from the village, the cost of the initial supplies and equipment, e.g., cement, the labor contribution (non-remunerated) of the villagers, and the cost of training a village-based repairman in maintenance and the animateur in proper water and sanitation practices. Since these costs are only part of the total costs of establishing and supporting the committees, they should be modest in relation to total expenditures and potential benefits.

It is possible to draw some conclusions about the operational effectiveness of the committees. The quality of operations seems directly related to the length of time a nongovernmental organization has been continuously operating a well-supplied and well-staffed hospital in the zone, and to the length of time the local population has been asked to pay, in labor, materials, or money, for services and infrastructure improvements. In general, the longer these institutions and practices have been in place, the higher the operational effectiveness of the committee.

Operational effectiveness may also be influenced by the leadership of a dynamic *medecin chef de zone*. Some *medecin chefs de zone*, like Dr. Kafuka Badiunda of Kabongo, are clearly supporting the work of the water committees in the belief that water and sanitation interventions have a measurable impact on the health of the local population. Those *medecin chefs de zone* who were trained at the school of public health of the University of Kinshasa under a USAID-financed project may also be among the most dynamic and articulate in emphasizing the importance of establishing and maintaining water and sanitation activities. This conclusion may be premature, although an evaluation to validate it is underway.

Another factor in the effectiveness of committee operations may be the presence of one or two informal leaders committed to improving the quality of life in the village. There are numerous accounts of the excellent work being done by individual members of local development committees, especially women.

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[34]It is interesting to note that six of the villages had already developed a water source as part of their community development activities.

[35]This information was provided by Dr. Franklin Baer, administrator of the SANRU project.

3.2 Water Supply and Sanitation Technologies

The construction of water systems in areas served by the Shaba, SANRU, and SNHR projects has used the technologies of spring-capping, piped-water, hand-dug wells, boreholes with hand pumps, rainwater catchment, and hydraulic rams. Significant numbers of latrines have also been constructed. Each of these has distinct advantages and limitations which are discussed in the following sections.

3.2.1 Spring-capping

Spring-capping is an inexpensive means of providing a generally safe water supply. Costs vary with the site and the volume of water to be capped. It is difficult to compare the costs quoted by Shaba, SANRU, and SNHR because each uses different accounting methods. Since AIDRZ includes all costs, including amortization of equipment, technical assistance, and labor, its figures are cited, except where noted. On average, spring-capping in Shaba cost $1,104 at 1989 prices, excluding the unremunerated labor contributed by the community. O&M costs are minimal and, for this reason, spring-capping is the technology of choice wherever sites permit.

Variations in the geology of Zaire have made some sites more difficult to cap than others, and have resulted in construction that has not always captured the full groundwater flow. Spring-capping is often considered an art rather than strictly an engineering exercise. Experience is important, and someone with technical proficiency should be consulted to determine which individuals or organizations are qualified to cap springs in specific zones.

The effectiveness of springs as sources of potable water depends on where they are. Many springs are located more than 500 meters from the center of the village, a distance which reduces per capita consumption. Some are located at the bottom of a steep incline. Climbing back with a container full of water requires an effort that may discourage use of the source. Water quantity and quality may vary seasonally. For these reasons, each site yields different benefits.

There is a tendency to report a specific number of beneficiaries per spring; 450 is the usual number, although the average in Zaire is 215. The higher number is probably an overestimate and therefore an incorrect measure of the real effectiveness of capped springs.

3.2.2 Piped-water Systems

Most piped-water systems consist of a spring(s) from which water flows via gravity to standpipes in a village. The source obviously must be uphill from the village, a condition not always found. Motorized pumps are used in some cases.

Piped systems usually deliver water very close to the consumers. Costs vary primarily with the length of pipeline required. Gravity-fed systems are inexpensive to maintain and are reliable, but pumped systems tend to be expensive and beyond the means of most rural dwellers. Costs per capita have averaged about $14,600 per kilometer of pipeline, based on two pipelines constructed in Shaba, although the average cost per kilometer in Kivu should be less. Piped systems, in general, are highly effective in providing a convenient and safe water supply.

3.2.3 Dug Wells

Dug wells have been constructed in only a few cases, where springs were not available and groundwater was relatively close to the surface.[36] The cost for constructing shallow wells has been $1,198 under the SANRU project. Wells at depths of more than 10 meters would be expensive and dangerous, and are not recommended.

The reliability of wells is uncertain because seasonal groundwater fluctuations or droughts may render them dry at times. The quality of water from an uncapped well is usually poor because it is frequently polluted. Wells may be capped and equipped with a pump to protect them against contamination, but this adds a capital cost and a maintenance requirement.

3.2.4 Boreholes

Boreholes equipped with India Mark II pumps and concrete pads have been constructed by SNHR in the Shaba project at a cost averaging $6,464 for wells 45 meters deep.

Boreholes can be located close to the users, usually near the center of the village. The quality of water is high, although in some areas the high iron content of groundwater has produced an undesirable taste. Boreholes are not usually affected by droughts. In many areas where springs or surface water is not available, they offer the only viable means of providing potable water.

The comparatively high construction and O&M costs limit the utility of drilled wells. The reliability of handpumps is dependent upon a somewhat complex management system involving several intermediaries. Effectiveness of boreholes may be high but only if the management of the O&M system is well established.

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[36]Dug wells are found primarily in SANRU-assisted health zones. SNHR has none.

3.2.5 Hydraulic Rams

Hydraulic rams have been used in a few cases, and SANRU has a proposal for a project in the Bandundu region. The site conditions for a ram to be useful are rather rare. The purchase price of a ram can be expensive but O&M costs are low. Over the long term, a ram is considered a good investment. Cost data from Zaire were not available. Hydraulic rams are recommended as an appropriate technology only where sites are judged suitable by a technician experienced in their use.

3.2.6 Rooftop Rainwater Catchments

Since rainfall is abundant and generally reliable in Zaire, SANRU has used rooftop rainwater catchments to provide potable water in some areas. This is usually an inexpensive means of capturing and providing water very close to the household. But SANRU estimates an average of $2,137 to construct a holding tank (ferrocement jar) that collects runoff from tin-roofed houses. This cost is unusually high and SANRU needs to reconsider the wisdom of using this technology.

The disadvantages of this system are that droughts may cause a disruption of supply and that the storage tanks are difficult to keep clean. Generally, rooftop catchments are recommended as a supplementary system for bathing and household cleaning.

3.2.7 Latrines

VIP latrines are among project objectives and have been constructed as demonstration models in many health zones, primarily near health centers, schools, and markets. According to the SANRU engineering director, few families have constructed VIP latrines for their own use, although some interest has been expressed. Most individuals indicate that the VIP is an unaffordable luxury. SANRU has developed a model that uses only locally procured materials and costs approximately $130 at 1988 prices.

In Zaire, as in many developing countries, interest in latrines among rural dwellers tends to lag behind water development. The SANRU project should be commended for having achieved the numbers indicated and is encouraged to continue to promote latrine construction and use, even pit latrines, since these have value. The combination of potable water, latrines, and hygiene education has been found most effective in reducing diarrheal diseases and should be promoted as a package within the overall rural health initiative. Interest in latrines may increase after water development has been completed.

3.2.8 Cost Summary of SANRU and Shaba Systems

Tables 14 and 15 provide a summary of the costs of the water supply and sanitation systems constructed by the SANRU and Shaba projects.

