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EVALUATION OF  
KIONZO POTABLE WATER PROJECT

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## I. Project Definition

The Kionzo Water Project proposed to remedy the inadequacy of clean drinking water in a community plagued with water communicable diseases. Two hydraulic rams were installed by Ateliers de Construction Electrique de Charleroi (ACEC), a local Belgian firm, to pump fresh spring water up to seven villages and Kionzo mission. The project was well designed, but several setbacks during its implementation phase make it unclear whether the project's objective will ever be sustained.

### I. Evaluation Purpose

The final evaluation of the Kionzo project constitutes a Lessons Learned and Development Issues Evaluation. The primary purpose of the evaluation is to provide recommendations for future projects. A secondary evaluation purpose is to determine the causes for the difficulties which occurred in the project's implementation phase.

## III. Evaluation Team and Itinerary

Citoyen Mulamba and Debra Rectenwald of USAID's Design and Evaluation Office made up the evaluation team. Citoyen Mulamba, USAID's engineering advisor has followed the project's progress since the beginning. Citoyen Isengingo, of the Bureau du Service Presidential d'Etudes, participated in the evaluation as an observer.

The team visited Kionzo Catholic mission between 22 and 25 April 1985. The Mother Superior and the Matadi Bishop were available to answer questions. The team also spoke with Mr. Haesevoets, the installation director at ACEC.

## IV. Project Background

The Kionzo Water Project was originally proposed by Father Jose Romero, a priest at Kionzo Catholic mission. Father Romero intended to service the Kionzo community with potable water by installing three hydraulic rams at two fresh spring water sources (refer to diagram attached to this document). Unfortunately, after USAID agreed to finance the project, Father Romero permanently left the country.

Because a replacement for Father Romero could not be found, local construction companies were solicited to install the water distribution system. Most firms refused to do the work for the small sum USAID offered (this activity had not been budgeted in original planning). At that time, Mr. Janssens, the senior field engineer of ACEC, was installing electrical equipment for USAID in Bas-Zaire (Project 660-0011). Mr. Janssens agreed to do a smaller version of the Kionzo project for the proposed sum, essentially as a favor to USAID. Although the company had little experience in water distribution systems, Mr. Janssens was regarded as personally competent.

In February 1983, Mr. Janssens contacted the Mother Superior at Kionzo. She was asked to motivate villagers to clear paths and collect rocks. ACEC paid the villagers for the work. Unfortunately, Mr. Janssens died in an automobile accident before the installation work began. His death marked the second failure to implement the Kionzo water project as planned and revised.

ACEC agreed to honor the Kionzo contract, despite the loss of its key project engineer. Two hydraulic rams were installed to pump fresh clean water up to seven villages and the mission. The water ran smoothly for three weeks before a problem developed, causing the system to break down.

Compounding the difficulties in implementing a successful project was a lack of continuity in the project management. The people overseeing the project at Kionzo--the Mother Superior, the Bishop, and the Bishop's assistant--all left for Europe on extended holidays. Thus, the project was not monitored as closely as it could have been.

By the time the Bishop returned from Europe, the system had been installed. He hired a technician to determine why the water had stopped running and to repair the system. The technician claimed that the system was so poorly installed that he could do little to repair it.

The bishop took the technician's criticisms to ACEC. ACEC wrote to RIFE, the American company which manufactures the hydraulic rams. RIFE responded six months later, providing suggestions of what might be wrong. ACEC sent an engineer to Kionzo to repair the system. Water ran for six weeks before another problem developed causing the system to break down again. The second breakdown occurred one week before the evaluation team arrived on the site.

## V. Evaluation

The Kionzo Water Project was to provide an adequate supply of drinking water to the Kionzo community. Achieving this objective would benefit villagers in two major ways. First, the clean water would lessen the incidence of disease. Second, the nearby water source would provide women with extra time to earn money (and children more time to study). Because the system has provided water for only two months, it is impossible to determine the project's effect on the community. Hence, this evaluation will examine the technical and managerial components of the project.

