

# **Combating Diarrhoea in Children**

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## **ABSTRACT**

Despite the fact that diarrhoea is both preventable and treatable, two million children die each year in developing countries from the disease, making diarrhoea the second most serious killer of children under five worldwide. The majority of cases are caused by unsafe water supplies, inadequate sanitation and poor hygiene. Populations in rural areas tend to be more severely deprived of adequate water and sanitation facilities than populations in urban areas. This leads to higher levels of disease in rural areas. Studies have indicated that low coverage rates of water and sanitation in rural Africa are largely the product of centralized provisions of these systems by national government monopolies. This supply-driven approach of governments providing water delivery and sanitation services without educating communities about maintaining them has proven to be highly inefficient and unsustainable. In order for governments to achieve sustainability of these systems and improve the quality of life in rural areas, they must adopt a grassroots approach more formally known as the demand-responsive approach (DRA). The goal of the DRA is for communities to organize themselves to express demand, choose services, and take ownership and responsibility for sustaining, operating and managing their water and sanitation facilities. Rural communities are thus empowered and capable of making informed, educated choices about improving the health of their children.

Using lessons learned from a rural water project in Ghana that utilized the DRA, this policy paper makes recommendations to the West Africa Water Initiative (WAWI). WAWI is a public-private partnership whose aim is to provide potable water and sanitation to rural Ghana, Mali and Niger in an effort to improve the health outcomes within those communities. The following recommendations outline how the DRA can be applied successfully as a framework for WAWI.

1. *Inform rural communities about the difference between “community participation” and “community management.”*
2. *Focus on the key role of women in hygiene education and the management of water delivery systems.*
3. *Educate communities about the causes of diarrhoea and the importance of ORT, hygiene and breastfeeding.*
4. *Create committees to distribute responsibilities and ensure accountability.*
5. *Establish evaluation criteria to measure WAWI’s success.*

## INTRODUCTION

Despite the fact that diarrhoea is both preventable and treatable, two million children die each year in developing countries from the disease, making diarrhoea the second most serious killer of children under five worldwide.<sup>1</sup> The majority of cases are caused by unsafe water supplies, inadequate sanitation and poor hygiene.<sup>2</sup> One of the objectives set at the World Summit on Sustainable Development in Johannesburg regarding health and water was to reduce by two thirds the mortality rates of children under five by the year 2015.<sup>3</sup> In order to achieve this goal in Africa, governments need to focus their efforts on populations in rural areas. Populations in rural areas tend to be more severely deprived of adequate water and sanitation facilities than populations in urban areas. This leads to higher levels of disease in rural areas.<sup>4</sup> Studies have indicated that low coverage rates of water and sanitation in rural Africa are largely the product of centralized provisions of these systems by national government monopolies.<sup>5</sup> This supply-driven approach of governments providing water delivery and sanitation services without educating communities about maintaining them has proven to be highly inefficient. Such an approach results in the neglect of rural populations and undermines the importance of community and user involvement. Furthermore, this top-down approach does not guarantee sustainability of water supply and sanitation facilities because these communities have no sense of ownership.

In order for governments to achieve sustainability of these systems and improve the quality of life in rural areas, they must adopt a grassroots approach more formally known as the demand-responsive approach (DRA). The DRA involves three groups of players: communities, governments and service providers. The DRA encourages rural communities to become involved

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<sup>1</sup> Accessed at <http://www.who.int/inf-fs/en/fact178.html>.

<sup>2</sup> United Nations, Fact Sheets: Johannesburg Summit 2002, pg. 11.

<sup>3</sup> Key Outcomes of the Johannesburg Summit 2002 Accessed at <http://www.johannesburgsummit.org/>

<sup>4</sup> Global Water Supply and Sanitation Assessment 2000 Report. WHO/UNICEF 2000. Pg. 41.