TABLE 14

UNIT COST OF SANRU WATER SUPPLY AND SANITATION SYSTEMS[37]

(DOLLARS)

SYSTEMS	1984	1985	1986	1987	1988	1989
SPRINGS	37	91	44	93	81	66
LATRINES	--	85	77	129	130	--
RAINWATER TANKS	1,588	1,186	2,440	--	--	2,137
HAND-DUG WELLS	--	--	--	519	779	1,198
PIPELINES + RESERVOIR/KM	--	3,403	4,735	--	5,040	5,732

TABLE 15

COSTS OF SHABA WATER SUPPLY SYSTEMS[38]

(DOLLARS)

SYSTEMS	AVERAGE COST	PERSONS SERVED[39]	COST PER PERSON	PER CAPITA CONSUMPTION (LITERS)[40]	COST OF WATER (PER M^3)[41]
SPRINGS	1,104	214	5.16	10	0.08
BOREHOLES W/ PUMPS	6,464	417	15.47	15	0.32
GRAVITY-FED	449,186	22,804	19.58	20	0.20

[37]These costs are for materials, such as cement and pipe, paid in local currency (Zaires) but presented in dollars using appropriate annual exchange rates. They do not include labor contributions by the communities. For example, SANRU engineers estimate that community participation, if valued at 200 Zs per person per day, would add 78 percent to the cost of springs and 70 percent to the cost of latrine construction.

[38]Costs are based on data provided by AIDRZ for the Shaba project (1989 values).

[39]This is the average number of persons served per system.

[40]Estimated consumption per capita per day based on typical accessibility of water to consumers, and experience in other African countries.

[41]These costs are based on average maintenance costs over a 20-year expected lifespan. Maintenance costs per person per year are estimated at $0.05 for springs, $1.00 for boreholes, and $0.50 for gravity systems. It is interesting to note that REGIDESO charges $0.09 per cubic meter for standpipes in periurban areas.

3.3 Financial and Programming Issues

3.3.1 Private Sector Involvement

When discussing the involvement of the private sector in rural water supply in Zaire, it is important to distinguish between for-profit organizations and others. Normally, discussions of the merits of fostering private sector participation assume that a market made up of competing enterprises will almost always produce cost savings when compared with government or nonprofit organizations. However, there are no for-profit enterprises in the rural water supply and sanitation sector. ECZ and AIDRZ are private sector, nongovernmental organizations, but both are nonprofit institutions that do not operate like enterprises competing in the open market.

The rural water sector does not follow the private sector market model. It is a mix of one government organization (SNHR) working with other donor-assisted projects and NGOs to produce outputs primarily related to infrastructure. SNHR relies to a major extent on USAID financial support which distorts any analysis of SNHR as a typical government agency. The rural health zones developed under the USAID/Zaire-financed Basic Rural Health (I and II) projects have significant operational and financial independence but still rely on assistance from the SANRU project and the many NGOs, primarily church affiliated, operating in Zaire. Adjustments are required for the development of an open market system in Zaire.

Once such a system is in operation, the advantages of private sector participation would be weighed against the ability of SNHR to offer the most efficient approach to rural water development. The cost of construction contracted out to firms or NGOs with construction expertise could be assessed as the alternative. In this scenario, SNHR would develop job specifications and evaluate bids, but to do this, SNHR would first have to acquire additional skills.

SNHR is a young organization and can be expected to undergo some change before it reaches stability and finds its operational niche. To establish a baseline from which to evaluate alternative approaches to water system construction, SNHR should compare its abilities and costs with those of private sector organizations. For example, bids for drilling wells could be solicited from the private sector, with SNHR supplying its own bid. If NGOs can construct systems more cheaply, SNHR should serve only in a monitoring role and stand ready to provide emergency assistance in the event of a failed system. For example, SNHR would expect to take action in the face of a disaster such as a flood.

The experience of the projects under review shows that well drilling in Shaba has been completed at a very reasonable cost. It is unlikely that any private sector enterprise would do better. The cost of constructing boreholes under similar conditions in Togo through a competitive bidding process was 40 percent higher. Costs from other countries have been

found to be even greater. Likewise, the spring-capping and other activities under the SANRU project have been conducted at very reasonable cost. It is unlikely that any truly private sector approach would be less expensive.

3.3.2 The Roles of SNHR and SANRU in the Development of Rural Water Supplies

SNHR is still evolving as the government agency responsible for rural water supply. USAID/Zaire has played a major role in the development of SNHR but unfortunately has given mixed signals of its intentions. On the one hand, it has financed institution-building; on the other hand, it has given official preference to the nongovernmental private sector. These are two fundamentally contradictory gestures. At the same time, it has encouraged SNHR to expand operations and increase construction activities, objectives that are in some sense at variance with institutional development and operational efficiency.

By financing SNHR construction activities through the SANRU project according to the project paper, USAID/Zaire suggests that SNHR is inefficient and not to be trusted to support SANRU without control. As a result, there is confusion and frustration, not only for SNHR, but also for SANRU and USAID/Zaire/HPN.

In the judgment of the evaluation team, it is necessary to reaffirm some of the basic objectives of the project paper and recommend that the parties involved strive to achieve them. The project paper and national government documents define three key roles for SNHR:

- to review and approve proposed projects and ensure that water resource development is planned and carried out in an effective manner

- to assist in the construction of the more technically difficult water systems

- to monitor the existing systems to ensure that O&M is carried out under the management of community organizations.[42]

[42]Initially, SNHR must be responsible for making spare parts and handpumps available. Later, this is expected to evolve into a private sector activity.

SANRU has two major roles:

- to continue to work with SNHR, at both the zonal and national levels, to plan the construction and execution of water systems in a timely and efficient manner[43]

- to continue the animation efforts needed to ensure that water and sanitation activities generate health impacts.

Ideally, the rural water sector should be managed by a government agency capable of planning and monitoring the orderly development of limited natural resources. That is why USAID/Zaire has adopted the commendable but undeclared policy of supporting the institution-building of SNHR, which other donors hopefully will emulate. Institutional effectiveness and efficiency take time to grow, but USAID/Zaire can accelerate the process by providing SNHR with:

- technical assistance to plan, carry out, and monitor construction and operation and maintenance activities

- funds to purchase the materials required to exploit rural water sources

- support to encourage other donors to finance activities in the sector.

In the immediate future, SNHR will be expected to carry out the following functions in rural water supply:

regulatory—policies, standards
planning—national and project planning and budgeting
capital mobilization—revenues, grants, and loans
outreach—animation
service delivery—site development
management—O&M

In time, as the private sector develops, SNHR can be expected to retain responsibility for the regulatory, planning, capital mobilization and, to some extent, outreach functions, and leave the private sector, NGOs, PVOs, and local communities with the responsibility for site development and O&M.

[43]This applies particularly to the more complex systems such as piped-water systems.

3.3.3 Programming: Water

The Shaba project offers well-documented figures (Table 15) on real costs, including technical assistance and amortization, that could be used as guidelines for budgeting and planning corresponding outputs.

