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Midterm Evaluation Report

Africare Solfala Province
Integrated Health, Water and Sanitation Project

Beira and Chibabava District Sites

13-23 November 1994

Consultants
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Jo Seiser, MS Water Resources
23 November 1994

ACRONYMS

ADB	Aguas da Beira
ADC	Agente da Comunidade
CQ	Voluntarios do Quarterao da Comunidade
DNA	Direccao Nacional de Agua
DPCA	Direccao Provincial de Construcao e Agua
DPS	Direccao Provincial de Saude
EPAR	Estatal Provincial da Agua Rural
EPI(PAV)	Expanded Program of Immunizations
GOM	Government of Mozambique
HIS	Health Information System
HPC	Health Program Coordinator
HWS	Health Water Sanitation
ICRC	International Committee of the Red Cross
IECC	Information Education Communication Coordinator
KAP	Knowledge Attitudes Practice
NGO	Non-governmental Organization
ORS	Oral Rehydration Solution
PEC	Programa da Educacao da Comunidade
SUPRA	Gabinete da Supervisao de Projectos da Agua
TOT	Trainer of Trainers
WASH	Water and Sanitation for Health
WPC	Water Program Coordinator
WST	Water Storage Tank

MIDTERM EVALUATION REPORT
AFRICARE SOFALA PROVINCE INTEGRATED HEALTH, WATER AND SANITATION PROJECT, BEIRA AND CHIBABAVA DISTRICT SITES, 13-23 NOVEMBER 1994

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I. INTRODUCTION AND BACKGROUND

In response to serious water shortages and periodic epidemics of waterborne diseases including cholera and shigella related to sanitation, water quantity and quality and environmental conditions, Africare began the Sofala Province Integrated Health, Water and Sanitation Project (HWS) with USAID funding in November of 1993. This mid-term evaluation is a condition of the USAID grant in order to release funding for the remaining two years of grant activities.

The objectives of this evaluation as stated in the Scope of work and specific terms for the evaluation (See Appendix 1) include:

- to assess progress towards objectives made during the first year of the Grant;
- to determine constraints to such progress and evaluate alternatives;
- to document lessons learned to date;
- to assess the environmental impact of Grant activities to date;
- to give recommendations for improved project implementation

The original project document also refers to capacity of the grantee to achieve project objectives by the end of the project period, June 30, 1996.

The evaluation team included two consultants: Jo Seiser, a water resources specialist who worked as the Environment and Water Quality Specialist with the Direcçao Nacional de Aguas (DNA) National Water Directorate, Mozambique for the past three years, and Nancy McCharen, a health education specialist with 14 years experience living and working in various countries in Africa including Guinea Bissau and Zimbabwe.

II. METHODOLOGY

In conducting this evaluation, the consultants have relied on:

1) Review of project documents including WASH assessments, Africare monthly and quarterly reports, USAID Project document as approved and others as listed in Appendix 2.

2) Discussions with Africare staff including the Health, Water/Sanitation and IEC Coordinators, their Mozambican Assistants, and the Program Coordinator.

3) Field visits to well and water tank construction sites in Beira, and health center construction sites in Chibabava District.

4) Field interviews and meetings with Africare Trainers, Community Development Agents (ADC), and members of health, water and sanitation committees in the community as they were doing the work of the project.

5) Meetings with Government of Mozambique (GOM) officials in the water and health sectors in Beira.

The Schedule of Consultants' Activities is included in Appendix 3. Discussion Guides for meetings and interviews are included in Appendix 4. Meetings and interviews were conducted as required in Portuguese language.

III. FINDINGS

Parts of Beira are located at levels below sea level presenting problems specifically of sewer and storm water drainage and salinity problems to the Pungue River, which is the source of the city water supply, as well as salt water intrusion of local shallow wells. Because Beira City has increased greatly in population in the cement city and the peri-urban area, the weak services of city water supply and city sewer have been further strained. In areas not reached by city services, water supply and human waste sanitation is below any kind of reasonable standard of quality and quantity of service.

Therefore, Africare is placed in this complex dilemma of trying to find solutions to problems of water supply and sanitation in a city and peri-urban area, some solutions which are inappropriate or just temporary in either a city or peri-urban situation. For example shallow wells in the city proper may delay efforts at improving house or apartment building water supply repair and connection to the city service. Or water supply in certain bairros may encourage people to move into low areas which are unsuitable for development and exacerbate sanitation problems.

The purpose of this project is "to improve the health status...through the reduction and control of water-borne and other diarrheal diseases. This will be done by the provision of safe and potable water and by community mobilization and education. Africare will construct hand-dug wells, water storage tanks and improved pit latrines; rehabilitate rural health posts; and

implement a water and hygiene community education program. (Attachment 2, III. B. Grant Document, 9/1/93)

BEIRA ACTIVITIES

A. Water - Shallow Wells, Water Storage Tanks (WSTs), Pit Latrine Construction

Africare was funded in September, 1993 and materials of mostly cement for wells and WSTs, and vehicles for material transport were ordered in October, 1993 and arrived in April 1994. Presently, all materials have been acquired for well rehabilitation and WST construction.

Contacts with government water authorities were made and meetings were held to develop working relationships, to accomplish a well survey and identify an area to begin water activities.

Water construction workers were recruited in November, 1993 and started work on 1 February 1994. Fifteen Africare water workers participated in 24 days of training in May and June 1994 from Latrinas Melhoradas. Other skills have been taught by the WPC.

There are 17 water construction workers for Africare including the WPC, an Assistant WPC, who also acts as a team leader, and two other team leaders. The workers are divided in three teams of four or five and assigned tasks of well rehabilitation, water storage tank construction or cement ring making by the WPC on a daily basis.

As part of the well survey process, some wells are cleaned as part of the evaluation for rehabilitation. Well survey activities began with DPCA in October, 1993 and are ongoing. Construction of wells and WSTs began in June, 1994. Five wells have been rehabilitated with 3 hand pumps and standpipes installed away from the well. Two WSTs have been constructed. One is associated with a public AdB standpipe and one is associated with a shallow well. Connection to the water source is not completed by AdB though the tank is ready. Finishing cement work is continuing on the second and Africare will do the connection with the well.

Workers learned about making and installing household latrines, but those supplied by Latrinas Melhoradas are for households and are not sized for institutions. No latrines have been installed.

The well survey program between the WPC and DPCA evaluated the City downtown, Ponte Gea, Palmeiras, Macuti, Esturro, Matacuane, Macurungu, Bairro Bambo and chipangara of some 300 wells in March, 1993 and Friday mornings from October to December, 1993. After

Manga Mascarenhas was identified as the priority area, the survey moved there with the following results:

Manga Mascarenhas

Unit	No. Wells	Good Wells	Chosen (Rehab)
A	127	43	10
B	46	?	4
C	55	8	5
D	nd	nd	nd

nd not done

After Manga Mascarenhas has been initially covered, Africare will rehabilitate wells in Esturro, where city standpipes are extended, Chota and Vaz.

In terms of grant activities, outputs fall far short of what was programmed, though the wells and WSTs rehabilitated and built are of high quality and attention to detail.

B. IEC - Training and formation of committees, education, surveillance and user fee system

The IEC program in place consists of an extensive system of trainers (TOT), community agents (ADC who are literate and CQ who are non-literate) who make up the health, water and sanitation committees. This model includes basic health education principles of community organization, training, support, teaching and practice with specific procedures that allow for follow-up and supervision.

The TOT are seconded from the government and work in the afternoons in the field in determined locations (such as Unit "B" of the Bairro Manga Mascarenhas) supporting and supervising the work of the ADC and CQ. This work in the field takes place every afternoon, and is supervised by the Africare Assistant IEC Coordinator. The TOT are assigned two per Unit and have been trained by Africare as have the ADC and CQ.

Training of the TOT was a four day workshop with follow-up, ADC received three weeks of training, and CQ received 2 weeks of training from Africare. This training is based on the Werner and Bower book, HELPING HEALTH WORKERS LEARN, which is in Portuguese, based on community experience and emphasizes active, participatory methodologies.

The process used by Africare is solidly rooted in IEC/Community Development theory. In the selected community (based on the original baseline study, see part C Health-HIS), Africare staff meet first with local leaders, particularly the Secretary of the Bairro, an appointed position linked with the City Council.

Following initial contacts, community meetings take place to explain the project, the role of Africare, the role of local authorities, and the committees.

Local people then meet, determine who wants to be members of the water, health and sanitation committees, and after local studies to know and understand the community, are trained by Africare. All volunteers receive training in all three areas, even though a person is a member of only one committee. Thus someone on the water committee receives education in health (principally diarrhea and malaria-fever management-control.

Each committee has well defined activities and responsibilities. The health committee using information from the HIS visits houses every afternoon providing surveillance and follow-up for children who have been ill in recent days. This follow up often includes making of ORS, bathing a child with a high fever, and referral to health posts for treatment. This contact with families also provides opportunity for education, though this consultant did not witness extensive education for prevention taking place. The TOT wait in a central location in case they are needed for assistance in diagnosis or treatment.

The water committees are responsible for well maintenance, collection of user fees and seeing that the guard is in place and doing his job. They also are responsible for individual and community education about the water program. The sanitation committee is responsible for clean-up campaigns, education about hygiene, garbage disposal and latrines. Attached in appendix 5 is a list of main messages and themes communicated through this system of TOTs and community agents and committees.

Though the emphasis at this time is on the work with individual households some public meetings, education specifically for the committees in groups has taken place. Committees are working on theater presentations to educate the community and one committee member showed the consultant her puppets that she was making. Another committee member also demonstrated to the consultant how to make oral rehydration solution.

In September 1994, a two day workshop bringing together 60 health, water and sanitation committee members from 5 different sites (Manga Mascarenhas Units A, B, C and D and Vaz Unit B) took place. The purpose of this workshop was to evaluate the effectiveness of different HWS/IEC messages and activities. It allowed for the exchange of information, and support and encouragement of committees in different stages of development.

Close collaboration exists between the IEC coordinator and the Health coordinator. The system represents a blend of curative and preventive interventions.

In terms of grant output, objectives have been met and exceeded:

- water committees exist and provide maintenance, guards and collect user fees where Africare wells are functional (3 so far). However, additional water committees have been formed in anticipation of well construction.

- committees have not been formed in schools as latrine construction issues have not been addressed. However, linkages have been established as one of the TOT is a teacher.

- 14 TOT have been trained; 68 CQ and 44 ADC have been trained by Africare, and these persons are working in the community each afternoon. They are essentially volunteers, though they do receive small compensation from Africare in the form of food for work, soap and small gifts such as T-shirts. It was interesting to note that one community gave the IECC sweet potatoes in appreciation for the work of Africare; these were then redistributed to the committees as a gift from the community to their own volunteers in recognition of their efforts.

The strength in the IEC component lies in the design of the system which provides for support and supervision of the different levels of workers, and encourages participation of many people with defined tasks at community level.

C. Health - HIS, baseline, KAP

The HIS system has been designed, data collected, analyzed and reports written. Baseline information is continually being collected as activities are initiated in one neighborhood, program installed and then the community mobilization moves on to other sites.

The initial baseline survey took place in all parts of Beira. 400 houses were sampled with a questionnaire of 55 items. The epidemiologic program EPI INFO is being used to process the data. The TOT were trained to collect the data. Appendix 6 includes a summary of the two principal parts of the HIS (baseline study and follow-up of families with high risk behaviors) and the instruments used to collect the data.