### A. Technical

The water distribution system installed at Kionzo includes two heavy duty hydraulic rams, two water reservoirs, 7,500 meters of piping, and eleven faucets. The reservoirs were connected to each other, rather than separately to the hydraulic rams as originally planned (see diagram). Supply pipes A join supply pipes B, 800 meters before the Mvuangu reservoir. Thus, after the juncture, the supply pipes should have been large enough to carry water from both sources.

The supply pipes that ACEC installed measured 1 1/2 inches in diameter; larger pipes were not installed to absorb the increased quantity of water after the juncture. This resulted in excessive pressure on the supply pipes and caused them to burst. The pipes burst during the rainy season when they were filled to their capacity.

To reduce the pressure on the supply pipes there are two solutions. The first is to replace the pipes after the juncture with pipes large enough to absorb the water flowing from the two sources. The second solution involves running independent pipes from each source to the reservoir. Either solution would be beyond Kionzo's financial ability.

USAID had requested ACEC to provide piping layouts and pressure calculations for the project before installation. There is some doubt whether the layouts or calculations were ever prepared because USAID never received them. Therefore, there was no opportunity to evaluate the system design before it was installed.

In February 1985 ACEC returned to Kionzo and repaired the system by replacing broken pipes and adjusting the air feed valve. ACEC also constructed a cement retainer around the rams to prevent sand from sifting into and destroying the hydraulic rams. Six weeks after ACEC made these repairs, the water stopped again. The air feed valve had not been properly adjusted. This caused the lever block to break because it was striking the ram too hard. ACEC plans to solder the lever block together and readjust the air feed valve again. Engineer Mulamba has suggested that a lever block and bolts be ordered from RIFE as spare parts. These parts cost under ten dollars.

## B. Managment

It would be incorrect to conclude that the Kionzo project was mismanaged. All the parties involved had a sincere interest in seeing the project successfully completed. This part of the evaluation will describe how each party met its responsibilities.

### 1. Kionzo Mission Staff

After Father Romero's departure, Kionzo's Mother Superior oversaw the project. She and the other nuns were enthusiastic about the project because the mission often had no water. Women were paid to transport water to the clinic.

When the system was being installed, the nuns provided the technicians with room and board. They held meetings with the villagers to explain the project and encourage them to help. They also paid for their chauffeur/mechanic to be trained by the technicians for minor repairs and maintenance.

When the system broke down the first time, the sisters immediately contacted ACEC and USAID. Again they provided the technicians room and board for the month it took to do the repairs. When the system broke down the second time, they carried the broken pieces, at ACEC's request, to Kinshasa. Because it takes so long to get help from Kinshasa the sisters have started looking for local technicians. Two engineers working for SNEL in Matadi are willing to do future repairs on the water system. The sisters have managed the project to the best of their ability.

## 2. ACEC

Mr. Janssens agreed to do the Kionzo project cheaply as a favor to USAID because he wanted ACEC to maintain good relations with USAID in hopes of future joint endeavors. ACEC was hired even though it had had limited experience with water distribution systems because Mr. Janssens, an uncommonly able engineer, agreed to handle the project himself. When Mr. Janssens died, his colleagues, who did not have his experience or imaginative adaptiveness, were left to implement the project.

Although ACEC did its best to install the unit, this was its first experience with such equipment. Each time the system broke down, ACEC returned to Kionzo to repair it. The mistakes made in the installation were a result of the company's inexperience, not of its neglect.

## 3. USAID

USAID agreed to finance the Kionzo water project but it did not intend to manage it. After Father Romero disappeared, USAID was forced to use its limited staff time to direct the project. A contractor, willing to do the project for the little money available, had to be found. Hiring ACEC was the quickest and easiest solution.

USAID's Engineer reviewed Father Romero's design for the project. He also monitored the project's progress. A project manager in Kinshasa was assigned to facilitate the procurement of American project supplies. USAID did the best it could to implement the project given its limited staff and funds.