SANRU health zones appear to have been successful in establishing development committees as the focus for programming grassroots activities that answer the felt needs of the communities. Future USAID/Zaire projects should therefore strive to utilize established health zones as a first choice. In the health zones where SNHR has operating stations, SANRU should continue the current practice of involving it in the more complex water development activities, such as well-drilling and piped-water systems, a policy in keeping with the intentions of the BRH II project paper. But SANRU should support spring-capping in the health zones where SNHR is not operating, and, with constantly shrinking counterpart funds and SNHR's dependence on the construction materials these buy, should question the financing of the more technically demanding water projects proposed by NGOs in areas without SNHR stations.

The approach of the SANRU project has been to finance spring-capping and other less technically demanding methods of water development through zone-level rural water and sanitation coordinators working with the community. SNHR has been assigned the more difficult tasks of piped-water systems and borehole drilling, while also assisting communities with spring-capping. This is an appropriate technical mix. Plans for water systems in health zones where SNHR is operating are approved by the chef de station and the health zone water and sanitation coordinator, and submitted to SANRU in Kinshasa for funding. Delays in funding the projects proposed and implementing the work have occurred because of uncertainties surrounding the availability and timing of counterpart funds from USAID/Zaire. Since the Program Office of USAID/Zaire indicates this is unlikely to change, SNHR and SANRU must strive to work together in what is unquestionably a difficult situation. The SANRU project and SNHR activities are complementary; each must strive to understand the institutional requirements of the other.

SNHR well-drilling operations should be concentrated in one region, as in Shaba. Transportation and communication are most difficult in Zaire, and limiting the geographic range of well-drilling projects makes eminent sense. For this reason, the choice of Bandundu as one zone for possible future USAID assistance is considered sound. AIDRZ has used its experience in Shaba to produce a sound proposal for Bandundu that USAID/Zaire should support if it can find <u>additional</u> resources.

USAID/Zaire is right in centering attention on Shaba and Bandundu. At the same time, it is committed to financing SNHR operations to the level resources allow. Table 10 has shown that existing and estimated finances can support no more than eight stations. Since it would be inappropriate for SNHR to close a station or stations because funding is limited

and then open one in Bandundu, the objectives of the project paper should be amended to allow USAID/Zaire to concentrate on Bandundu, to save SNHR from embarrassment, and to achieve efficiencies in station operations.

3.3.4 Programming: Sanitation

Although sanitation activities have not had the desired community support, they should be continued at current levels nonetheless because linking water, sanitation, and hygiene education is an integral part of a health strategy. Since community interest is likely to pick up in the future, sanitation activities are a wise investment.

3.4 Sustainability Issues

This section assesses how far present rural water and sanitation policies and practices are likely to ensure the continued operation of systems and institutions.

3.4.1 Systems Installed

Although the evaluation team was able to gather firsthand information from only a few sites, written reports and information gained from interviews confirmed that action to ensure that the newly installed systems continue to operate has not been neglected. Following the decisions made at the April 21, 1990, meeting of CNAEA, communities have been invested with ownership of their rural water systems and made responsible for their operation, and the community development committees and community water committees have been officially authorized to collect the necessary funds. As the team observed in the Shaba region, the communities are eager to gain access to potable water and village committees are anxious to keep the systems in operation. Most have begun to collect funds to purchase the pump repair kit (*kit de base*) and, in some cases, spare parts. Many have also selected a local resident to be trained in the operation and maintenance of the system, primarily in pump repairs. The O&M program, launched only within the last few years, is already showing promising results.

At the community level, the animateurs have worked to foster pride in ownership and responsibility for the systems. At the national level, SNHR tries to ensure that spare parts and repair kits are available in the regions. The attention given to the rural systems has also sparked the interest of the private sector in making spare parts for the India Mark II pump, the standard for the system. These actions, coupled with the training in O&M supported by WASH and financed by USAID/Zaire, suggest that most of the systems in place are sustainable. However, the O&M program is relatively new and must stand the test of time before a final judgment can be made on its value and viability.

3.4.2 Community Development Committees/Water Committees

Village development committees have a long tradition in many parts of Zaire. In areas of the country where government services and assistance have been minimal but nongovernmental organizations have been active, community development committees have learned to resolve local problems. In the SANRU-supported health zones, committees established when the project began in 1980 now have almost a decade of experience.

This experience in bottom-up development, the modest resources required to train and motivate villagers to participate in improving their lives, and their eagerness to gain access to potable water suggest that the development committees will be able to sustain operations with minimal, if any, direct outside assistance.[44]

This same judgment may not apply to the water committees, established in the villages where the SANRU project has yet, or is not scheduled, to begin operations. In the Shaba region, for example, where the tradition of paternalism is strong and communities are not accustomed to paying for services or resolving local problems, attention has only recently been given to facilitating the establishment of water committees. The SNHR and project staffs are aware that they should be built up, and in a few instances, e.g., at Tshimbalanga, where a water committee was collecting revenues, the efforts of the animateurs appear to be bearing fruit. But it is too soon to determine whether they will continue to operate effectively after the close of the project.

3.4.3 SNHR

As explained earlier, SNHR is almost totally dependent on donor assistance. USAID/Zaire contributes almost 65 percent of its annual operating budget, the GOZ less than 20 percent. This dependency jeopardizes the long-term viability of operations and the sustainability of the institution. Without question, if USAID/Zaire were to withdraw its support, SNHR would have to scale down operations radically, confining its activities to those areas where local residents could support the cost of ongoing operations. SNHR is aware of its dependence on USAID/Zaire and other donors, readily complies with donor directives, and is seeking additional support. It appears confident that USAID/Zaire assistance will continue and increase, in spite of the fact that present contributions in counterpart funds have been insufficient to complete the planned objectives.

SNHR lacks skilled and motivated staff and the organizational solidarity needed to survive. While the director is trying to broaden the donor-support base and urging the GOZ to

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[44]See Itoko Y'Oluki et al., *"Role de l'Eau et l'Assainissement en Soins de Santé Primaires au Zaire,"* SANRU, May 1987, pp. 3-4.

increase its contribution, few of his staff seem to believe that the survival of the institution could hang on their performance and commitment. Most staff assume that donor support will and must continue. Judging from the operational reports of most stations, they frequently ascribe failure to reach targets, even those that are realistic, to forces beyond their control. Fatalism appears to permeate the organization. In the minds of many, the quality of personal performance cannot improve without access to outside resources—training, materials, finance. Yet, when these are provided, performance improves only marginally and more resources are requested and expected.

SNHR is in a very precarious position. Donor patience is waning and donor resources are diminishing. It must set about improving its efficiency and effectiveness if it hopes to survive. This judgment is harsh, but USAID/Zaire, which has encouraged SNHR to expand rather than to consolidate its operations and increase efficiency, must share the blame. In summary, although SNHR has made measurable progress in developing sites and increasing the level of services in rural areas (Table 13), it still has a long way to go.

Chapter 4

PROJECT IMPACTS

The two subsections that follow summarize current information on project impacts and stress the need to begin a systematic review of the data being collected by the SANRU project.

4.1 Health Impacts

AID's current support for child survival programs emphasizing oral rehydration therapy (ORT) and immunization testifies to the agency's awareness that diarrheal diseases are among the leading killers of children in the world. Measles vaccination has been shown to have some effect on diarrheal incidence, and ORT has a demonstrated palliative effect on the dehydration attendant on diarrhea and may prevent death. Still, neither of these interventions protects children against the ingestion of diarrhea pathogens. Diarrhea strikes when children consume pathogen-laden food or water. Pathogens are transmitted via a fecal-oral route and do not require an intermediate host.