An enormous amount of data is being collected. At times, it is difficult to identify the most important factors. Also, presentation of data in some cases is not very clear.

Important variables being used in this system include: use of the health post, use of SRO, use of latrines, type of water system used, quantity of water used, vaccination status of children and

women in fertile age groups, how long residents have lived in Beira among others.

The numbering of houses, and surveillance of persons sick in the previous 2 weeks has allowed for detailed followup. The HIS prints out the house number and diagnosis for persons/children sick at the time of the original survey. This information gives a good idea of local prevalence of malaria, simple diarrhea, "bloody" diarrhea as reported by an adult family member and malnutrition as measured by arm circumferance.

Reported cases of diarrhea and use of SRO are being tracked at two health posts, Alta Manga and the Airport.

In most cases, information is collected to reflect gender and age.

The HIS is primarily a quantitative system. Although some KAP issues have been looked at (where do people defecate, why do people not use (have) a latrine), the emphasis has definitely been on quantitative indicators and survey work.

CHIBABAVA ACTIVITIES

D. Health Center Rehabilitation/construction

The health post rehabilitation and constructions began in April, 1994 and in seven months are well on the way to completion.

Revue

A new health post, presently on hold for funding reasons is in Revue. The soils are prepared to begin foundation work and materials are available on site. Possibly pit latrines and a well in the basin of the Revue River may be included if this project is continued.

Goonda

There is a beautiful new 5 room health post at Goonda likely to be completed in February, with pit latrines and a well planned. It is located relatively near the Buzi River.

Casa Nova

At Casa Nova, there is a nicely rehabilitated building which has been claimed by the district police. Final touches to the 4 rooms will not be done until use and ownership is resolved. It is in an area quite distant from surface water and a request for assistance from DNA, Maputo is in order concerning recommendations for a hydrogeological study before making well decisions. Latrines are planned.

Toronga

A fine rehabilitated 2 room health post has been completed in Toronga, 45 km from Goonda, far from the other communities.

Latrines are planned and DNA, Maputo should be solicitated for comments concerning well possibilities in this area.

The Assistant Health Project Coordinator has managed the rehabilitation and construction work on these 4 health posts and a renovated house in Goonda which Africare uses while in the district since April. This included planning and organizing activities in advance such as brick making, ordering materials, managing Africare workers and many others hired under the Food for Work Program. The efficiency of this work and the results attained reflect well on the Assistant, the Health Project Coordinator and Africare.

E. IEC - Training and formation of committees, education

These activities have not yet been initiated, though plans have been made to begin these activities with the opening of the health centers in early 1995. The same model of training TOT, then ADC and CQ and forming local committees for water, health and sanitation will be used, adapted to a rural setting.

Africare will also be training and supervising nursing staff paid by UNICEF and working in these centers. The EPI program will be a priority as it has not functioned regularly since the beginning of the war.

F. Health - Hiring of nurses, training, supervision, HIS, baseline, KAP

These activities also have not been initiated pending completion of health facilities. The HPC and IECC, both of whom have clinical qualifications, will work together in the design and implementation of training for local staff. Much of the HIS system as implemented in the Beira area will be replicated.

PROJECT MANAGEMENT

G. GOM Capacity to Support and Continue Project Activities

WATER/SANITATION

Aguas de Beira (AdB), the Beira Water Supply Company is assisted by a donor project, FinnConsult. FinnConsult has decided to limit its role to the specific task of replacing water supply pipes to tighten the system, increase water pressure and save water. Presently, they estimate losses of 50% of treated water.

AdB staff is committed to trying to repair leaks in the city water supply system. This is a priority activity. Their teams repair leaks and test house piping systems to connect to the new network, if the house piping is tight. They only work up to and including the household connection, but not the household plumbing.

Engineer David Rowe and Director Hannu Hermunen of Finnconsult have voiced reservations about the usefulness of WST associated with the AdB standpipes. At times of water shortages and low pressure, filling the WST will be difficult. They indicated no reservations at this time about shallow well rehabilitation in the city since the water supply system is so weak, though sometime in the future there could be problems of cross connections between city supply and well piping.

Mariano Roia Tesoura, Head of the Technical Division of AdB since October, 1994 is preparing now to view the first WST associated with a AdB standpipe and make arrangements for its connection. An AdB water manager is already in place and working at the standpipe. Mr. Roia will be involved in putting on line and evaluating WST use.

Gabinete Supervisao de Projectos de Agua (SUPRA),
Water Project Supervision Office
Director of SUPRA, Anabela Durao, has responsibilities to improve water supply, storm water and waste water drainage and eventual treatment. She identified several projects presently funded: water supply network improvement with FinnConsult, water supply treatment plant rehabilitation by the Italian Government, rehabilitation of waste water pumping stations by the Dutch and sewer pipe replacement by the World Bank.

She was aware of Africare's work and commended their role in the International Water Day commemoration in October 1994. She did say Africare should be sure to work with the AdB project and not just the FinnConsult project, to be sure there is good coordination of the WST associated with AdB standpipes as far as site selection, connection, and documentation of use and maintenance.

She too had reservations about the WST used with AdB standpipes thinking pressure to refill the tanks will not be adequate.

Conselho Executivo, the Mayor's Office
Lucas Renco, the President of the City Executive Office said there exists five public sanitary facilities of which only one works. Rehabilitation is needed on the other four.

Direccao Provincial de Construcao e Agua (DPCA),
Provincial Directorate of Construction and Water
A meeting took place with DPCA Water Supply and Sanitation Chief, Abel Florencio Antonio and two Water Technicians, Adelino Semente and Manuel Francisco, who discussed their ongoing water survey which they do on Friday mornings. Some 300 wells have been reviewed in Manga Mascarenhas.

They reviewed the data collected and the criteria used to select the wells for rehabilitation, well condition, capacity for production, salt content and the location.

Abel Florencio Antonio expressed support for the shallow well rehabilitations and the WST associated with them. He was hopeful that rehab and tank construction could be speeded up.

They all suggested that the GOM was properly involved in the work of Africare and did not see a problem that Provincial Rural Water (EPAR) does not seem involved at this time.

Provincial Planning Commission
The Provincial Planning Commission has a document titled *Reconstruction Plan for Sofala Province*, 5/1993, which identifies government agencies working on water supply (DPCA, EPAR) and sanitation including sewerage and latrines.

Paulo Tarmamade, Planning Assessor and Raimundo da Costa, the Department of Planning Chief are working on a project database of public investment including the Health Ministry and the Ministry of Construction and Water.

HEALTH/IEC

Given the context of Mozambique, at the present time, the overwhelming priority is to rebuild infrastructure in the health system. As indicated by the DPS, Mozambique would like to provide services at a minimum of the level they were at before the war. Many resources will be absorbed in this rebuilding effort.

Coordination and collaboration with other NGO such as Kulima and the ICRC (International Committee of the Red Cross) is good, as are relations with local government. The original project document spoke of collaboration with the PEC (Community education program of the rural water program), but this has not been realized as the PEC does not appear to have necessary resources (especially personnel).

H. Africare Capacity/Experience

Project staff in Beira include health, water/sanitation and IEC coordinators and their Mozambican assistants, a program coordinator and Africare administrator who are all competent in Portuguese, who have lived and worked in Beira for a year or longer and who have been with this project from the beginning of activities. Many of the problems encountered in start up of the project have been confronted and overcome, sometimes quite creatively.

Work crews have received adequate training and now are competent in the tasks they are asked to complete.

Monthly reports since January 1994 have on the whole been informative, timely and complete.

The internal management problems that Africare Mozambique has experienced seem to be resolved and part of history.

Africare Beira has gained valuable experience in the development and implementation of this project.

ENVIRONMENTAL IMPACT

I. Water - Wells, WST

There is an environmental impact from wells in disrepair. Open wells can be dangerous holes in the ground. Children have fallen in them and drowned, and shallow wells in Beira are certainly big enough in diameter (1 m) for this to happen.

When open and unsealed the individual wells can be contaminated with bacteria or chemicals, if waste is disposed in or reaches a well. Open wells can be a conduit for contamination to the groundwater, such as leaking from underground fuel tanks which can render water useless for drinking or bathing. The most common contamination to wells throughout the world, and certainly in Beira with conditions of high groundwater, flooding and poor well construction, is bacteria. Though soils successfully reduce bacterial and viral contamination, conditions in Beira also may preclude soil filtration.

This project's purpose is to rehabilitate wells which requires sealing them to prevent outside contamination, a positive impact to the environment. During the well survey and investigation process many wells, which were not finally chosen for total rehabilitation, were cleaned, deepened and in some cases cement caps made to improve the well.

Cement rings are extended above ground and a generous 1 m cement apron has been put around the improved wells to prevent surface runoff or standing water to enter into the well. A delivery pipe is usually placed 2 m from the well, again to reduce well contamination with attention also given to natural drainage and erosion control with small dug trenches. Wells are chlorinated to kill bacteria and tested for total coliform before use.

The WST are fairly large, heavy cement structures measuring roughly 3 m high, 1.5 m wide and deep. They are somewhat imposing structures to be located in common areas near AdB standpipes or wells. How water will be distributed from the tanks to individuals, and the reality of the tank's management is not yet known; however it is hoped the community users will accept ownership and responsibility of the tank for the resource it is just as they take care of the water source, either AdB standpipes

or wells. Some of the well/standpipe sites are treeless and very hot in the sun. Possibly the tanks will provide some shade for the women waiting for their turn to get water.

An engineer with FinnConsult, David Rowe, expressed confidence in the integrity of the structural design of the WST. Documentation of durability of these tanks is necessary to note cracks or cement disintegration, so repairs can be made to extend the life of the tanks. This attention to detail can be started by Africare, but needs to be passed on to the water committee, water manager and the community water users.

J. Latrines

Pit latrines work best when waste is exposed to air so decomposition is aerobic. When latrines are in contact with ground water, as is quite possible in Beira where the water table is high, the water can become contaminated. If set backs of latrines to wells are not sufficient, water may be unsuitable for drinking and not meet health standards.

Though defecating on the ground surface can be aesthetically unpleasing and can transmit disease through direct contact or vectors such as flies, it may be better from an environmental point of view, since decomposition is accelerated in the air and sun, and the ground water remains pure. Latrines are designed to drain liquid wastes away, and not allow direct human contact, but they drain to the surrounding environment. When there is enough soil contact, bacteria and viruses are filtered by the soil, but without adequate unsaturated soil, these organisms contaminate ground water which again can affect humans, if they drink contaminated water.

Set back requirements of a latrine from a well attempts to protect the well. Thirty meters is suggested in the book, *Rural Water Supplies and Sanitation*, by Peter Morgan (1990). Latrine location is considered by the Water Coordinator as part of the well survey. Nevertheless, conditions of high water and shallow or non-existent, non-saturated soils may not provide for water filtration by the soils, so a set back requirement may be inadequate. It is because of these conditions, that Africare is working on this project.

Locating latrines needs to be seriously viewed on a case by case basis. In some cases latrines do not affect the environment negatively. In other cases, latrine construction can pollute the ground water and create unhealthy conditions for humans.

Locating latrines on the highest land sites possible and constructing them as shallow as possible will minimize contamination to the ground water. Working with and gaining the benefit of the experience of the Latrinas Melhoradas people in Beira has been the practice of Africare, correctly.

K. Health Post Construction

At the health posts in Chibabava District, there is attention being given to appropriate locating of the latrines and wells. However, this may need to be reconsidered depending on recommendations concerning borehole location from DNA/Hydrogeology in Maputo.