<sup>5</sup> George Aduko Yanore, "Upper Regions Community Water Project, Ghana," Rural Water Supply Unit Quarterly Report, March 1994.

in the improvement of their water supply and sanitation systems. The hope is that communities will learn to “organize themselves to express demand, choose services, and take ownership and responsibility for sustaining, operating and managing their services.”<sup>6</sup> Rural communities are thus empowered and capable of making informed, educated choices about improving the health of their children. The DRA requires that governments play the role of a facilitator by seeking internal and external funds to support water and sanitation projects in their country.<sup>7</sup> Finally the DRA calls upon external support agencies such as partnerships, research institutes, and NGOs to play the complex role of service providers. These service providers are expected to educate communities, serve as social intermediaries, supervise construction, and enhance capacity-building by training communities.<sup>8</sup>

This policy paper is divided into two parts. The first half is a general overview of prevention and treatment of diarrhoea. The prevention discussion outlines how improving people’s access to safe drinking water, promoting the use of latrines, and teaching appropriate hygiene practices help to control the transmission of diarrhoeal pathogens from the environment to children. The treatment discussion explains the importance of continued nourishment, breastfeeding, and oral rehydration therapy in the treatment of diarrhoea. The second half of the paper analyzes the lessons learned from a rural water project conducted in Ghana that utilized the DRA. Based upon this analysis, the recommendations essentially advocate for the adoption of the DRA by the West Africa Water Initiative (WAWI), a \$40 million public-private partnership. As a service provider, WAWI plans to provide potable water and sanitation to rural villages in

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<sup>6</sup> Jennifer Sara, [Giving Communities Choice Is Not Enough!](http://www.wsp.org/english/focus/conference/communities.html), The World Bank. Accessed at <http://www.wsp.org/english/focus/conference/communities.html>.

<sup>7</sup> Jennifer Sara, [Giving Communities Choice Is Not Enough!](http://www.wsp.org/english/focus/conference/communities.html), The World Bank. Accessed at <http://www.wsp.org/english/focus/conference/communities.html>.

<sup>8</sup> Jennifer Sara, [Giving Communities Choice Is Not Enough!](http://www.wsp.org/english/focus/conference/communities.html), The World Bank. Accessed at <http://www.wsp.org/english/focus/conference/communities.html>.

Ghana, Mali and Niger. This paper will hopefully convince WAWI and similar service providers that the DRA is the best way to ensure the sustainability of their water and sanitation endeavors in rural Africa.

## **MECHANISMS OF DIARRHOEAL TRANSMISSION**

Diarrhoea is an intestinal disorder characterized by watery and frequent bowels that occur at least three times in a twenty-four hour period. Diarrhoea results in the rapid depletion of water and sodium, both of which are essential for body functions. If water and sodium are not rapidly replaced, a person risks becoming dehydrated. Death occurs if a person loses more than 10% of his or her body fluids.<sup>9</sup> Although there are four clinical types of diarrhoea, approximately 50% of all cases of childhood diarrhoea can be attributed to chronic diarrhoea. Chronic diarrhoea typically lasts more than two weeks. The majority of diarrhoeal cases are caused by pathogens such as bacteria, parasites, viruses and protozoa.<sup>10</sup>

The origin of diarrhoeal pathogens is human feces. Once the contaminated feces are excreted into the environment, pathogens often get onto people's hands or into bodies of water where they can then be consumed. Flies are significant transmitters of diarrhoeal pathogens. Flies that have come into contact with feces easily transmit pathogens to food and water. Animals in rural settings also spread pathogens by walking in fecal material and then frequenting domestic environments where they come into contact with children and women preparing food.

## **PREVENTING TRANSMISSION OF DIARRHOEA**

### **1. *Improving Access to Safe Drinking Water***

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<sup>9</sup> Accessed at <http://www.rehydrate.org/diarrhoea/index.html>.

<sup>10</sup> V. Curtis et al. "Domestic Hygiene and Diarrhoea- Pinpointing the Problem" *Tropical Medicine and International Health* 5 No I January 2000 pg. 23.