Excreta disposal, personal and domestic hygiene, and potable water are major factors that interrupt transmission and reduce morbidity and mortality.[45] As reported in Esrey's recent publication for WASH:

> the size of reduction any particular project actually achieves depends largely on the interplay of two factors: the manner in which different combinations of interventions are installed and the characteristics [e.g., behavior] of the people for whom the intervention is targeted.[46]

Water supply and sanitation interventions have been promoted and financed by the SANRU project.[47] While community interest in sanitation has been modest, as noted elsewhere, an improved water supply has been often requested and well supported. There are many explanations for this. One *medecin chef de zone* interviewed by the evaluation team said

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[45]There are no available data on the effects of hygiene education or sanitation practices in the projects. Consequently, only the impact of improved water supplies can be assessed.

[46]Steven A. Esrey et al., "Health Benefits from Improvements in Water Supply and Sanitation: Survey and Analysis of the Literature on Selected Diseases," WASH Technical Report, No. 66, p. 9.

[47]Only the SANRU project has data on health impacts. The health impacts of the SNHR and Shaba activities cannot be assessed, although some comments are made on the other impacts of the water interventions supported by these two projects.

women, who are the primary bearers of water, often asked to have a pump installed so they could save time on this task. Almost all those interviewed expressed the view that potable water ensured good health, although few could recall dramatic changes in diarrheal incidence or other morbidities as a result of the installation of an improved water supply.

Although the data from the sites briefly visited by the evaluation team do not allow a conclusion that diarrheal incidence has decreased as a result of the increased availability of water and latrines, a study prepared by Dr. Rene Tonglet and his colleagues, and still under review, provides evidence of a strong relationship between the incidence of diarrhea in children under five and the consumption of potable water.[48] This study, which followed five villages in the health zone of Kirotshe (Nord-Kivu), showed that the risk of diarrhea, especially in children under two, was greatly diminished when the household used at least 50 liters of potable water daily or when the household was not more than a five-minute walk to the nearest source of potable water, specifically a public standpipe. The data presented suggest that a child whose household is 10 or more minutes from a source of potable water or collects less than 25 liters of water per day has twice the risk of a diarrhea episode as a child whose household collects 50 liters and is five minutes from the source.

In addition to the Tonglet study, other SANRU data suggest a correlation between the number and presumed use of capped springs and the incidence of diarrhea. Table 16 shows that diarrheal incidence decreases as the number of capped springs per health zone increases.

TABLE 16

NUMBER OF SPRINGS PER HEALTH ZONE
AND DIARRHEAL INCIDENCE PER 1,000 POPULATION

NUMBER OF SPRINGS	DIARRHEAL INCIDENCE
0	29
7-20	36
25-35	17
50-100	18

These results are very preliminary and remain to be validated. However, the relationship suggested corresponds to the findings of other studies.[49]

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[48]Rene Tonglet et al., *"Effect de l'Approvisionnement en Eau sur le Problème de la Diarrhée Infantile en Milieu Rural au Zaire,"* [draft], 1989.

[49]Esrey, op cit., p. 11.

These SANRU data might also suggest another important health relationship, namely, the connection between the number of springs capped and the coverage of other primary health care interventions. As sources increase, the coverage of other health programs, e.g., vaccination and control of diarrheal disease, also seems to increase. Total coverage for both improved water sources and other health programs might be the result of synergism. Taylor and Parker have shown in Narangwal, India, that integrated or combined services generally performed at least as well as more selective approaches and, because of their integrated nature, were often more efficient. Integrated services have the advantage of providing multiple benefits, an important consideration in areas with many competing causes of morbidity and mortality.[50] These important relationships remain unexplored in the health zones. SANRU has yet to begin to examine the data to validate these and other important associations.

In Zaire, where villagers are used to paying for medical care and the cost of care is becoming a barrier to service utilization, there is one other impact that should be assessed, namely, the savings in health care expenditures resulting from improved water sources. Community members interviewed in Shaba observed that water was a health benefit, but no one was able to confirm that personal expenditures for health care were less after the Sandoa station had installed handpumps.

4.2 Other Impacts

In addition to health, the SANRU data may be able to document at least two other developmental impacts.

The first is on women, who have the most to gain from more convenient access to water. As the Tonglet study suggests, easier access has an effect on diarrheal incidence. More accessible sources of water also free women to spend more time on other domestic or income-generating activities. Some might be led to serve on water or development committees, on which they are poorly represented in certain zones, meeting the objectives of an AID policy that emphasizes the importance of incorporating women in development activities.[51]

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[50]C.E.Taylor and R. L. Parker, "Integrating PHC Services: Evidence from Narangwal, India," Health Policy and Planning: A Journal of Health and Development, Vol 2, No. 2, p. 150.

[51]See Itoko Y'Oluki et al., *"Role de l'Eau e l'Assainissement en Soins de Sante Primaries au Zaire,"* SANRU, May 1987, p. 5.

The second impact is on socioeconomic development. The SANRU data on 50 villages in 20 health zones confirm that an improved water supply is among the benefits most desired by rural communities. There is some evidence that communities are better prepared and more motivated to embark on other development activities after successfully completing and sustaining a water project. For example, a preliminary review of a large sample from the SANRU health zones showed higher measles vaccination rates in zones with improved access to potable water. SANRU should analyze the data to validate such associations between improved water supply and socioeconomic development.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

USAID/Zaire has invested wisely in the water supply and sanitation sector of Zaire where, with a few exceptions such as REGIDESO, the infrastructure is weak but nongovernmental organizations are highly motivated and well equipped to provide services that are wanted and needed by rural residents. USAID/Zaire has fostered the managerial and technical advancement of SNHR, a young organization charged with expanding the coverage of water services in the rural areas of a vast country. At the same time, in supporting a decentralized primary health care system based on health zones, USAID/Zaire has encouraged water and sanitation activities at the local level.

These activities have been financed through two projects and implemented at levels ranging from those requiring extensive expatriate technical assistance, e.g., well-drilling, to those requiring less sophisticated skills available in the community, e.g., spring-capping. The Shaba project, for example, has for the last six years supported the work of a full-time expatriate drilling team, whose primary concern has been to provide water as efficiently and cost-effectively as possible, but which has also contributed to the technical experience of the SNHR staff at the Sandoa station. Primary emphasis has been placed on the outputs measured at the infrastructure in place.

In the SANRU II project on the other hand, service delivery has not been ignored but more emphasis has been placed on fostering the community development committees, responding to expressed local needs, and supporting health improvement measures for which the communities contribute time, materials, and funds. Improved access to water has played a significant role in establishing development committees.

This project has also supported the institutional development of SNHR by offering finance, managerial and technical training programs at the local and national levels, and assistance with activities at selected rural sites, and encouraging the process of decentralized community development and local autonomy.

While both projects have significant accomplishments to show, they differ in cost, in the replicability of their approaches, and in the sustainability of their operations. In the case of the Shaba project, designed to serve the local population and Zairian refugees returning from Angola, there is some question whether drilling operations can be sustained after the contractor's departure in September 1990. This same concerns does not apply in the SANRU-assisted communities, although there are indications that O&M is inadequate at several sites.