Actual construction activities were done with care to minimize environmental impact. A solid foundation with a rock base was constructed at Goonda to support the structure and prevent erosion. The site is also sloped toward the river but with careful work, there appeared to be no apparent erosion.

During construction, workers were exposed to dust and fibers in the air from Lusalite roof panels, wall cement and plaster. They were wearing face masks. The AHPC said the roof panels were calcium, but the HPC said they contained asbestos.

Paints were mostly water based, but some oil based paints were used. The crews conserved the paints well by transferring small amounts from the big can to a smaller can and shutting paint cans well. There was no disposal of waste paint.

Petroleum product was used in small amounts to clean brushes of the oil based paint. Small amounts were thrown away onto soil.

The crews were conscientious about not wasting materials such as cement, however some solid waste materials were put in a hole and covered over with soil at the sites.

The Africare crews have noted the shade available at each health post and are considering some tree planting for shade, if the local people concur with the idea and will protect the trees from agricultural or garbage burning.

L. IEC Activities

IEC activities often impact the environment in a positive manner, through encouragement of behaviors such as clean-up of wastes and drainage of ditches. It must be recognized that population movement, pressure of increasing numbers and returning refugees has a great impact on the environment, and IEC has a role to play in this area.

IV. CONCLUSIONS AND RECOMMENDATIONS

BEIRA ACTIVITIES

A. Water - Shallow Wells, Water Storage Tanks (WST), Pit Latrine Construction

The government water offices are many and not integrated well, though here in Beira, there appeared to be good relations and information sharing between the government workers. Africare has worked hard to encourage and facilitate this coordination and cooperation.

Nevertheless, organization with specific government offices and Mozambican counterparts is necessary when working on the water activities. These relationships include:

WST/AdB	AdB
WST/wells	DPCA/EPAR
Wells	DPCA/EPAR
Boreholes	EPAR/PRONAR Maputo
Latrines	Latrinas Melhoradas

Pronar or EPAR is not very involved in the shallow wells as a counterpart. Since Africare's well program is so important, the relationship of Africare with DPCA and Africare with EPAR needs to be very clear. The long term responsibility of these shallow wells lies with DPCA and EPAR, so this connection should be strengthened.

A.1 Put in writing the existing relationship of Africare with DPCA and EPAR and submit the letter or letters to those offices, asking for their comments and reaction.

A similar letter from Africare to the other counterpart offices may also be a good tool to acknowledge the work accomplished and to appreciate the work of the civil servants, besides further clarifying working relationships. Relationships with responsible NGOs can improve the capacity of these government offices by acknowledging and requesting their input and direction and working with them on decision making.

The purpose of collecting well survey information is to choose wells to rehabilitate and plan future activities. Summary information has not been presented in regular reports except a total number of wells surveyed in a month. Information such as the community area, number of wells, number recommended for rehabilitation and why, the distance from latrines or other wells should be compiled regularly. The wells proposed for rehabilitation should be presented for staff consideration. Wells cleaned or slightly repaired as part of the survey should also be reported as work accomplished.

A.2 A written summary of well survey results is needed from the Manga Mascarenhas area, along with sites selected for well rehabilitation and WST construction. Survey information for planning in other areas is needed in a written form.

Whether or not services of water supply and sanitation are adequate is affected by the density of the population and planning for future development. Project activities should be consistent with future planning of water supply and sanitation of the City of Beira.

Concerning wells, water supply from shallow wells are clearly a solution where piped water is not available in the peri-urban or peri-rural neighborhoods. They can also be a good option in areas where piped water is available, but the system is weak with insufficient pressure.

There is general support by the GOM for well rehabilitation. Five wells have been rehabilitated since April. Some were very large time consuming projects. There have been personnel problems with Africare Workers. The Water Coordinator has confidence in the Assistant Water Coordinator and one of the two team leaders. Supervision problems need to be resolved quickly if an ambitious well rehabilitation program is to follow.

The number of wells listed in the grant of 200 over 3 years appears to based on need for water and not reflecting time required to do the work. A more realistic but still ambitious target would be 90 wells in the remaining 18 months of the project period.

A.3 Personnel problems which slow down construction need to be resolved. Increase well rehabilitation monthly outputs by delegating responsibility to the team leaders, dividing the teams, choosing the easier wells to rehabilitate, giving assignments and measuring team and worker performance based on outputs. The Water Coordinator should document the quality of the work at weekly not daily intervals.

With three teams, it is recommended that each team do two wells per month on the average, depending on their latrine and WST work load. With that in mind, the total number of wells to be rehabilitated should be 60 wells per year, calculating 5 not 6 wells per month. **This is the most important work of the water component of the Africare project.**

Make a stencil and apply to the well cap or apron saying Africare, USAID 1994.

WST associated with city standpipes (WST/AdB) may be an efficient mechanism for water storage in peri-urban areas, which are not too crowded, and where the water committee and water manager can take care of the structure, gain experience in filling it when there is enough pressure, perfecting distribution and refilling. This may provide a greater quantity of water to a small community group and more stability.

WST/wells in peri-rural areas where the water committee supports having the structure may also be very useful.

Since some technicians have expressed reservations about the success of WSTs during emergencies, documentation of their usefulness in a development context is in order. It is important to construct enough WSTs to start to gain experience using them. The number recommended by WASH in an emergency situation should not be tried until there is more practical documentation here of their usefulness.

A.4 Africare staff should work with Mariano Roia, AdB to select 9 more city standpipes to build a WSTs/AdB for a total of 10 in the first calendar quarter of 1995. Work with Abel Forencio Antonio, DPCA to select 9 more wells to build associated WSTs/wells for a total of 10 by the second quarter of 1995. Ten WST/AdB and 10 WST/wells, 10% of the 200 recommended by WASH and constructed by June 1995, would allow for some documentation of the WSTs within this project grant.

With each water manager, Africare should document when the tanks are connected, filled and the water used and refilled. Copies of the documentation should be shared with AdB and DCPA.

Conditions of high water tables around Beira mean that latrines will not work well in some areas. In crowded peri-rural areas latrines are still the best solution. Latrinas Melhoradas does a good local service making and supplying latrine materials for household sizes. Clearly institutions such as primary schools need latrines and this seems to be an appropriate objective of Africare to install several ganged up latrines from Latrinas Melhoradas at schools, if they would approve this use. If the Ministry of Education has a plan for school latrines, this should be followed.

A.5 Latrines should not be installed at city schools which are in the area of the sewer system. Such installations would be inconsistent with the work in progress to improve the sewer system and connect buildings to it.

A.6 Africare should only install latrines from Latrinas Melhoradas. If these are unacceptable for institutions, they should not consider other designs. Africare will only lose more time when other project work could be accomplished. Technology exists for high ground water (mound) systems, but this is outside the scope of this project.

Many private individuals want latrines for their households. Africare may also want to provide this service to committee members and IEC staff as a payment or benefit of their work.

A.7 Install latrines using those from Latrinas Melhoradas at 10 institutions, especially primary schools only where sewer is not extended.

There are areas of overcrowding in Beira, where sanitation conditions are bad, where neither city sewers nor latrines are being used. The city is discussing making available land on the outskirts of Beira to reduce internal crowding. Providing wells in the overcrowded areas encourages people to stay instead of encouraging them to move to a more suitable location. Coordination needs to continue with the Mayor's office.

Africare could do well and latrine development in the proposed peri-urban communities identified by the Mayor. Africare has already demonstrated success at community work and could likely play a key role in helping people see the benefit of moving to a less crowded area with better services and supporting good government decisions.

A.8 Africare should contact the Mayor's office in writing and the District Planning Commission to be aware of overcrowded areas identified by the Mayor's office for population reduction. Africare, with local officials should not provide wells, WSTs or latrines in these areas which would only encourage people to stay and be inconsistent with planning decisions.

B. IEC - Training and formation of committees, education, surveillance and user fee systems

The program developed by Africare and implemented in the peri-urban areas of Beira is well organized and effective. It combines known health education strategies with primary health care techniques in addressing locally identified needs. The mix of activities includes a large curative component. Incentives are a thorny topic. We like to think of local people using our assistance to carry out their own projects and yet in many cases, asking communities to volunteer and commit much time and resources is not practical. Africare incentives in this project have remained modest.

B.1. Continue with this approach, paying particular attention to support and encouragement of local committees as Africare begins to withdraw from certain areas. The workshop with participants from various committees in different neighborhoods was an excellent idea, and should be offered periodically.

B.2. As much as possible, shift the mix of activities from curative to preventive and promotive, and use more group strategies to provide education and encouragement to persons in the

community. For example, using the HIS, identify households with children aged 2-3, invite the mothers and fathers to come to a discussion group, give them a chance to ask questions and bring up the question of family planning as families with children in this age group may be likely to have other children soon.

Share data with the committees. Two way tables or trends over time can be put on large posters and understood and discussed in the community.

Have periodic group or community meetings to recognize the work of the committees, to reinforce accomplishments and to continue to draw in new members to the committees and Africare activities.

TOT time: at present, the TOT wait in a central location, on call, to provide assistance to the ADC and CQ. Perhaps it would be a better use of their time for them to accompany a team to verify their teachings, encourage education, model supportive behavior rather than spending time waiting. If all teams know where the TOT is going, then they could still locate them if needed. Ongoing training and education both of ADC/CQ and community members with an emphasis on prevention would seem to be a better use of their time than on call.

B.3. Be sure to pretest materials and questionnaires. Before explaining a poster, ask what people see. The people are neither right nor wrong - they are telling us what they see. Pictures of giant mosquitoes are often misinterpreted.

B.4. Encourage and help facilitate the development of new projects by the local committees. Clean-up days, the well construction, and shelves for drying of dishes are good examples used in the Africare program of these types of activities.

Other community projects could include ideas such as a garden that would be used to help old people or malnourished children; cooperative buying of mosquito nets to reduce individual costs, or even buying the netting and working together to make them; community work crews where each family pays for their own materials, but everybody pitches in to help with construction of household latrines, for example.

These kinds of community projects will help local people perceive a benefit they gain that is apart from the incentives they currently receive from Africare. Where the project is working well, begin to discuss with the TOT and other members of the community how these activities will continue when the Africare project finishes in mid 1996.

B.5 Make simple graphs on large posters that help individual unidades evaluate their progress. For example, make a graph showing how the number of children completely vaccinated is increasing during the year; a graph showing how the number of latrines built and used is increasing. These can be discussed with the committees, and serve as both a motivator and encouragement that what they are doing is making a difference. (See Recommendation C.4 below and Appendix 9 as well.)

C. Health - HIS, Baseline, KAP

The HIS generally meets or exceeds the requirements of the project document. Data is not always agregated by sex, but can be pulled out if needed. Data on children under age 5 is complete and quite detailed allowing for tracking of individual children. However, qualitative information that might be useful in development of IEC strategies and in assessing what is working and why, is not built into this system. On the whole, quality and quantity of data are excellent, achieving a level of precision most commendable in difficult field conditions. Certain modifications could be made in presentation for ease of understanding and appropriate interpretation of results.