From a management viewpoint, the project competed for USAID attention with larger investments where the available staff time might have been better spent. Generally, USAID should probably steer clear of such small, independent activities, which almost perforce absorb more staff time than their value warrants (however helpful the results may be for the beneficiaries). The same objectives might better be achieved by conducting such activities in a larger framework of technology testing, adaptation, and dissemination.

## VI. Conclusions and Recommendations

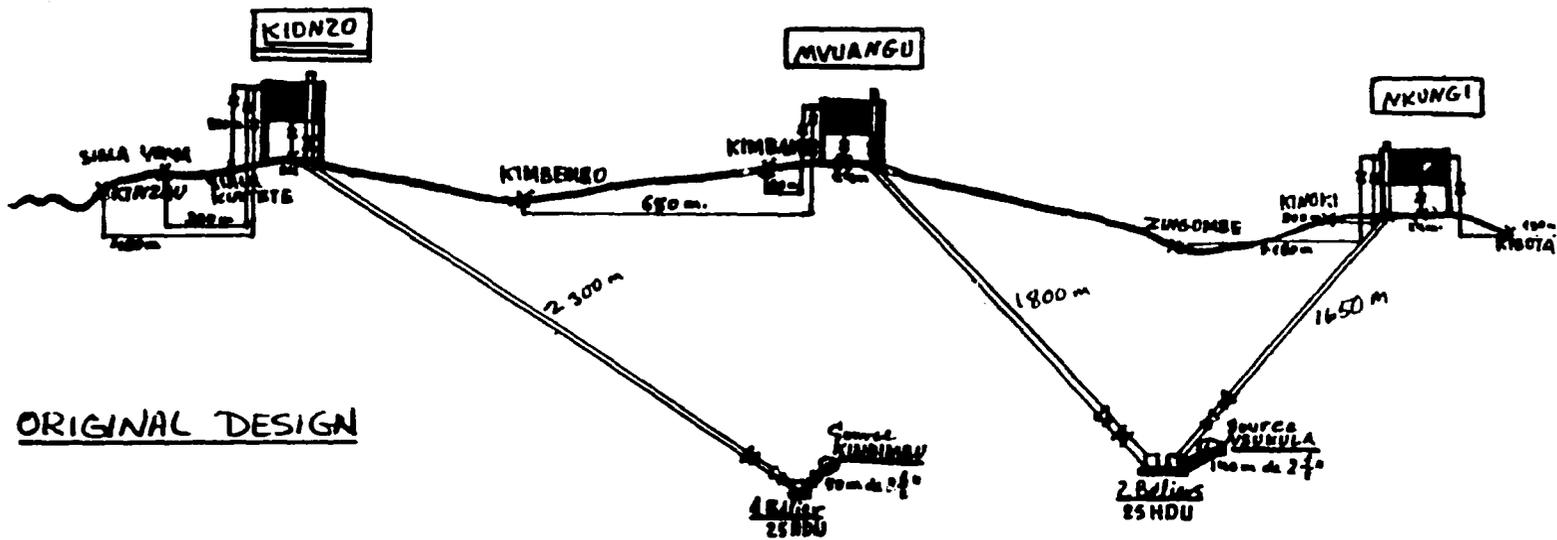
A. The villagers appreciated the water system when it worked. Countless hours were saved in having a water source close to their homes. Chances of contracting water-communicable diseases were lessened; the water which came from the faucets was pure. Providing a clean, close source of water is a development project which has a visible, positive effect on villagers' lives.

B. Hydraulic rams are a simple, appropriate way of supplying water in rural areas. The rams have few parts and can be made locally. They are durable when made from good materials and properly regulated. Maintenance is minimal and easy. A villager with a mechanical background can be trained to monitor the system. The rams are also relatively inexpensive.

C. The Kionzo Potable Water Project should not discourage USAID from considering future water projects. The problems which occurred resulted from ACEC's inexperience with water distribution systems. The project should be viewed from as a pilot project. From this perspective, the Kionzo project was successful in demonstrating problems to avoid in future projects.