Based on a review of documents, visits to selected sites, and interviews with those involved in developing and sustaining rural water and sanitation activities in Zaire, the evaluation team offers the conclusions and recommendations set forth below. Only the main conclusions and recommendations are listed, as requested in the issues paper (Annex 2) and during discussions with the staff of HPN.

CONCLUSIONS AND RECOMMENDATIONS

The SANRU II project paper establishes many objectives that past experience and projected revenues suggest are unattainable. **USAID/Zaire should amend the project paper, outlining the objectives to be achieved by 1992 and proposing the design of a new project to follow.**

Institutions

1. Part of the SANRU II project resources have been to used to strengthen SNHR, which has made commendable efforts to reach the targets defined in the project paper and to become a viable institution. However, these targets, e.g., 172 piped-water systems, 16 new stations, cannot be achieved with present and projected resources. As SNHR's institutional capacity and field of operations increase, it should be engaged in constructing water and sanitation systems, assisting and monitoring the work of other organizations involved in the sector, and overseeing the operation and maintenance of existing systems. **USAID/Zaire should measure SNHR's <u>institutional</u> efficiency by its performance in all three roles and not just its proficiency in construction. New targets and responsibilities should be defined in the project paper amendment.**

2. Many SNHR stations are less than efficient, partly because efficiency has been sacrificed to the expansion proposed in the project paper. SNHR, using the young engineers working with the USAID-financed *conseiller technique*, should collect data to determine the unit cost of each work realized and to calculate the range of efficiencies among SNHR stations. This activity should be carried out before September 30, 1990, and the findings being reviewed between October 1 and December 31, 1990. Based on the financial resources available and the institutional capacity as defined in SNHR's assessment of station operations, **USAID/Zaire should support perhaps no more than eight of the most efficient stations and the national headquarters, and should prepare a realistic estimate of the resources that will be available for this support over the next two years.**

3. SNHR's training needs will depend on the level of operation to be supported. Current impressions are that technical skills at some stations are adequate but managerial skills are deficient. As part of the data collection exercise, SNHR should determine the skills needed to operate a reduced number of stations and the headquarters office, and in which of these skills the present staff is deficient and should be trained. **However, before USAID/Zaire decides to support additional training, it should review the plan being developed by UNDP and should request the *conseiller technique* to outline short courses that address the priority training needs of SNHR.**

Technical

1. The technologies used in the projects—spring-capping, well-drilling, and piped-water systems—are appropriate and cost effective even in the case of boreholes, which, although expensive, are necessary in areas where spring-capping is not possible. **USAID/Zaire should continue to support the current mix of technologies, but should also consider the feasibility of hydraulic rams and the cost effectiveness of hand-dug wells and rainwater catchments.**

2. The quality of spring-capping varies with geologic conditions, some sites being more difficult to cap than others and requiring greater technical proficiency than the health zones or NGOs can muster. **USAID/Zaire should encourage SNHR to review the plans and monitor the work of all water development in the zones where it is operating, and to assume responsibility for completing the work wherever it is difficult.**

3. At present, there are no guidelines for the choice of the most appropriate technology and the most desirable organization to carry it out. The selection of appropriate technologies depends on many factors which vary from site to site. However, as a general rule, some criteria based on project experience in Zaire may be established. SNHR should adopt the following:

   - Springs should be the first choice wherever they are less than 500 meters (10 minutes' walking time) from the village.

   - Piped-water systems should be selected where populations are large, distances between residents and the source are reasonable, and gravity flow is possible.

   - In spite of their higher cost, boreholes must be considered where there is no cheaper alternative.

- Based on data from USAID-assisted projects, tentative cost guidelines are $5.00 per capita for springs $15.00 for boreholes, and $20.00 for piped-water systems.

- SNHR should grant the right of construction to any organization that has a proven capacity to carry out work within these guidelines.

USAID/Zaire should request SNHR to review and adopt the guidelines proposed.

Financial and Programming

1. Delays in disbursement and inadequate counterpart funds have created uncertainties in project planning and execution for both SANRU and SNHR, and have no doubt contributed to their failure to achieve project targets. Current funding levels for the Shaba project appear adequate. SANRU and SNHR should develop plans that require varying levels of USAID assistance and should specify the outputs achievable under the Basic Rural Health II project. The plans should include an estimate of the number of construction activities for each type of water system, based on performance during the first five years of the project. **USAID/Zaire should strive for accurate estimates of the counterpart funds available for the remaining project years and should improve the timeliness of its disbursements**.

2. Based on 1989 figures, springs cost $1,100 per system, and boreholes $6,500 per system. The cost of piped-water systems varies with the length of the line. **If USAID/Zaire must reduce project budgets, construction targets will have to be reduced proportionately, and defined more precisely in the project paper amendment.**

3. The current arrangement, under which the development committees in SANRU health zones provide SNHR with materials for the construction of water projects, is appropriate because it fosters collaboration between the communities and SNHR. But competition and tension characterize the relationship between SNHR and SANRU at the headquarters level. SNHR believes it should have control of the resources available at SANRU for the construction of water projects, and, at a minimum, should have the right to approve the plans to be executed in SANRU-assisted areas. SANRU, on the other hand, regards the communities as owners of the resources, and feels that each community should have the right to select the water project it wants and to determine the best means to execute the work. In some but not all cases, SNHR assistance would be requested. This friction is neither unusual nor unexpected, but it stymies collaboration between SNHR and SANRU at the national level and runs counter to the objectives of the SANRU II project. Although the current arrangement does not ensure that each SNHR station will

receive sufficient resources to be fully employed, there are no alternatives that offer USAID/Zaire a better return on its investment. Separating the allocations, for example, might prompt SNHR to operate without taking the concerns of the health zones into account, and might leave the zones without the technical assistance required to develop the more difficult sites. **USAID/Zaire should maintain the current arrangement but continue to remind both SANRU and SNHR of the importance of resolving their differences speedily and satisfactorily. As a first step in improving this relationship, USAID/Zaire should insist that both submit proposed work schedules during the fourth quarter of each calendar year and meet to select priority activities according to the availability of counterpart funds.**

4. SANRU-assisted zones offer USAID/Zaire an opportunity to make water and sanitation an integral part of health assistance. SANRU should be commended for its part in doing this for child survival activities in a cost-effective manner.