C.1 As a means to making presentation of data more clear, and assuring that important points jump out at the reader, perhaps the HPC could try writing "mini" reports to answer specific questions relevant to the project such as:

- What are the best ways of informing different groups?
- What is the situation of children under 5? (variables of EPI, SRO, recent history of illness)
- Describe the findings by location-demographic, socio-economic information: Unidade B of Manga Mascarenhas, census, light, income profile
- Everything learned about latrines

These mini reports would be no more than two pages; data would generally be two way tables or graphs over time; use bold headings, phrases to summarize important conclusions, and add a recommendation heading so that staff know what to DO based on this information. Topics for these reports could be generated by the Program Coordinator as well as other Africare staff including TOT.

C.2 Make sure that all reports and data presentations include women, not just in fertile age groups, but as respondants provide for analysis as male and female. Is there a difference in KAP for example due to gender?

C.3 Opt for simple, clear tables. Even though a knowledgeable reader can deduce percentages if only part of the variable is presented, it is much clearer to present both options - that is, for example, present those who use and those who do not use SRO so that the total 100% is obvious. 3 or more variables combined into one table is confusing-two way tables are better, especially in a field setting where even other health personnel are not used to looking at data and interpreting results.

This consultant finds three dimensional bar graphs of multiple variables extremely confusing. It is worth pretesting these graphs asking people what they see and what they think the graphs mean before explaining it. If staff finds that local colleagues understand this kind of graphics, use them.

C.4 Graphs that show relationships between variables overtime can be quite effective in presenting information and in showing the impact of project activities. For example, a graph such as the one drawn in Appendix 9 - particularly on a poster for the community - might be very helpful. Further, the household survey provides excellent localized information that could be used in preparation of these graphs.

C.5 The KAP study includes very little about attitudes. (instruments in Appendix 6). Africare staff may want to brainstorm together or with TOT/ADC/CQ to determine important local attitudes towards HWS behaviors, and then add attitudinal questions to instruments to see what the local communities think. Examples of these kinds of questions would be:

Do you agree or disagree with this statement:
People who use latrines are snobs.
People in this community who have latrines are looked up to.

Show a picture of a marasmus child and ask the person to complete these phrases:
I think the family must have this problem because.....
*they are very poor
*of jealousy, witchcraft
*the mother doesn't care
*no man lives there
*because they come from the country

C.6 Qualitative data: Much could be learned that would be helpful in devising IEC strategies. RAP (Rapid Assessment Procedures) methodologies can be used to explore particular questions especially in looking for those things that make community participation sustainable. Possible qualitative issues to explore include:

What makes committees in areas work well? Why do some people drop out? Why in some communities are members various ages, men and women, etc. and in others, they are only women? How do committees deal with conflict? Methodologies could include some focus group discussions with members from different committees in different parts of town; focus group discussions with selected groups such as women, men, young people, ADC or CQ. This information will be very helpful in organizing new committees and for looking for ways to help communities continue after Africare has left town.

Use focus groups to find out what people know, believe and practice with regards to certain key behaviors: handwashing- is it worth using precious water to wash hands after going to the bathroom? before eating? how can you tell that hands are dirty? is it more important for children or for adults? During this consultant's visit, one Africare staff person indicated that children seem to enjoy defecating in the open together, a social time. If this is an accurate perception, then it needs to be considered in behavior strategies.

Use the HIS system to identify various groups to pretest materials and activities. These kinds of focus groups become both a part of information gathering as well as a kind of intervention.

C.7 The HIS system as currently functioning provides much useful information both for field operations and for research. However, the operation is dependent on computer support, is labor intensive for collecting, inputing and analyzing data. For 3 years of a pilot project with Africare, this is very helpful. However, the ability of the GOM to sustain this system is open to question. Africare needs to look for ways to simplify procedures and to diminish dependence on computers in order to come up with a model that can effectively be transferred to the GOM.

C.8 Africare should plan now for final evaluation. The baseline study conducted in December 1993 should be repeated in December 1995 both in bairos where Africare has worked, and others as a control. Where and at what intervals the household survey is repeated should be carefully considered. This too could perhaps be once again before end of project, preferably during the same months (July, August, September of 1995 or 1996 depending on end of project dates).

CHIBABAVA ACTIVITIES

D. Health Center Rehabilitation/Construction

Health post construction has been an efficient program. More posts could be constructed or rehabilitated, but this is not recommended.

D.1 Complete the construction projects ahead of schedule.

D.2 Redirect staff to the well rehabilitation component.

D.3 Do not undertake new health post construction because HPC and IECC cannot supervise more than 4 centers.

E. IEC - Training and formation of committees, education

The approach as developed in Beira is applicable with modifications for the area of Chibabava.

E.1 Use members of committees from Beira to share with Chibabava District local folks what they have learned from the committees. Establish links.

E.2 Pretesting of materials and questionnaires is important; pretest and revise as needed to reflect local needs.

F. Health - Hiring of nurses, training, supervision, HIS, baseline, KAP

Needs in terms of restructuring health services, equiping and staffing these facilities will be great, and may take Africare staff and resources away from other vital project activities. They will tend to emphasize curative services.

F.1 Africare staff need to remain dedicated to preventive training and education: focus on getting going on the EPI program, family planning, ORS and nutrition. Africare staff are already working on re-launching the EPI, and they should resist having too much of their time taken up in procurement of medicines, training in diagnosis and treatment.

F.2 Initiate qualitative studies as indicated above C.6

PROJECT MANAGEMENT

G. GOM capacity

Water:
There are many capable people in the GOM water sector. Though communiction activities take time, most of that effort has been done. The Mozambicans are working to make water supply and sanitation programs sustainable.

G.1 Continue to coordinate activities with the GOM to assure sustainability in the long run.

Health and IEC:
While the GOM recognizes the importance of prevention and historically has a commitment to programs such as EPI, benefitting child health, the rebuilding of infrastructure as a priority will mean that Africare may be encouraged to continue these efforts, but the GOM will be unable to provide much in the way of resources.

G.2 Continue to maintain close contact with GOM, sharing information, including MOH personnel where possible. Continue trying to involve the PEC program.

H. Africare Capacity/Experience

The Africare technical and support staffs have the experience, knowledge and skills to do a good job in completing this job. The objectives as originally outlined in the project document will probably not be met by June 1996, but good progress is now being made at a reasonable rate. Some of the original objectives were not realistic, while others became unworkable because of local conditions. In some other respects, Africare needed to gain experience on the ground before becoming effective.

H.1 Africare should continue working to achieve the objectives of this project. Africare should focus on limiting staff time and activities to those detailed in the project document.

ENVIRONMENTAL IMPACT

I. Water - wells, WST

Rehabilitating wells to prevent water contamination and provide potable drinking water is the most important environmental impact of this water project.

I.1 Clean and rehabilitate shallow wells to prevent ground water contamination of bacteria and viruses.

J. Latrines

Latrines especially in areas of high ground water cause contamination to the environment, soils and ground water. They are appropriate technology in areas with enough soil depth to protect ground water, located in areas which are not densely populated.

J.1 Install latrines from Latrinas Melhoradas at schools in less populated peri-urban areas. Locate them on the highest sites possible.

K. Health Post Construction

The rehabilitation and construction of health posts has been done with careful attention to the detail of conservation in all building practices. Building rehabilitation itself, is conservation of materials.

K.1 Continue building practices of conservation and emphasizing rehabilitation of existing structures.

L. IEC Activities

At present, IEC's role is mainly to point out the impact of specific behaviors on the environment and also to make the linkage between population issues and environmental degradation.

L.1 All behaviors encouraged in the IEC program should be screened for any adverse environmental impact. For example, any chemicals or products used for eliminating mosquito larva should be carefully evaluated (no DDT, please).

L.2 Much of the environmental distress in and around Beira as well as in Chibabava District is a direct result of population pressure. IEC activities should work with committees in the communities so that they see the connection with population, and then work with them to facilitate effective use of family planning.

V. A FINAL NOTE

As Africare works to provide water and sanitation in and around Beira District, they consider regularly ways to not interfere and also ways to support city services of water and sanitation. Three ideas follow which are presently not in the purview of the Africare grant but are included for future consideration.

Plumbing connections within houses and buildings is broken and leaking, wasting treated potable water. Teams of plumbers are needed to repair and replace pipes before they can be connected to the new and improved water supply system. Training workers and private enterprise support would improve water supply services.

Similarly repair is needed of broken drain pipes to the sewer system. Training workers and small business support could improve city conditions where standing waste water is common.

Just as large latrine systems may be appropriate technology in peri-rural areas, small sewage treatment systems in cities may be a solution to the aesthetic and environmental problems of discharging human waste directly to the ocean as is done in Beira. Innovative systems using marshes for waste discharge exist. It would be useful to assess the environmental impact of using open

areas in Beira for localized sewage treatment and possibly Africare could supervise such a contract.

The challenges of a health, water and sanitation project in Beira, Mozambique are awesome. Africare has taken on a difficult task. While some of the hoped for results may not be forthcoming, others of value will be achieved. The evaluators encourage both USAID and Africare to continue to work with the Mozambican authorities and local populations in Sofala Province to make whatever improvements are possible.

The consultants recommend that USAID release funding for the second half of this Africare Project.

APPENDICES

1. Statement of Work; Terms of Reference
2. Documents Reviewed
3. Schedule of Consultants' Activities
4. Discussion Guides
5. List of IEC Messages/Themes
6. Health Information System
7. Well Drawing
8. WST Drawing
9. Examples of graphs

APPENDIX 1

SCOPE OF WORK AND SPECIFIC TERMS FOR THE EVALUATION OF USAID GRANT # 656-0217-G-00-3022-00

USAID/AFRICARE EVALUATION, NOVEMBER 14-23, 1994

Terms of Reference

The Sofala Province Health, Water and Sanitation Project (HWS) was originally designed to address the emergency water and sanitation needs of Sofala Province, specifically within the city of Beira, but including a health post rehabilitation component in Chibabava District. Subsequent analysis of contemporary needs has has caused a shift in project focus from an emphasis on strictly supplying water to the people of Beira to include a stronger component of health education, monitorization, and community participation.

While the implmenting agency (Africare) remains mindful of the possibility of drought, and of actions which may threaten the status of water systems within the city (including potential civil unrest within Sofala Province), Grant activities now focus on longer term health, water and sanitation programs, capable of being sustained at a (decentralized) community level. In addition to this move from an "emergency" to "developmental" focus, the Chibabava health post component has been broadened to include new construction activities within the rehabilitation process, as well as to include longer-lasting, quality building materials.

Therefore, the purpose of the mid-term evaluation is:

- to assess progress towards objectives made during the first year of the Grant;
- to determine constraints to such progress and evaluate alternatives;
- to document lessons learned to date;
- to assess the environmental impact of Grant activities to date;
- to give recommendations for improved project implementation.

Physical locations and specific issues to be addressed during this evaluation include the following:

BEIRA SITES:

A) the bairro Manga Mascarenhas, unidades A, B, C, and D
B) the bairro Vaz, unidade B
C) other locations throughout the city determined pertinent by Africare project staff

B

BEIRA ACTIVITIES:

1 IEC

Within the city the evaluation team will assess the impact of Africare IEC activities as they relate to the following activity outputs:

1.1 Have water committees been created at each Africare-rehabiliated water point?

1.2 Does each water committee have a "user-fee" plan which is appropriate to the given situation? If so, what are the chances of each user-fee system covering 100% of the recurrent costs of the given water point?

1.3 Is Africare currently engaged in the construction of school latrines? If so, have committees been formed at each school which will be responsible for the maintenance of each latrine?