D. A more methodical approach should be adapted to explore appropriate technology. Small projects like the one at Kionzo should be set in a larger framework. Such a framework might include the following ideas. First, the types of appropriate technology to be explored must be selected (water distribution systems, solar power, simple vehicles, mills, etc.). Second, the appropriate technology process should be identified in phases. These phases might include research, experimentation (pilot projects), production, distribution, and follow-up. Third, an organization which is capable of managing each phase should be identified (e.g. CEPAS for the information and research phase, the Protestant and Catholic Churches for the distribution phase, etc.).

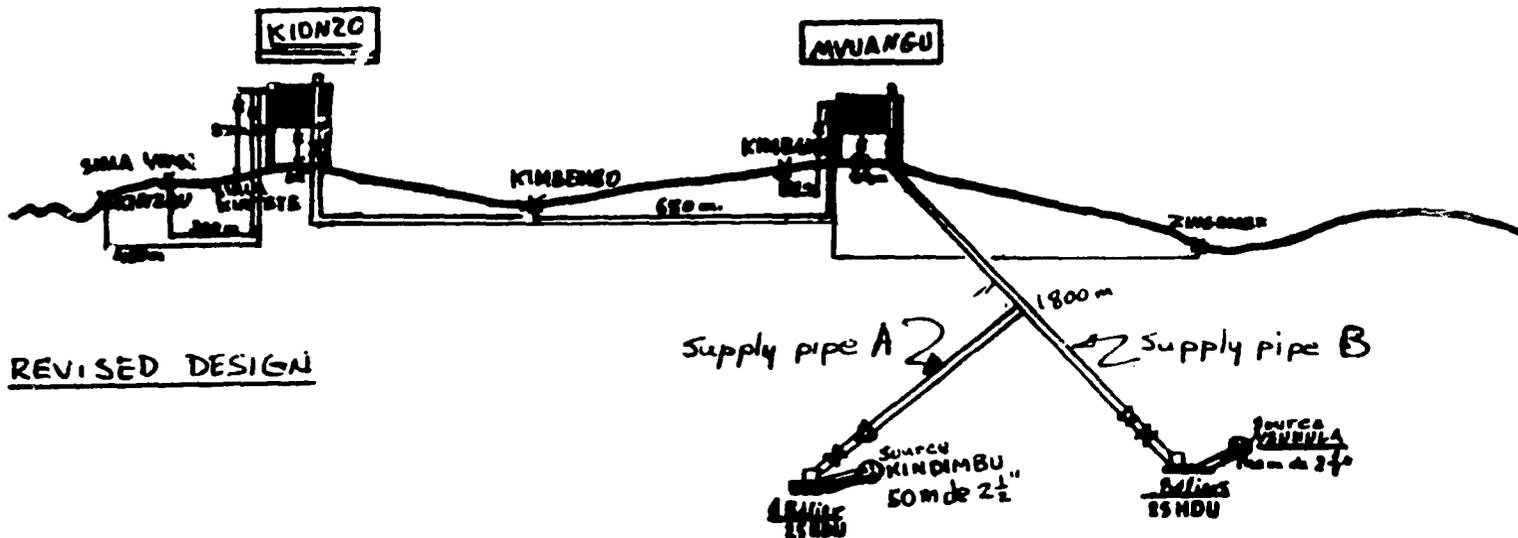
Finally a team to monitor the entire process and supply USAID and other potentially interested parties with information should be designated. The team could be based in Kinshasa or a regional capital and monitor the process from start to finish. With this framework a manageable and remunerative approach would be taken, allowing USAID to better understand why appropriate technologies do or do not take hold and if there are ways in which USAID can facilitate their acceptance.



ORIGINAL DESIGN

N.B.  $\Sigma = 20$  vannes d'isolation  $\left\{ \begin{array}{l} 11 \text{ d'un } 1'' \\ 6 \text{ d'un } 1\frac{1}{2}'' \\ 3 \text{ de } 2\frac{1}{2}'' \end{array} \right.$   
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REVISED DESIGN