5. Given the limits on time and resources and the problems of transportation and communication in Zaire, USAID/Zaire would be wise to concentrate on one region at a time, particularly with well-drilling. For the installation of complex systems, it makes sense to continue to focus attention on Shaba, where major investments have been made. To ensure that effective operations continue at the Sandoa station, USAID/Zaire should ensure that SNHR makes adequate resources available. Once there are indications that operations are sustainable, USAID/Zaire could initiate water supply and sanitation activities in Bandundu. This is not to suggest that Bandundu should be ignored until the work in Shaba is completed. SNHR/AIDRZ has developed a cost-effective proposal for work in the area. **<u>If additional resources are available,</u> AIDRZ should collaborate with SNHR in the execution of this plan and USAID/Zaire should support it. Present resources should not be diverted to Bandundu.**

6. Drilling operations in the Shaba project appear to be cost effective, and it is unlikely that the Zairian private sector could do better than AIDRZ. Still, the private sector should be encouraged to bid on all construction and so also should SNHR. **USAID/Zaire should identify and support <u>local</u> experts who can work with SNHR to prepare bid documents and review proposals submitted.**

7. Available evidence on the cost of operations suggests that the present mix of public (SNHR and health zones) and private (NGOs) organizations is appropriate. **No changes are recommended.**

Sustainability

1. The systems, primarily spring-cappings, installed in SANRU-assisted villages, where community development committees are experienced and active, appear to be sustainable. Water committees, established in the Shaba region by SNHR, are less experienced and may require more support and assistance through animation efforts before they are capable of sustainable operations. Special attention should be given to the animation efforts at Sandoa and Kabongo. Through the WASH Project, USAID/Zaire has already financed the development of an O&M strategy for rural water. **USAID/Zaire should continue to support the implementation of the O&M strategy and the animation activities focused on enhancing the capacity of water committees and development committees to maintain systems, especially handpumps.**

2. A key element to sustainability is the adoption and implementation of the WASH-assisted O&M policy and program. Already endorsed by the CNAEA, this policy is expected to receive national approval by the end of 1990. **USAID/Zaire should continue to support the adoption of the O&M strategy, already endorsed by the CNAEA, as national GOZ policy.**

3. Since some of the systems, especially the handpumps, may be straining a community's ability to afford the maintenance requirements, it is imperative that close attention be given to the implementation of the O&M plan. **USAID/Zaire should insist that SANRU and SNHR routinely develop procedures to monitor scheduled O&M by the development and water committees.**

4. Through 1989, USAID/Zaire had provided almost 65 percent of the financial support for SNHR, which is not conducive to the organization's long-term sustainability. USAID/Zaire is responsible for encouraging SNHR to expand operations but does not have the funds to maintain them at the current level. USAID/Zaire must encourage SNHR to seek help from other sources while reducing present operations to levels commensurate with USAID/Zaire funding. **USAID/Zaire should continue the "policy dialogue" with the GOZ and negotiate benchmark amounts of government financing for SNHR for the period 1990-1992.**

5. USAID/Zaire is to be commended for attempting to provide the institutional capacity to meet the needs of rural residents of Zaire by fostering the establishment of a rural water authority. **At the close of the current project (1992), USAID/Zaire should be prepared to develop a new project that continues support for SNHR but phases out as SNHR's institutional viability and resources from the GOZ and other donors increase.**

Health Impacts

In light of AID's current emphasis on child survival, it is important to document the impact of water, latrines, and hygiene education on the incidence of diarrhea in children under two years of age. Studies of the extent to which water supply influences the acceptance of other development activities, such as education, are also badly needed. Some work has been done but more data should be collected and analyzed systematically. SANRU staff or graduates of the Ecole de Sante Publique at the Université de Kinshasa, assisted by locally available experts, might be used as health zone personnel investigators. **USAID/Zaire should support SANRU staff, health zone personnel, and the school of public health in the collection and analysis of data that document the health impacts of water supply and sanitation.**

ANNEX 1

SCOPE OF WORK

I. Scope of Work

A. Objective: The contractual technical assistance to be provided by the WASH III project is intended to assist USAID, SNHR, and SANRU in carrying out two assignments related to AID's assistance in the water and sanitation sector. The first assignment is to conduct an "internal review" of USAID's assistance in the water and sanitation sector. The internal review will result in recommendations to improve AID's programming and project implementation of ongoing water and sanitation activities. The internal review will be conducted in close collaboration with USAID staff and expert consultants. Recommendations emanating from the review will then be incorporated into an amendment of the Project 107 Project Paper, this constituting the second assignment under this authorization for technical assistance.

B. Background: The government of Zaire and USAID are partners in two ongoing water and sanitation projects. A Cooperative Agreement to the AIDRZ (local PVO) under the 116 project funds water systems in the Lualaba sub-region (Shaba region), including spring cappings, gravity-fed piped water systems and boreholes fitted with handpumps. The project will end in 1990 and transition to becoming an SNHR station is already well underway.

Under the BRH II project, both SANRU (managed by the Eglise du Christ aux Zaire) and the SNHR are funded to plan, design and execute community water systems. SANRU has directly funded and executed hundreds of spring cappings as well as supported Health Zone Projects in collaboration with SNHR to drill wells or build gravity-fed systems in health zones assisted by SANRU. USAID also funds SNHR directly to support its expanding field offices and develop its institutional capacity. The BRH II (#107) project is planned to end in September of 1992.

In early 1989 two Mobile 80 well-drilling units with support equipment and trucks began operations in Kabongo. The operation and maintenance of these rigs has proved to be far more costly than foreseen in the Project Paper. The planned expansion of SNHR to 26 field stations (currently there are 15) has become impossible given budgetary constraints. USAID's ability to provide additional support to these activities is unlikely, in fact, budgets are likely to be increasingly constrained in

upcoming years. Community financing is receiving increasing emphasis under SNHR's assistance program, but, given the level of effective demand, these are not expected to fill the funding shortfall.

At the end of 1989, an agreement with UNICEF was reached which will provide important co-financing of the well-drilling operation. On the other hand, the GOZ's ability and willingness to increase its contribution to the sector is tentative at best. At the present time, USAID assistance extends across the country to all 15 of the SNHR stations. In both 1990 and 1991, counterpart funds expected from the PL 480 Program and the Commodity Import Program, are expected to decrease over levels obtained in previous years. As a result, there is a widening gap between planned project outputs and the available resources. Project objectives and outputs will have to be revised to reflect the expected level of resources. In addition, options for improving the return on USAID's investment through targeting project expenditures must be thoroughly analyzed and considered.

C. Level of Effort: The required technical assistance will require two distinct efforts: a two-person team to carry out the internal review of USAID's water and sanitation assistance (six person weeks in-country) and one person with strong programming skills to draft a project paper amendment (four person-weeks in country), including budgets, narrative and technical analyses. The internal review will be held in April and early May. At a later date, probably in mid-September, one of the two consultants from the internal review will return to post and draft the PP Amendment and any required analyses. It's important to the integrity of this effort that the expert chosen for the second activity be one of the two experts conducting the internal review (the prior activity).

II. Contractor's Duties and Responsibilities:

A. General: The contracted experts will consult with project and USAID officials in conducting an internal review of the Mission's water and sanitation assistance and in building upon those recommendations to draft a Project Paper amendment to the PNI II-Water (\$197-W) project. The consultants will produce a review document in draft and after comments from the Mission make the necessary revisions to produce a Final report.

In the second phase of the consultancy, the contracted expert will conduct the necessary analyses, prepare the budgetary estimates and draft the body of a Project Paper amendment. The consultant will work closely with USAID officials in developing an outline and workplan for this project redesign effort.

B. Specific Duties and Responsibilities:

Part I. The Internal Review

The contracted technical assistance team will be responsible for carrying out the following activities:

1. review of prior project documentation -- including project papers and amendments, evaluations, technical reports, trip reports, etc. in preparation for the internal review. A list of appropriate documents will be provided to the contractor by the project officer.

2. close consultation with USAID liaison officials in drafting a workplan for the internal review and an outline of their report. This will be due after 3 days in the country. The workplan will indicate the important persons to be contacted, the issues to be addressed and a schedule of activities including travel.

3. an assessment of progress to date in meeting objectives using secondary data sources (semi-annual reports, evaluations, trip reports, etc.) and opinion of knowledgable informants; an analysis of project's strongpoints and weak points and problems hindering efficient performance of the executing agency.