1.4 Have 20 (CVM) volunteers been trained in IEC methods? If so, are they currently working as community mobilizers?

1.5 Have 20 community volunteers been selected and trained in key sanitation and health messages? If so, have they retransmitted these messages to 80% of the mothers in their neighborhoods?

1.6 Have 10 trainers been trained in HWS IEC methods?

1.7 Have teams from Aguas de Beira (AdB) and Agua Rural (AR) been trained in basic health education?

1.8 Has Africare developed and delivered a minimum of 6 key health messages to health centers, participants, etc.?

1.9 Has Africare received written agreements from private well owners prior to construction?

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2. WATER

Within the city of Beira the evaluation team will assess the impact of Africare water and sanitation-related activities as follows:

2.1 Has Africare assisted DPCA with a survey of existing wells in Beira?

2.2 Have water storage tanks (WSTs) been constructed at public standpipes? If so, do they comform to AdB/etc. standards? Is the number of tanks constructed to date proportional to the number Africare intends to construct over the life of the project?

2.3 Have WSTs been constructed at hand-dug wells? If so, is this number proportional to the number Africare intends to construct over the life of the project?

2.4 Has Africare rehabilitated hand-dug wells? If so, is this number proportional to the number Africare intends to rehabilitate over the life of the project?

2.5 Has Africare trained commnity water technicians for each water point rehabilitated to date?

2.6 How many beneficiaries are receiving at least 5 liters/day of potable water sources from Africare-constructed wells and/or WSTs?

2.7 Have 5 latrine construction workers been trained in basic sanitaion, construction, and maintenance issues?

2.8 Have teams from AdB and AR been trained in WST construction?

2.9 Have Africare water team members been trained in latrine construction techniques by Latrinas Melhoradas?

3 HEALTH

3.1 Has a baseline survey been developed and implemented for Beira beneficiaries?

3.2 Has a health information system been designed and implemented?

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CHIBABAVA DISTRICT SITES:

A) the newly-constructed health post in Goonda
B) the rehabilitated health post in Tronga
C) the rehabilitated health post in Casa Nova *
D) the site of proposed health post in Revue

CHIBABAVA DISTRICT ACTIVITIES:

4 IEC

4.1 Have 15 rural (CVM) volunteers been trained as community mobilizers in health, water, and sanitation issues?

4.2 Have 50% of families in 4 to 5 Chibabava District communities received some form of health education?

5 WATER/SANITATION

5.1 Have 30 simple latrines been constructed at 30 households and/or institutions, including 1 or 2 at each health post?

6 HEALTH

6.1 Have 3 rural health posts been rehabilitated, equipped and staffed? Are they currently operating?

6.2 Have 3 preventive health agents been recruited and trained? If so, are they being used as link between health posts and communities?

6.3 Have 6 to 8 local staff been trained in preventive health care who will serve at the 3 health posts?

6.4 Has a baseline survey been completed for 3 to 4 communities? Does this comprise part of the HIS?

* Note: the Casa Nova site, originally rehabilitated to serve as a local health post, was annexed by the District Police. It is not presently known if the building will revert back to health post activities or remain with the police. The case is currently under consideration by the Dept. of Health, the Provincial Police, and District Administrators.

Period of Study and Time Required

The period of evaluation will be approximately two weeks, from November 14 - November 23, 1994. Field work will take place within the city of Beira, and within Chibabava District. The final report and recommendations will be written in country and possibly hand-delivered to the USAID Mission in Maputo immediately following the evaluation. A "debriefing" will take place at USAID after Mission staff have had time to read the final report and formulate questions. During this "debriefing", at least one of the evaluators will be present along with Africare project staff.

Qualifications of Participants

The evaluation team will be composed of two outside evaluators. In addition, an appropriate member of the Africare HWS Project will accompany the team during relevant periods, eg. the Water Project Coordinator when looking specifically at water points, the IEC Coordinator when assessing public health issues, and the Health Coordinator when visiting the rural health posts. The Program Coordinator will be available to facilitate all evaluation activities. The outside evaluators must have experience in developing country, public health-related issues, including, but not limited to: public sanitation, public water systems, IEC methodologies. Profeciency in Portuguese is desirable, and familiarity with Mozambique's social, political, and economic history is essential. At least one of the evaluators will have relevant evaluation experience.

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APPENDIX a

READINGS TO ASSIST 4301 MID-TERM EVALUATORS

1. BACKGROUND READINGS

- Media File

- Africare Annual Report

- Medecins Sans Frontieres Bulletin #23, May 1994

- UNOHAC Report on the Consolidated Humanitarian Assistance Programme for 1994

- Aguas de Beira Report on "Affordability and Willingness to Pay for Water Services in the Urban and Semi-Urban Areas of Beira, October 1993".

- The Latrine chapter in Peter Morgan's "Rural Water Supplies and Sanitation"

- WASH's December, 1992 draft report on "Action Plan: Water Shortage and Related Public Health Problems, City of Beira, Mozambique".

- WASH's February, 1993 final report on "Water Shortage and Related Public Health Problems: An Action Plan for the City of Beira, Mozambique".

- WASH/Africare April, 1994 report on "Redirection Plan for the Health, Water and Sanitation Project, Mozambique".

2. GRANT ACTIVITY-SPECIFIC READINGS

- 4301 Original Project Proposal

- Africare-USAID Grant Agreement (4301)

- USAID-Africare Health, Water and Sanitation Grant Activity and Budget Amendment (these outputs to be used as a guide during project evaluation)

- IEC Activity File

- Chibabava Health Post Activity File

- Monthly Progress Reports

- Quarterly Reports

- Other materials which may assist the project evaluators

APPENDIX 3
SCHEDULE OF CONSULTANTS' ACTIVITIES

Unless otherwise indicated, consultants were working together.

SUNDAY 13 NOVEMBER 1994

Arrival of consultants in Beira from Maputo and Harare

MONDAY 14 NOVEMBER 1994

8-12:30 Both consultants met with Ricardo Duenez, Africare Program Coordinator for background briefing, orientation to the Sofala HWS project, introductions to Africare staff including Health, Water and IEC coordinators and their assistants

15-16:00 Both consultants accompanied by Health Coordinator (HPC-Claude Prost) and IEC Coordinator (Arminda Prost) met with the President of the Conselho Executivo, a position equivalent to the mayor of Beira

16-18:00 Continued briefing with Program Coordinator, administrative matters with Philippa White, Africare Administrative Officer

TUESDAY 15 NOVEMBER 1994

8-10:30 Additional briefings with Program Coordinator

10:30-13:00
Driving tour of Beira neighborhoods conducted by water coordinator, John Swett, to see the layout of the town, the extent of water and hygiene problems including public defecation, broken pipes, standing sewage and waste water

14:00-18:00
Water consultant visited field sites with Water Coordinator

Health consultant met with Arminda Proust, IEC Coordinator for briefing on IEC activities

WEDNESDAY 16 NOVEMBER 1994

8-9:45 Met with the Provincial Director for Health, Dr. Amos, (DPS) and the Director of City Health and the Chief of Studies, accompanied by the IECC and HC.

9:45-12:30
Water consultant met the Chief of the Planning Department at the Provincial Planning Commission to arrange a meeting. Met with Engineer David Rowe of FinnConsult, Ltd.

Health consultant with the IECC and HC visited the National Improved Latrines Program (Latrinas Melhoradas) and spoke with the Project Coordinator, Carlos Jeque, Munhava animator, Paulo Pangaia, and Project Engineer, Isa Telles. Also visited the Alto Manga Health Center, spoke with the doctor and visited the Airport Health Post where the nurse in the afternoon works as an Africare trainer (TOT)

13:30-18:30
Health consultant with the IECC, HC and Assistant HC went to visit Manga Mascarenhas, Unidades A, B, C, D accompanying ADC and CQ while doing their work of visiting households, talked with members of health, water and sanitation committees.

Water consultant reviewed WASH documents.

THURSDAY 17 NOVEMBER 1994

8-13:00 Water consultant met at DPCA with the Chief of Water Supply and Sanitation, Abel Florencio Antonio, and Technicians Adelino Semente and Manuel Francisco. Met with the Director of the Water Project Supervision Office (SUPRA), Anabela Durao. Met with Hannu Hermunen, Director of the FinnConsult Project at AdB and Mariano Roia Tesoura, the Head of the Technical Division, AdB.

Health consultant met individually with IEC Assistant Coordinator Elizabeth Roque, Driver and Artist Carlos Va-Lem Di-Tiane, and Health Coordinator (HIS) Claude Prost.

14:00-15:00
Health consultant with IECC and HPC met with Kulima, a local NGO working on community project such as cleaning drainage ditches, using "Food for Work" and unemployed workers.

Water consultant reviewed project documents.

15:00-18:00
Health consultant with IECC and HPC preparing for the trip to Chibabava

Water consultant prepared for trip to Chibabava

FRIDAY 18 NOVEMBER 1994

7:00-18:30
Water and health consultants with IECC and HC traveled to Chibabava District, stopping first in Goonda (where the

Africare guest house is located). Activities included: visit to exisitng Revue health post, meeting with medical assistant there, and discussion of construction plans; assisting local health post staff in Goonda with rehydration and treatment of severely malnourished/ill 4 year old child; accompanied by assistant health coordinator visit to Casa Nova health post rehabilitation and discussion with RENAMO nurse who had started seeing patients in empty school building on 15 November 1994; visit to health post rehabilitation in Toronga; visit to health post new construction in Goonda; met with the District Administrator.

SATURDAY 19 NOVEMBER 1994

8:00-15:00
Discussion with assistant health coordinator (and the supervisor of construction) at the Africare house in Goonda; visit to ill child in Goonda health post; return to Beira

SUNDAY 20 NOVEMBER 1994

9:00-17:00
Water and health consultants continue reviewing documents, began draft of report document, discussed impressions and findings.

MONDAY 21 NOVEMBER 1994

8:00-18:00
Consultants continue discussions with Africare staff, drafting of report and formulating of recommendations. Mary Schwarz, USAID Project Officer from Maputo arrived from Maputo to visit project sites and to debrief with consultants.

TUESDAY 22 NOVEMBER 1994

8:00-18:00
Consultants writing report and discussing findings with Africare staff.

WEDNESDAY 23 NOVEMBER 1994

8:00-11:00
Final draft of consultants' report

11-12:00 Debriefing meeting with consultants, USAID Project Officer and Africare staff

16:00 Health consultant departs for Harare
19:00 Water consultant and USAID Manager depart for Maputo

APPENDIX 4
DISCUSSION GUIDES

The consultants used open ended questions in speaking with Africare collaborators on the Sofala Province HWS Project. The questions and issues notes below were raised:

1) What for you is the most important objective of the Africare Project?

2) What do you know about activities of the Project?

3) Are activities of the project consistent with the plans and policies and activities of your department (organization)? What are your department's (organization's) plans and priorities for the future?

4) How are you informed about the Project? Do you receive reports?

5) How effective are the various aspects of the project?

Depending on who the interview was with, consultants posed specific technical questions about WST, wells, latrines or surveys.