Approximately 1.1 billion people in the world have no access to safe water.<sup>11</sup> In order to provide people with safe drinking water, public health officials must prevent contamination both at the water source and between collection and use of water. People in rural areas collect water from a variety of sources including surface water, wells, hand pumps, public taps and pipes. In order to protect the quality of water, it is generally recommended that water sources be placed on elevated platforms surrounded by a wall or fence in order to keep animals and children away. In the case of wells, platforms are necessary to prevent soil or waste from falling back into the water source. People in rural areas should be encouraged to bathe and wash clothes away from water sources. Women should be taught about covering containers with lids when carrying water over long distances and about the dangers of sharing containers with animals.<sup>12</sup>

## **2. Improving Sanitation Through Latrine Building**

Access to proper sanitation is an even greater problem, affecting 2.4 billion people in the world.<sup>13</sup> The WHO and UNICEF have identified safe disposal of feces and use of latrines as two factors necessary to decrease the incidence of diarrhoea mortality and morbidity. Safe excreta disposal is an important part of lowering the incidence of diarrhoea. Studies have shown that the type of sanitation facility is closely correlated with diarrhoea morbidity.<sup>14</sup> In a study conducted in Burkina Faso, child stools left out indiscriminately were associated with a 50% increase in the risk of hospitalization with diarrhoea compared with disposal by a latrine.<sup>15</sup> All latrines should be built as far away as possible from houses, paths, animals and young children. They should

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<sup>11</sup> Water, Sanitation and Hygiene At A Glance. Accessed at <http://www.worldbank.org/hnp>.

<sup>12</sup> J.K.Tumwine, et al., "Diarrhoea and Effects of Different Water Sources" *Tropical Medicine and International Health* Vol. 7. No 9 September 2002 pg. 753.

<sup>13</sup> Accessed at <http://www.worldbank.org/hnp>.

<sup>14</sup> J.K. Tumwine, et al., "Diarrhoea and Effects of Different Water Sources" *Tropical Medicine and International Health* Vol. 7. No 9 September 2002 pg. 753

<sup>15</sup> E. Traore et al. (1994) "Child Defecation Behavior, Stool Disposal Practices, and Childhood Diarrhoea in Burkina Faso; Results from a Case-Control Study. *Journal of Epidemiology and Community Health*. 48 270-275.

be built at least ten meters away from all water delivery systems. Latrines should be situated in dry areas that are well drained and well above flood level. The building of latrines is also important because it helps with fly control. Studies have shown that fly control is strongly correlated with a decrease in the incidence of diarrhoea. Most of these fly control attempts have depended on the use of insecticides to kill flies, but this is simply not cost-effective for rural communities. Therefore, health officials have concluded that it is more important to focus on preventing the flies from accessing the stools by building latrines.

In order to evaluate the type of latrine that would be most useful to a rural community, public health officials must assess several factors. There are two general types of latrines: drop systems and flush systems.<sup>16</sup> If water is not used for cleaning, then a drop system of disposal is appropriate. On the other hand, if water is used for cleaning and is available year round in a place where the soil in the surrounding area is permeable, a pour flush system of disposal is more appropriate. However, seeing that most rural areas in the developing world have low water supplies, pour flush latrines are usually not suitable. Furthermore, they are expensive and require skilled workers to install and maintain. Drop system latrines are more feasible and practical in rural areas. They are simple to construct and require no water. There are two general types of drop systems: pit latrines and VIP latrines. A pit latrine is essentially a hole dug three meters into the ground with a cover to protect against flies. Pit latrines can be used until they are two-thirds full, at which time they should be completely covered up with soil. The solids remaining in the soil become harmless after two years and can be later used for fertilizer. New pits can be dug besides old ones. VIP latrines are slightly more complicated. They require vent pipes to create good ventilation. Because a VIP latrine is enclosed, the pipe is necessary to draw away bad fumes, trap any flies that attempt to enter, and allow in oxygen for decomposition. The pipes

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<sup>16</sup> Health Basics: Water and Sanitation Dialogue on Diarrhoea. Accessed at

need simple maintenance to verify that air is still able to circulate. This maintenance involved pouring water through the mesh to get rid of any insects or spider webs that may have collected there.