4. analysis of alternative program stragies for the project: a recommended mix of water systems to be completed by the end of project given budgetary constraints; undertake a comparison of project implementation under the PVO project (116), under execution by SANRU (107-Health) and by SNHR (107-Water) citing the relative strengths and weaknesses of each and recommending possible change in project emphasis between and within programs including an analysis of the need for additional funds.

5. draft a review document citing the major problems impeding project implementation, the major findings and recommendations of the internal review. The document should then be discussed and revised after review and discussion with USAID responsible officials.

6. Revise the draft internal revie report and produce a final version (in English) acceptable to USAID.

II. Project Redesign Effort (Drafting the PP Amendment)

1. The consultant will consult closely with USAID liaison officials in drafting an outline for the Project Paper (PP) Amendment and in plans for any necessary technical analyses (appendices to the PP Amendment).

2. The consultant will incorporate the recommendations of the internal review into a complete draft of a PP Amendment following Mission guidance and standards.

3. After Mission review and comment, the consultant will revise the document and produce a final draft acceptable to USAID.

NOTE: A six-day workweek will be authorized for this assignment.

III. Reports

The consultants for the internal review will be required to produce a draft internal review no later than 5 working days prior to their departure. A final draft incorporating Mission comments and revisions will be due prior to departure from post. The report will be submitted in English.

For the redesign effort, a draft PP amendment (in English) will be required no later than 5 working days prior to departure. The final draft, incorporating Mission comments and revisions will be due prior to departure from post.

IV. Qualifications and Requirements:

The consultants for the internal review should be development professionals with at least five years of experience in working on development projects in third world countries. One of the consultants should be experienced in the management, design and/or evaluation of health/water and sanitation projects with appropriate graduate training. The other consultant should have field experience in implementation, design and/or evaluation of water and sanitation efforts and an appropriate degree qualifying them as an expert in water and sanitation (e.g., civil engineering, hydrology, environmental sciences, etc.).

Both consultants should be fluent in French (FSI Level Speaking 3 and Reading 3). Prior experience in francophone Africa is desirable.

V. Reporting Relationships

The contractors will work under the immediate supervison of the Health Development Officer. Other important contacts at USAID include the HPN Office Chief and the staff of the Programming office. The contractors will work in close collaboration with the project's senior water & sanitation advisor and the project chiefs of the 107-Water, 107-Health and 116 projects.

ANNEX 2

ISSUES SUBMITTED BY PROJECT STAFF

1. USAID'S objectives in W & S.

   - Are they appropriate?
   - Are they feasible? Why or why not?
   - Changes recommended?

1 2. Taking into account human and material resources currently available at headquarters, how many stations can SNHR handle efficiently?

3. 2. Accomplishments ~~Success~~ to date in W & S Activities.

   By type:

   - Spring cappings (#, cost, benefit)
   - Handpumps (#, cost, benefit)
   - Adductions (#, cost. benefit)

   By Executing Agency: Costs, Results, Benefits

   - For AIDRZ (Project 116)
   - For SANRU (Project 107-H)
   - For SNHR (Project 107-W)

4. Should simple structures such as spring cappings, he built/financed through SNHR or left for the health zones or less technically capable entities ?

5. What are the training needs of the institution at headquarters and in the stations, at the levels of "cadres" and "agents"?

6. 3. Constraints Analysis: What constraints impede obtaining more efficient results with our resources?

7. Adequacy of: Funding levels? Technical assistance? Logistics? [Management capacity? Field capacity?] [Community interface and participation?]

8. Should USAID require the GOZ to contribute a definite amount to the jointly financed activities?

9. 4. Sustainability: Do the community water systems being put in place have a reasonable chance of being operated and maintained after the project assistance ends? [Lessons learned and recommendations.]

10. 5. Programming Issues.

- Counterpart-funds (PL 480) for water systems passes to the ECZ/SANRU for both the SNHR and ONG'S. Has this arrangement been effective? Should it be continued?

- Are the budgets for planned ouputs of handpumps, adductions and springs realistic? Given the likelihood of fewer resources, what should be done?

- Should USAID assistance in the water supply sector be limited to the SANRU zones? To the adopted regions of Bandundu and Shaba?

- Should drilling continue to be implemented through force accounts? If so, how much technical assistance is needed in the planning and implementation stages? Or should it be contracted out to local, US-based, or foreign entrepreneurs?

- USAID is financing both private sector (SANRU) and public sector W & S activities. Do we have the appropriate mix? Recommendations.

Conseil de Santé Familiales en Milieu Rural

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KINSHASA-GOMBE

MEMORANDUM

Date: April 8, 1990
From: Franklin C. Baer/ SANRU
To: Chris McDermott/ HPN
Subject: Water and Sanitation: Internal Review

Here are my comments concerning the SOW and issues for the internal review of USAID's water and sanitation activities.

1) While I think I understand what you mean by "health zones or less technically capable entities" it could be easily misinterpreted as being somewhat derogatory. I would suggest rephrasing this to "health zones and other capable entities."

2) "CPF for water systems passes to the ECZ/SANRU for both the SNHR and ONGs". This is not a complete description and could be the basis, I think, of some of the current misunderstandings. SANRU does not receive and pass on money for SNHR or ONG projects but rather for health zone projects carried out with SNHR or ONG technical support. The difference is very important in order to make it clear that it is the population who manages the water system. I suggest that the sentence be changed to read:

> CPF to finance the material costs of complex water systems passes to the ECZ/SANRU for health zone projects carried out with the technical support of SNHR or ONG stations. Has this arrangement been effective? Should it be continued?

3) "USAID is financing both private sector (SANRU) and public sector W&S activities." The definition of private sector in this context is not clear to me as most of what SANRU does is finance public sector W&S in public sector health zones of which some have NGO management input. I would think that project 116 with AIDRZ is as much or more private sector than are SANRU activities. Perhaps the question should be:

> Project 107 calls for financing complex water systems both through SNHR and NGO stations. Do we currently have the appropriate mix? Recommendations.

→ 4) The distinction between dug wells and drilled wells needs to be made when comparing the costs, results and benefits of water systems. The reference to "handpumps" should imply more than just drilled wells.

5) The sanitation component is weak or nonexistent in the SOW. I would suggest adding at least the following issue:

> How have sanitation activities have been promoted as part of the W&S component? Who has done what? What are the funding levels and technical assistance required? What are the lessons learned?

6) It will also important to consider the relationship between W&S activities and other community development activities:

> How does the promotion of W&S relate to other community developmental activities? To what degree are W&S activities justified as developmental catalysts for promoting primary health care and/or integrated development? How are IE&C activities for W&S being carried out?