APPENDIX 5

TITULOS DE MENSAGENS DE EDUCACAO PELA SAUDE

1. Veja o que esta acontecer contigo
2. Como ajudar o corpo a vencer as doencas
3. O que se pode fazer para evitar as doencas
4. Como cuidar a crianca com diarreia
5. Como prevenir a desidratacao quando a crianca esta com diarreia ou vomitos
6. Como dar o soro caseiro
7. Como cuidar a tua latrina
8. O que fazer com o teu lixo
9. Como se transmite as diarreias
10. Cuidados com as fezes
11. Higiene da agua
12. Lavar sempre as maos com sabao
13. Higiene dos alimentos
14. Conservacao e manutencao do poco
15. Porque é importante utilizr a agua do poco
16. Porque é importante conservar o poco
17. Como deve manter o poco
18. Como devemos conservar diario o poco: "pequenas informacoes nas mensagens desenhadas" escritas em tres linguas: portuguese, sena e ndau.
    - A. A mosca é o nosso maior inimigo, transmite-nos doencas.
    - B. A aranha é má, devemos combate-la
    - C. Com a falta de higiene individual, podemos facilmente apanhar a tinha.
    - D. E pelos pés que podemos apanhar certas doencas.
    - E. As lombrigas vivem nos nossos intestinos e suijam o nosso sangue
    - F. Devemos ensinar as criancas à lavar as maos
    - G. O mosquito provoca a malaria
    - H. Devemos arrumar a loica suija numa bacia com agua limp e sabao.
    - I. Devemos dar banho às criancas todos os dias
    - J. Cortar o capim no quintal
    - K. A crianca deve ser pesada todos os meses no posto de saude.
    - L. A falta de agua no corpo mata
    - M. Com a falta de higiene podemos apanhar a sarna
    - N. As moscas poisam na nossa comida quando nao protegida
    - O. O lixo é fonte de doencas
    - P. Devemos arrumar a loica lavada n tarimba
    - Q. Coza bem a comida para evitar a diarreia

APPENDIX 6
SUMMARY OF HIS STUDIES

I.1 Title: First Investigation = Baseline on Knowledge, Attitudes and Practices in the Urban and Peri Urban Areas of Beira

I.2 Purpose of the Study: to choose the place to begin project activities; selected site to be designated at the request of the Executive Council (Mayor's Office)
A. Choice of the target population(s)
B. Identification of the best indicators for development of a health information system

I.3 Beginning of the study: 20 December 1993
Completion of the study: 23 December 1993
Completion of Report: End of February 1994

I.4 Location: All of the urban and peri-urban areas of Beira

I.5 Methodology: household interviews (questionnaire attached) conducted by 26 interviewers trained by Africare and drawn from the Provincial Directorate for Health, the City Directorate for Health, the Planning Section of Provincial Government, Mozambican Red Cross, and two local NGO, Kulima and Green Zones. Cross-sectional study.

I.6 Sample of 400 houses, cluster sample

I.7 Will this study be repeated? Yes
When? January 1995
Where? Chibabava
How many times? one or two

II. Title: Second Investigation = HIS ongoing study and Epidemiologic Mapping

II.2 Purpose of the Study: identify families having high risk behaviors; to evaluate progress achieved over time; to show clearly the relationships between water, sanitation and community health.

II.3 Beginning of the Study:
June 1994 in Manga Mascarenhas-Unit B
August 1994 in Manga Mascarenhas-Unit A
September 1994 in Manga Mascarenhas-Unit C
November 1994 in Munhava Vaz
Reports: HIS generates lists of problems by house and these are used for monitoring purposes; also monthly reports from the ADC and CQ with forms for both literate and non-literate; periodic progress reports feed into Africare monthly and quarterly reports

II.4 Location: all project sites, Manga Mascarenhas Units A, B, C and Munhava Vaz Unit B

II.5 Methodology: based on cross-sectional survey with follow-up providing information allowing prospective analysis; questionnaire "Investigacao Saude Saneamento e Agua" Manga Mascarenhas attached, as well as monthly report forms for

ADC and CQ and sample list of houses with problems; Systematic survey in all houses. Houses are numbered and marked with a red identification on the front door. Investigation form filled out by two ADC under the supervision of a TOT.

II.6 Sample based on population, and increases with project activity; by end of October 1994, 4,087 household questionnaires completed and used in monitoring system

II.7 Will this study be repeated? Yes, in the new areas when the project begins.

1. BASELINE

CONFIDENCIAL

PESQUISA E RECOLHA DE DADOS sobre
INFORMATIVOS, QUANTITATIVOS, QUALITATIVOS E ANALITICOS
NA CIDADE DE BEIRA

{ Conhecimento, atitude, e Pratica

Data: 21 de dezembro de 1993

Equipa: 3

Questionario: 216

1. Bairro:
   a. PONTAGEA ____
   b. MUNHAVA X
   c. MANGA ____
   d. CHINGUSSURA ____

2. Pessoa entrevistada:
   a. Mae X
   b. Pai ____
   c. Outro ____

3. Quantas pessoas moram na casa Escreve o numero 3

4. Quantas criancas em casa tem menos de cinco anos Escreve o numero 0

5. Quantas criancas vao a escola Escreve o numero 0

6. A casa tem luz: sim ____ nao X

7. A familia tem radio:
   sim ____ nao X

8. O radio funciona :
   sim ____ nao ____

9. A que hora do dia Voce escuta o seu radio: ____

10. Tem algum programa preferido que escuta no radio ____
    sim; qual ____ nao ____

11. O radio é aberto só quando o pai e a mae estiverem em casa
    sim ____ nao ____

12. Toda a familia escuta o radio
    sim ____ nao ____

13. Como tens recebido as noticias da cidade
    a. Radio ____
    b. Jornal ____
    c. Vizinho X
    d. Televisao ____
    e. Outro qual ____

14. Quem tem lido o jornal na sua casa
    a. Ninguem ____
    b. Pai ____
    c. Mae ____
    d. Outro quem ____

41

CAPACIDADE ORGANIZATIVA DA COMUNIDADE

15. A sua Comunidade esta organizada
sim X nao ____
Se sim como ____

16. Quem tem mais influencia sobre a sua Comunidade
a. Cooperativas ____
b. Organização de mulheres ____
c. Grupo de Jovens ____
d. Secretario do bairro X
e. Regulo ____
f. Igreja ____
g. Outros quais ____
h. Nao sabe ____

17. Quem toma decisoes gerais na sua Comunidade:
a. Regulo ____
b. Secretario do bairro X
c. Governador ____
d. Ametramo ____
e. Igreja ____
f. Outros quais ____
g. Nao sabe ____

AGUA

18. Como transporta agua para dentro da sua casa
a. Balde ____
b. Bidoes X
c. Panela ____
d. Bacia ____
e. Outro qual ____

19. Quantos litros de agua transporta para a sua casa cada dia Estima o numero ou/ tamanho das LATAS. 40

20. A agua transportada para a sua casa tem sido suficiente para toda a gente sim X nao ____

21. Quanto tempo leva para recolher toda a agua para a familia para um dia: 5m horas
____ nao sabe

22. Aceitaria pagar agua se fosse mais limpa ou/ mais perto:
sim X nao ____

23. Quanto custa a agua por dia 100,00MT ou por mes ____

24. Onde deita a agua suja depois de banho ou depois de lavar a roupa:
a. Canais de drenagem ____
b. No chao ____
c. Num buraco X
d. No quintal ____
e. Poe no jardim nas flores ____
f. Utiliza para lavar as latrinas ____
g. Outro (qual) ____

POÇOS DE AGUA E SUA CONSERVACAO

25. Onde tira a sua agua para beber e cozinhar
a. Fontenário ____
b. Poço aberto no seu quintal ____

c. Poço aberto da Comunidade ____
d. Poço aberto noutro quintal ____
e. Torneira no quintal ____
f. Torneira dentro da casa ____
g. Torneira na casa do vizinho _X_

26. Onde tira a agua para lavar a roupa e tomar o banho
a. Fontenário ____
b. Torneira no quintal _VIZINHO
c. Poço ____
d. Torneira dentro da casa ____

27. Quanto tempo este poço ou/ fontenário foi construido
Recente ____ Antigo _____ Nao sabe ____

28. Se for poço, a agua deste Poço é tratada
sim _____ nao _____
Se SIM: Como trata
i. Cloro ____
ii. Plantas medicinais ____

29. Quantas pessoas alem da sua familia vem tirar agua neste Poço _____ pessoas

30. Quem construiu o seu Poço
a. Proprio ____
b. Secretariado do bairro _____
c. Igreja ____
d. Organização estrangeira ____
e. Outros quais ____
f. Nao sabe ____

31. Existem no seu bairro poços construidos para o uso de toda a Comunidade
sim ____ nao _____
Se SIM: Quem construi
a. Secretariado do bairro _____
b. Igreja ____
c. Organização estrangeira ____
d. Dono duma outra casa ____
e. Outros quais ____
f. Nao sabe ____

32. Como tira a agua do Poço
a. Panela ____
b. Balde ____
c. Lata ____
d. Bidao ____
e. Bomba eletrica ____
f. Bomba manual ____

33. Existe alguem na sua Comunidade que controla agua do seu poço
sim _____ nao _____
Se SIM: Quem controla
a. Proprio ____
b. Secretariado do bairro _____
c. Conselho Executivo ____
d. Igreja ____
e. Organização estrangeira ____
f. Outros quais ____
g. Nao sabe____

13

34. Se SIM: O que e controlado
a. Agua limpa do poço ____
b. Arredores do poço ____
c. Outros quais ____
d. Nao sabe ____

USO DE LATRINAS

35. A familia tem latrina
sim ____ nao X
Se sim, para o que serve a latrina
a. Evitar doencas ____
b. Por as fezes no mesmo lugar ____
c. Para nao ser visto nu ____
d. Outro ____
e. Nao sabe ____

36. Havera problemes se colocar a latrina perto do poço:
sim ____ nao ____
Se sim: o que e:
a. Contaminação do poço ____
b. Cheira ____
c. Nao e conveniente ____
d. Outro qual ____
e. Nao sabe ____

37. O que vao fazer quando a latrina estiver cheia:
a. Esvaziar ____
b. Tapar e cavar outra ____
c. Outro qual ____
d. Nao sabe ____

38. O que se pode fazer para evitar o mau cheiro das latrinas:
a. Limpar ____
b. Cobrir o buraco ____
c. Por cinza ____
d. Por criolina ____
e. Outro qual ____
f. Nao sabe ____

39. Qual tipo de educação a familia precisa acerca da utilização das latrinas:
a. nada ____
b. limpeza ____
c. utilizacao ____
d. Outro qual ____
e. Nao sabe ____

40. Se nao tem latrina, onde e que a familia defeca:
a. No capim X
b. Outro qual ____

41

41. Gostaria construir uma latrina:
sim _X_ nao _____
Se sim: podia pagar alguma coisa para construir uma latrina melhorada para o seu lar:
sim _X_ nao _____

42. Tem qualquer problema quando a gente defeca no chao:
sim _X_ nao _____

a. Se SIM: quais sao:
i. Da mau cheiro _____
ii. Causa doença _X_
iii. Outro qual _____
iv. Nao sabe _____

43. Onde e que as criancas de menos de cinco anos fazem coco
a. Na latrina _____
b. Fora do quintal _____
c. Dentro do QUINTAL _____
d. Outro _____

44. Onde poe as fezes dos bebes :
a. Enterra _____
b. Poe na latrina _____
c. Deita fora _____
d. Deita fora num buraco _____
e. Outro (QUE) _____

SAUDE

45. Foi para um curandeiro no ano passado
sim _____ nao _X_

46. Foi para o posto de Saude no ano passado
sim _X_ nao _____

47. Quem é mais confiado para dar boas informações acerca da saúde das crianças
a. mais velho da Comunidade ____
b. Enfermeiro no PS _X_
c. Curandeiro ____
d. Outros quais ____
e. Nao sabe ____