### **3. Hygiene and Health Education**

Improving domestic hygiene is one of the most difficult aspects of fighting diarrhoea. Past programs aimed at improving hygiene practices in rural areas have tried to convey too many messages. In order for these programs to be effective, they need to focus on a small number of interventions of proven public health importance.<sup>17</sup> Studies have shown that the most significant hygiene practice is washing one's hands with soap after having stool contact.<sup>18</sup> This is particularly crucial in rural communities where it is common for women to use their bare hands instead of toilet paper to clean their children.<sup>19</sup> This unsanitary practice is an easy way for pathogens to be transmitted to food, and must be prevented by educating women and children.

Researchers have found that health education approaches that are entirely based on giving knowledge to rural communities are incapable of changing people's behaviors.<sup>20</sup> A newer concept being adopted by many hygiene education projects involves active participation of the communities being targeted. This marks a shift from giving information in a didactic manner to a more participatory approach geared towards developing problem-solving skills and empowerment.<sup>21</sup> The educator should function more as a facilitator than an expert coming to

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<http://www.rehydrate.org/dd/fullmenu.htm>

<sup>17</sup> V. Curtis et al. "Domestic Hygiene and Diarrhoea- Pinpointing the Problem" *Tropical Medicine and International Health* 5 No 1 January 2000 pg. 22.

<sup>18</sup> V. Curtis et al. "Domestic Hygiene and Diarrhoea- Pinpointing the Problem" *Tropical Medicine and International Health* 5 No 1 January 2000 pg. 27.

<sup>19</sup> V. Curtis et al. "Domestic Hygiene and Diarrhoea- Pinpointing the Problem" *Tropical Medicine and International Health* 5 No 1 January 2000 pg. 26.

<sup>20</sup> G. Laverick, et. al., "Participatory Learning Materials For Health Promotion in Ghana - A Case Study," *Health Promotion International* Vol. 12 No. 1 Oxford University Press 1997, pg. 21.

<sup>21</sup> G. Laverick, et al. "Participatory Learning Materials For Health Promotion in Ghana - A Case Study" *Health Promotion International* Vol. 12 No. 1 1997. Pg. 22.



impose new views on communities. This new approach encourages conducting preliminary assessments of cultural perceptions of disease in order to effectively implement interventions. One example of an education initiative that adopted this approach was Ghana's Kumasi Health Education Project. The project found that the community's response to this teaching method was overall quite positive. However, the project managers found that many Ghanaian educators were not very comfortable with the new method. Many reported feeling threatened and insecure about an approach that asked communities to draw upon their own experience and ask questions.<sup>22</sup> Thus it is necessary for health educators to receive extensive training in order to understand the benefits of such an approach. The organizers of the Kumasi Health Education Project believe that more research needs to be conducted in hygiene education promotion in rural communities. They also believe that more teaching materials need to be developed and tested in order to assess the extent to which communities are truly empowered.

## **DIARRHOEA TREATMENT**

### ***1.     Nutrition***

A common misconception about diarrhoea in children is that increased food uptake will actually cause stool output to increase, worsening the diarrhoea.<sup>23</sup> Thus many women inappropriately choose to cut back on certain foods and often discontinue breastfeeding.<sup>24</sup> Unfortunately, many women do not realize that breastfeeding protects infants against infection by providing them with additional nutrition and maternal antibodies. Studies have shown that children under five who are breastfed during a diarrhoea episode have reduced stool output and shorter duration of illness than children who are not breastfed.<sup>25</sup> Breastfeeding also helps to reduce the contact that a child has with bottles that may already be contaminated with diarrhoeal

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<sup>22</sup> G. Laverick, et al. "Participatory Learning Materials For Health Promotion in Ghana - A Case Study" *Health Promotion International* Vol. 12 No. 1 1997. Pg. 24.