With regards to the schedule/itinerary it is unfortunate that Dr. Duale, Cit. Kasongo, and Cit. Kalonji will all be away from Kinshasa this week. While we knew this internal review was being planned the timing has come has a last minute surprise. Cit. Kasongo is now in Shaba looking at construction projects. Cit. Itoko is currently in Kinshasa but due to go to Shaba for the pretesting of the O&M materials. Perhaps we can link Kasongo or Itoko up with the consultants for at least the Kabongo visit. I would also expect to have a SANRU person along for the Vanga visit (probably myself and/or Kasongo). A visit to a health zone such as Kisantu, Nselo, or Sona Bata is also required in order to see W&S activities outside of the technical stations. This could be done by Itoko on the 13th or 14th.

cc: Ray Martin / Rhonda Smith / Duale Sambe / Nick Adrien

ANNEX 3

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ANNEX 4

PERSONS INTERVIEWED

USAID/Kinshasa
- Dennis Chandler, Director
- Ray Martin, Director - HPN
- Chris McDermott, Project Officer - HPN
- Rhonda Smith, Project Officer - HPN
- Cheryl Anderson, Program Office
- Cit. Mulimura Nyimuringa, Program Office
- Cit. Mangindula Lubaki, Program Office

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- Cit. Kabamba Bilonda, Sous Directeur

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- Cit. Luvula Agnen a Mbat, Adjoint Technique
- Cit. Masumbuko, Chef, Suivi/Planification
- Nicolas G. Adrien, Conseiller Technique - USAID
- Guy Goyens, Conseiller Technique - Coop. Belge

Projet de Soins de Sante Premieres en Milieu Rural (SANRU)
- Dr. Duale Sambe, Directeur
- Dr. Franklin Baer, Directeur Adjoint/Project Manager
- Cit. Itoko Y'Oluki, Responsable Eau/Assainissement
- Cit. Kasongo Ntambwe, Chef de Division des Infrastructure

Association Internationale de Developpement Rural au Zaire (AIDRZ)
- Guy Petit, Administrateur delegue
- Christian Ermgodts, Administateur
- Cit. Kabagema, Chef de Service d'Animation
- Maaurice DeBachere, Conseiller au Chef de Projet (Sandoa)

Ecole de Sante Publique, Universite de Kinshasa
- Dr. Walter Mason, Professeur
- Dr. William Bertrand, Professeur
- Cit. Leon Kintaudi

United Nations Childrens Fund (UNICEF)
- Mr. Akadiri, Coodonnateur de Programmes
- Cit. Lubila Samba, Administrateur des Projets

Zone de Sante - Ngindinga
- Dr. Tsasa-Thubi Mabiala, Medecin Chef de Zone
- Cit. Nzau-Lutaladio, Administrateur-Gestionnaire
- Cit. Matando-Mangani, Secretaire de la Zone
- Jenny Schumacher, Voluntaire du Corps de la Paix

Station de SNHR - Kabongo

Cit. Tsimba di Mavunga Chef de Station
Cit. Ngindu wa Ngindu, Charge de Logistique
Cit. Nyimi Phuabu
Cit. Songa Nsampela, Forage "D"
Cit. Lulu-Esula, Chef d'Unite de Forage
Cit. Nkuninpoko Lempwa, Technicien
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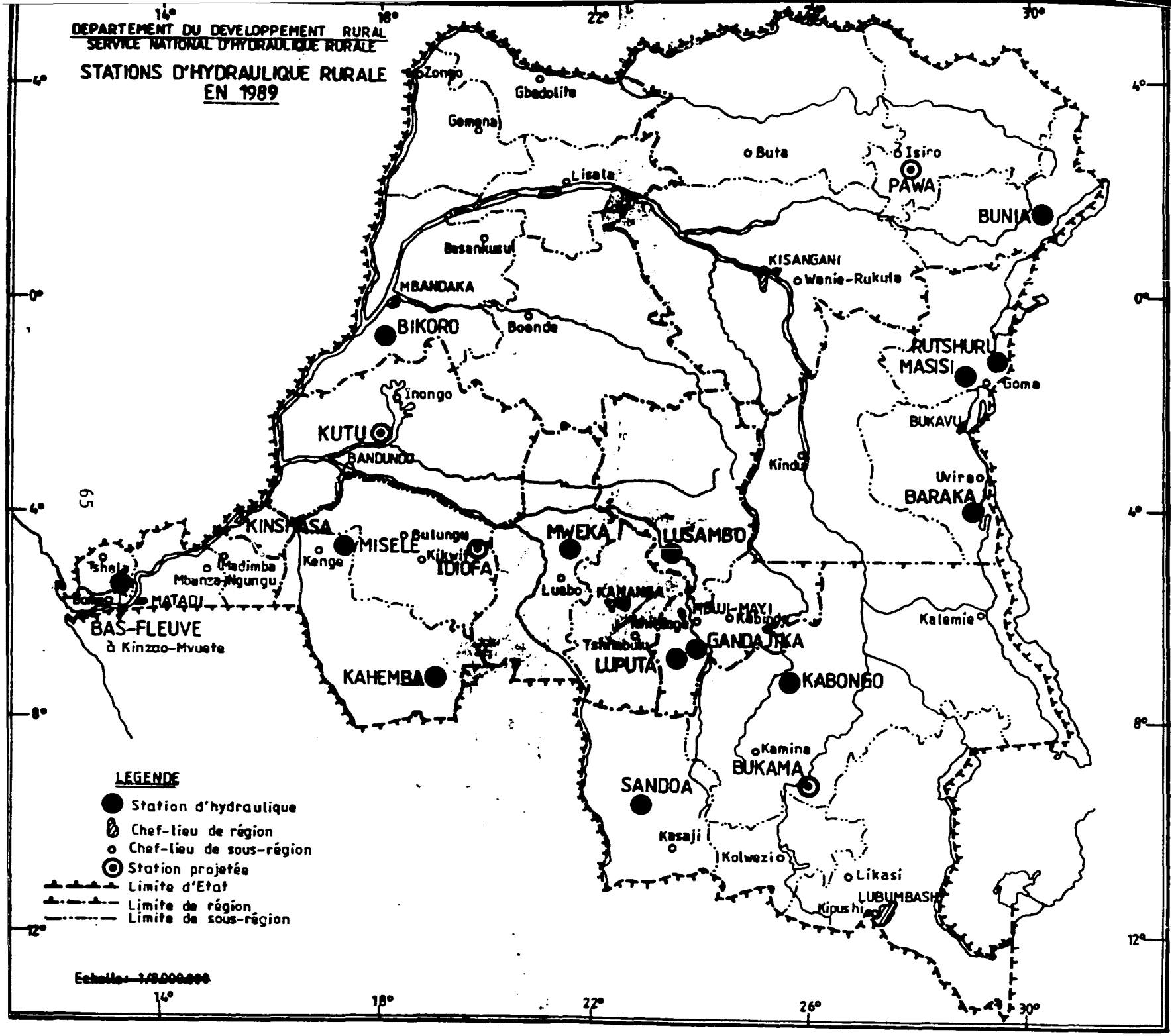
Lt. Bola, Officier politique
Cit. Mudahama Terera, Chef de Station
Cit. Luyindula, Assistant Technique
Alain Pirney, Maitre Sondeur

Zone de Sante - Sandoa

Dr. Tshimpanga Mutatshi, Medecin Chef de Zone
Cit. Liamby Lembianga, Administrateur-Gestionnaire

REGIONAL STATIONS OF SNHR



ANNEX 6

PHOTOGRAPHS

Photo 1: Borehole development (blowing air through casing to circulate water) in recently drilled well.

Photo 2: Construction of spring and pipeline.

Photo 3: Waiting in line with water containers.

Photo 4: India Mark II handpump with fence.

Photo 5: Removal of handpump for repair.

Photo 6: Repairmen with total kit.