48. Fervem a agua para beber
sim _____ nao _X_
Algumas vezes _____
Se SIM ou Algumas vezes: Porque
i. Matar bichos ou/ prevenir doenças ____
ii. Outros quais ____
iii. Nao sabe _/_
Se NAO: Porque
iv. Falta do tempo ____
v. Falta dos meios ____
vi. Falta de habito ____
vii. Outros quais ____
viii. Nao sabe _X_

49. Tiveram uma criança menos de cinco anos com diarreia nessas duas ultimas semanas
sim _____ nao _____

50. Quais são as causas de diarreia

a. Agua contaminada ____
b. Defecar fora ____
c. Moscas _X_
d. Falta do higiene ____
e. Má alimentação ____
f. Outros quais ____
g. Nao sabe ____

51. Quais são as quatro coisas que gastam mais dinheiro cada semana

sal ____ milho _X_ carile _X_ lenha ____
carvao _X_ petroleo ____ agua ____ sabão ____
oleo _X_ arroz____ açucar____

a. Outros quais ____
b. Nao sabe ____

52. Onde arranjam dinheiro para o seu sustento

a. Vendem comida, lenha ou carvão ____
b. Vendem bebidas tradicionais ____
c. Trabalho fora de casa _X_
d. Outros quais ____
e. Nao sabe ____

53. O marido tem emprego

sim _X_ nao ____

a. Outros quais ____
b. Nao sabe ____

54. Beira é a sua zona de origem

sim ____ nao _X_

Se NAO: Para quanto tempo pretendem ficar aqui TODA VIDA

55. Qual é o problema maior para a gente do bairro NÃO TEM

INVESTIGAÇÃO SAÚDE SANEAMENTO E ÁGU

MANGA MASCARENHAS — UNIDADE

INVESTIGADOR — DATA: — QUARTEIRÃO No

CASAS letra:	números						
Quantas vezes tira água durante o dia no poço							
Quantos Litros traz cada vez							
Número de membros da família							
Número de Crianças menos de 5 anos							
Casos de ma-nutrição							
Número de Crianças vacinadas de 0 à 5 anos							
Numero de mulheres com idade fértil vacinadas							
Tem latrinas							
Alguêm teve Diarreia sem sangue no último mês							
Alguêm teve Diarreia com sangue no último mês							
Utiliza os sais orais ou o soro caseiro							
Utiliza os postos de saúde							
Alguêm teve o corpo muito quente no último mês							
Tem trabalho							
A subsistência do camponês							
Ordenado ganho							
Quanto tempo está Residindo aqui							

"C" significa "mau"
"B" significa "médio"
"A" significa "bom"

RELATORIO MENSAL

MES

UNIDADE

BAIRRO

SUPERVISOR

QUANTOS DOENTES VOCE ATENDEU ESTE MES

HOMENS		MULHERES		CRIANCAS	

PROBLEMAS DE SAUDE ENCONTRADOS ESTE MES

IDADE / DIAGNOSTICO	=<1A	2 - 5	6-15	16 40	CASO NOVO	CASO ANTIGO	RECEBEU MEDICAMENTOS	ENCAMINHOU AO P.S
TOSSE								
CONSTIPACAO								
OUTROS PR RESP								
DIARREIA SIMPLES								
DIARREIA C/ SANGUE								
COLERA								
VOMITOS								
LOMBRIGAS DOR ABDOMINAL								
MA NUTRICAO								
PROBLEMAS DA PELE								
FERRIMENTOS								
FRACTURAS								
MORDEDURAS DE COBRA								
MORDED DE ESCORPIAO								
SARAMPO								
MALARIA								
TUBERCULOSE								
RAIVA								
OUTROS								
PROBL NAO IDENTIFICADOS								
TOTAL								

ACTIVIDADES PREVENTIVAS
SANEAMENTO

O que foi feito para nao se defecar ao ceu aberto? _____

n. de latrinas construidas		
n. de latrinas em construcao		
n. de latrinas ainda por construi		

Que e feito do lixo na Comunidade? _____

O que foi feito em relacao ao capim alto ? _____

Os pocos estao bem conservados? _____

Educacao em Saude

A quem fizeram educacao na comunidade? _____

O conhecimento da preparacao dos SRO e mistura caseira melhorou _____ em quantas familias? _____

As maes estaõ cumprindo com a vacina das criancas ..... e das consultas de gravidez?

A higiene pessoal e das criancas tende a melhorar em quantas familias ?

A higiene das casas e a arrumacao melhorou em quantas casas .

Algum ADC ou CQ teve problemas na execucao das suas actividades

O problema teve solucao . Qual?..... . .. .

Voce tem reunido com o grupo todo para discussao do trabalho Quantas vezes por mes? .....

O TOT tem empenhado a sua tarefa coforme a descricao Quais as dificuldades mais frequentes?

Como esta o seu estoque de medicamentos?

O que acha que deve ser retirado ou acrescentado?

Qual ajuda ou informacao Voce e o seu grupo estao precisando para desenvolver melhor o trabalho? _____

Data: _____ 1994

	2				5	6	7	8	
	C	C			X	C	X	C	X
	C	X				C	X	C	
	X	X		C	X	C	X	C	C
	C	C		X		C	C	C	C
Água	C	X		X	C	C	X	C	X
	C	C		C	C	X	C	C	
1 L 1 L	X	C			C		C	C	
	C	C		C			C	C	
	C	C		C	C		C	C	
	C	C							

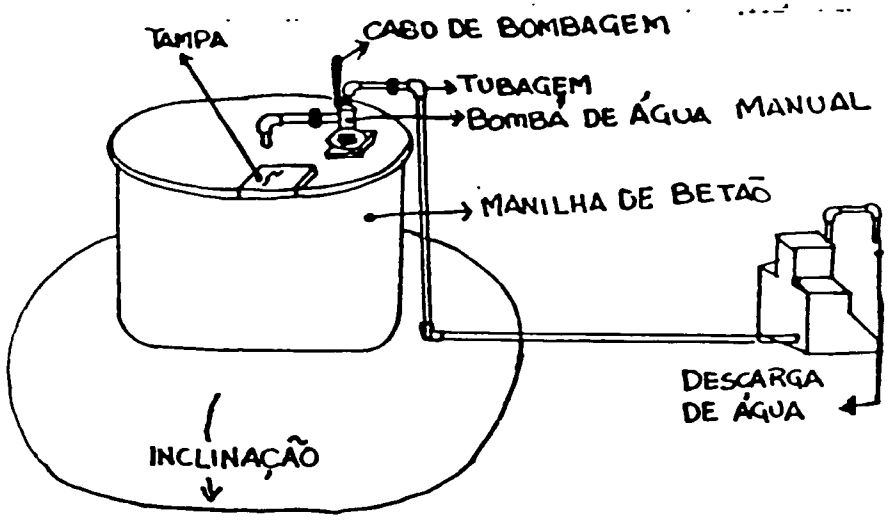
LISTA DAS CASAS COM CRIANCAS DOENTES

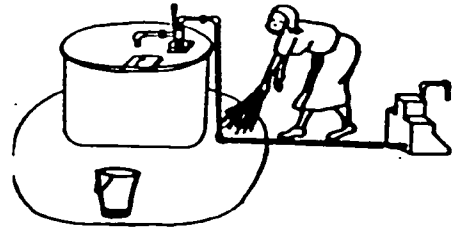
Q=QUARTEIRAO, L=LETRA, NUM=NUMERO DA CASA
QPES=NO PESSOAS, QCRI=NO CRIANCAS
C=MA-NUTRICAO, DCRI = DIARREIA SIMPLES
SGCRI = DIARREIA DE SANGUE, PCRI = MALARIA

Q	L	NUM	QPES	QCRI	C	DCRI	SGCRI	PCRI
1	A	1	12	4			2	1
1	A	5	11	3			1	
1	A	6	15	5	1	1		1
1	A	12	6	3				1
1	A	14	7	2				1
1	A	22	8	1		1		1
1	A	34	3	1			1	1
1	A	39	3	1		1		
1	A	41	5	2				1
1	A	43	6	2				1
1	A	44	4	1		1		
1	A	50	15	2		2		
1	A	51	20	5	1			
1	A	57	4	2	1			
1	A	76	6	2		1		
1	A	78	4	2	1			
2	B	2	4	2		1		1
2	B	6	9	1	1			
2	B	16	11	3	2			
2	B	24	3	1		1		
2	B	35	4	2	1			
2	B	39	9	4	1			
2	B	46	7	3				1
2	B	50	5	2	1			
2	B	52	10	2	1			2
2	B	53	6	2	1			
2	B	63	5	3				1
2	B	70	9	2				1
2	B	73	9	2				1
2	B	77	5	3				1
2	B	78	7	3		1		
2	B	81	3	1	1			
2	B	86	4	1	1			
2	B	89	6	1	1			
2	B	90	4	2	2			
3	C	9	6	1				1
3	C	12	5	1		1		
3	C	20	6	2		1		
3	C	29	12	3		1		
3	C	36	6	1				1
3	C	44	3	1		1		
3	C	45	6	1		1		
3	C	49	8	2				2
3	C	55	6	1				1
4	D	1	5	2				1
4	D	21	5	2				2

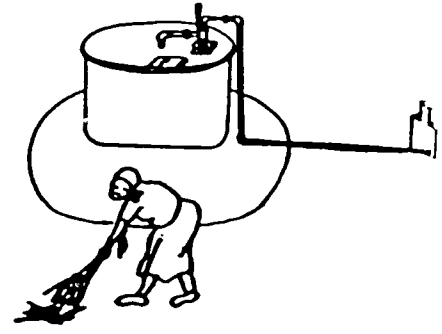
VAZ - B / NOVEMBRO DE 1994

O POÇO E OS SEUS COMPONENTES

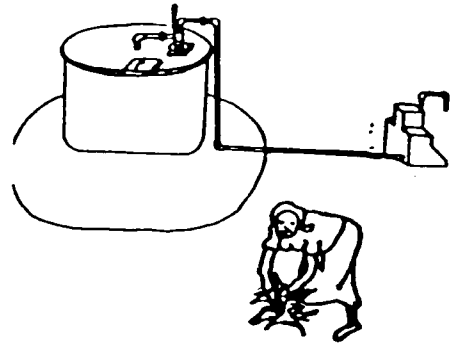




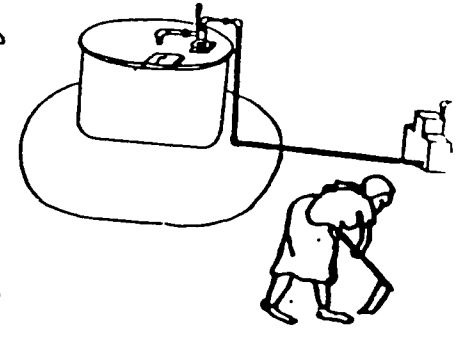
LIMPE O PASSEIO COM UMA VASSOURA E BALDE DE ÁGUA



LIMPE À VOLTA DO POÇO C. VASSOURA SEM USAR ÁGUA



TIRE A SUJIDADE COMO FOLHAS CASCA DE CANA DOCE

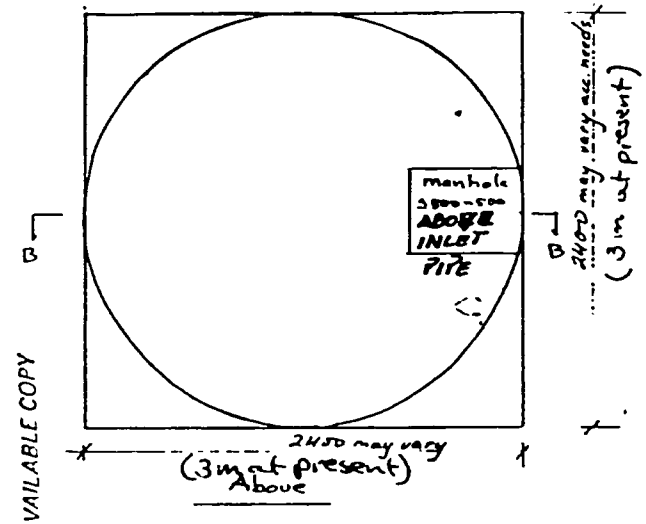


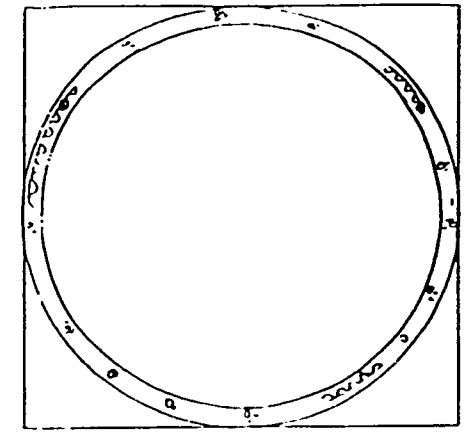
ABRA UM DRENO PARA PERMITIR A SAÍDA DA ÁGU.

FAÇA OS QUATRO TRABALHOS INDICADOS DIARIAMENTE A UMA HORA CERTA, POR EXEMPL AO FIM DO DIA.

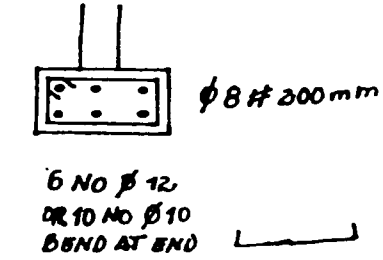
APPENDIX 8

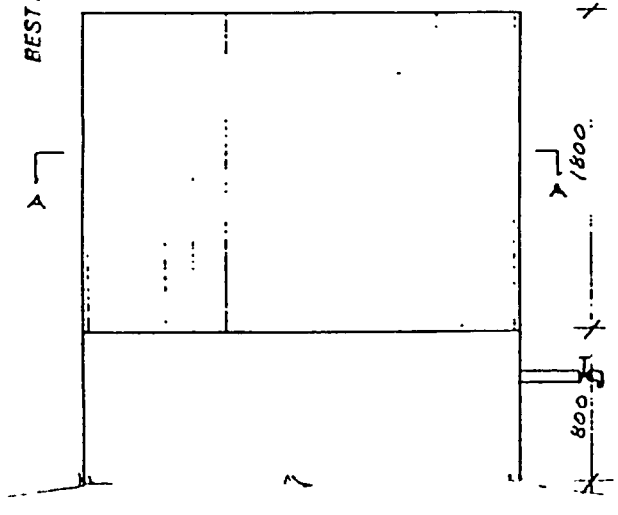
BEST AVAILABLE COPY



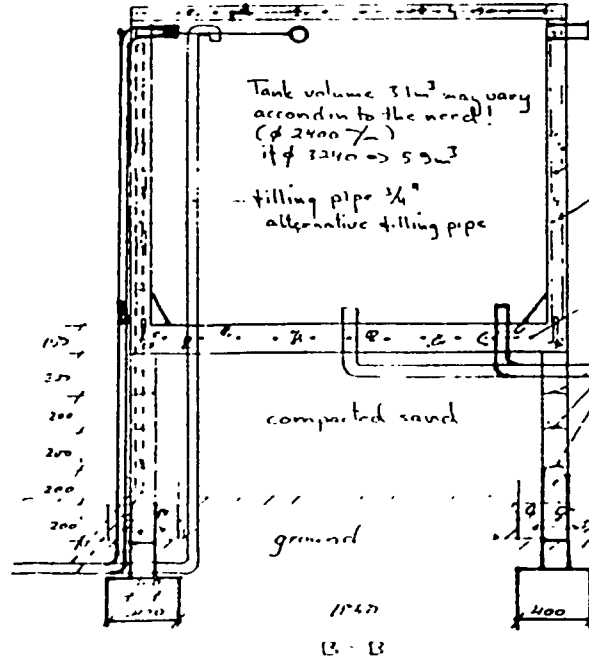


A – A





Face



B – B

SLAB 100mm. STEEL IN BOTTOM
ϕ6 # 200 ⌀ d TOT = 60 ⌀ min (effective)
40mm COVER
overflow hole

chicken net 2m
blaster d TOT = 120 ⌀

2m/Fe corrugated plate

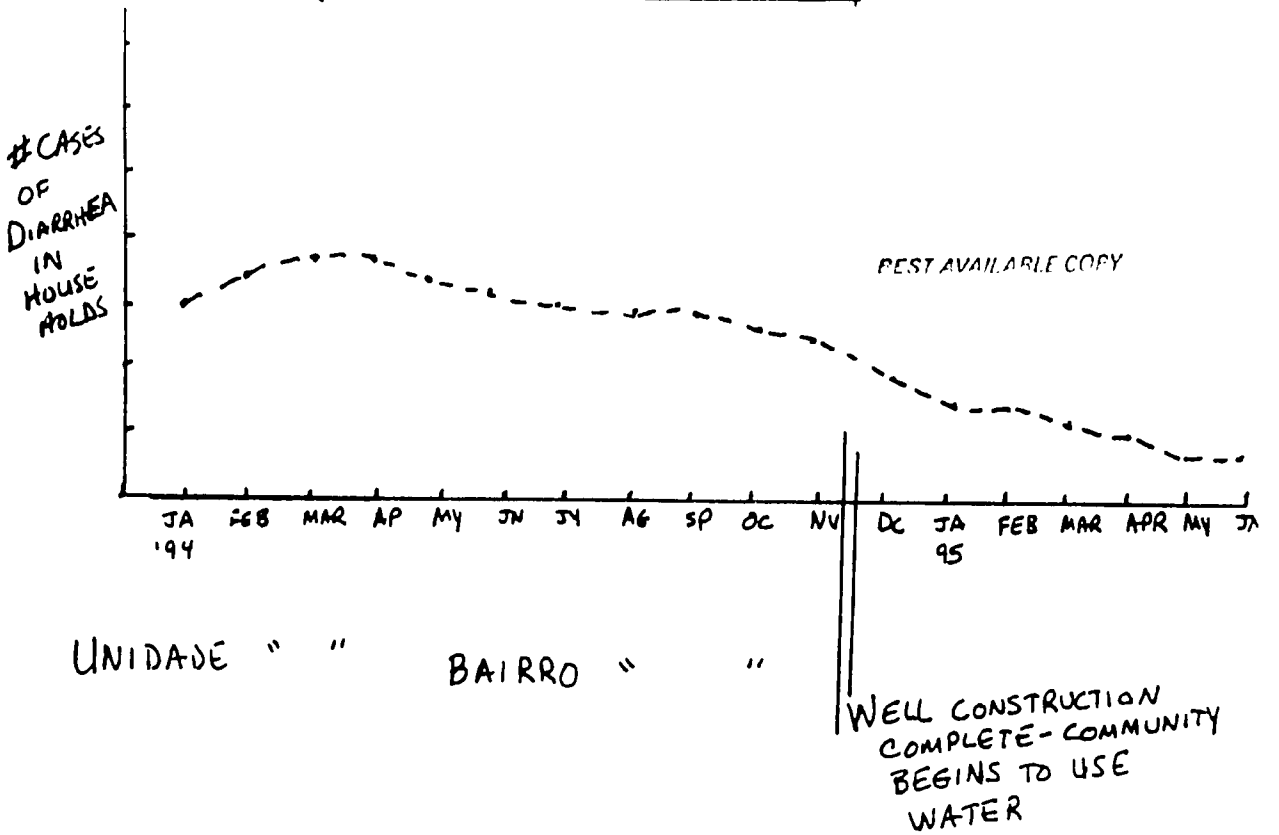
concrete BK 25 (BOTTOM WITH 40 COVER)
ϕ10 # 200 ⌀
ϕ6 cc 300 L 300 ⌀ ⌊

ϕ6 ⌀ – BEND ROUND CORNER
steel pipe 3/4" 2m

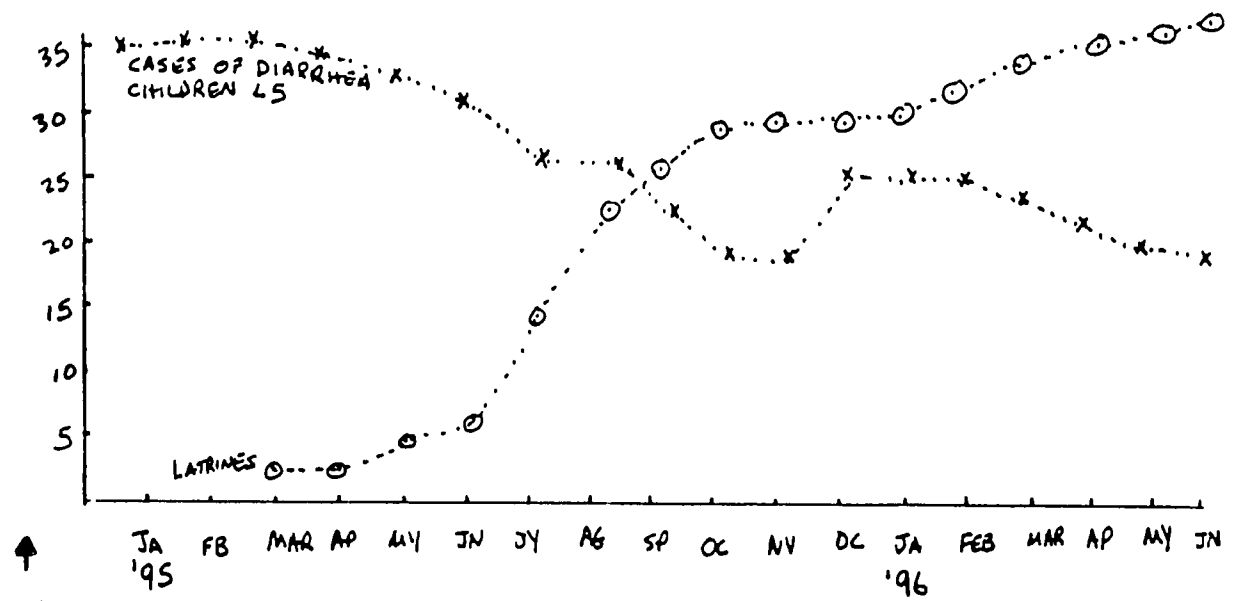
concrete blocks 150×200×400 (4-6 Tiers)
2 ϕ10 + ϕ6 cc 300

concrete BK 25

EXAMPLES OF GRAPHS | APPENDIX J



BEST AVAILABLE COPY



#'s OF CASES OF DIARRHEA IN HOUSEHOLDS (CHILDREN < 5 YRS)

#'s OF NEW LATRINES INSTALLED (PLOT TOTAL # OF NEW CONSTRUCTIONS)