<sup>23</sup> Accessed at [http://www.who.int/child-adolescent-health/New\\_Publications/CHILD\\_HEALTH](http://www.who.int/child-adolescent-health/New_Publications/CHILD_HEALTH)

pathogens.<sup>26</sup> This is an increasing concern in developing countries because of the recent introduction of infant formula and the use of bottle-feeding as a substitute for breastfeeding. Furthermore, infants who are entirely bottle-fed tend to experience a slight increase in stool volume.<sup>27</sup> For infants older than four months, local staple foods that are easy to digest such as rice, corn, sorghum, potatoes or bananas should also be given. (see Table 1)

## 2. Oral Rehydration Therapy

The development of oral rehydration therapy (ORT) using oral rehydration salts (ORS) in 1979 was a major advance in the global fight against diarrhoea. Between 1979 and 1995, ORT use rates reached 58% to 81% in various parts of the world.<sup>28</sup> Oral rehydration salt (ORS) solution is the simplest method of treatment for diarrhoea. ORS is used to replace salts and fluids lost from the body. The quantity consumed should equal the volume of vomit and stools passed.<sup>29</sup> ORS can be administered simultaneously with breast milk. Initially, the WHO recommended that ORS be used for all cases of diarrhoea, but it soon found out that the ORS packages were not readily available throughout the world. The WHO also discovered that ORS was only necessary in 30-40% of diarrhoea cases resulting in dehydration.<sup>30</sup> Thus, the WHO shifted its emphasis from ORS to the use of recommended home fluids (RHF), more commonly known as home-made solutions. This approach became extremely popular in the 1980s. These home-made solutions included salt and sugar solutions, salted rice water, cereal-based solutions and traditional soups. Because the types of RHF vary so greatly, the WHO required that each country

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<sup>24</sup> <http://www.icddrb.org/manuals/manual.html>

<sup>25</sup> [http://www.who.int/child-adolescent-health/New\\_Publications/CHILD\\_HEALTH](http://www.who.int/child-adolescent-health/New_Publications/CHILD_HEALTH)

<sup>26</sup> V. Curtis et al. "Domestic Hygiene and Diarrhoea- Pinpointing the Problem" *Tropical Medicine and International Health* 5 No I January 2000 pg. 29.

<sup>27</sup> [http://www.who.int/child-adolescent-health/New\\_Publications/CHILD\\_HEALTH](http://www.who.int/child-adolescent-health/New_Publications/CHILD_HEALTH)

<sup>28</sup> Nathaniel F. Pierce. "How Much Has ORT Reduced Child Mortality?" *Journal of Health and Population Nutrition*. 2001 March (19) 1. Center for Health and Population Research.

<sup>29</sup> Accessed at <http://www.icddrb.org/manuals/manual.html>.

<sup>30</sup> Accessed at <http://www.childinfo.org/eddb/Diarrhoea/progress.htm>.

create a WHO-approved local list of RHF.

ORS can be prepared in the home using basic ingredients such as salt, sodium bicarbonate, potassium chloride and sugar. The widespread use of ORT in addition to improvements in water supply, sanitation and quality of housing have led to a decrease in worldwide diarrhoea-related child mortality, but not a decrease in morbidity. However, studies indicate that this decrease in child mortality is largely the result of ORT administered in hospitals, not in the home. This is not because home-based ORT is ineffective, but rather because it is more difficult to assess since each mother is responsible for preparing her own solution. It is also difficult to assess because women may not have access to clean water to prepare the solution. Efforts need to be made to standardize home-made rehydration solutions as much as possible within communities.

Because of the rapid loss of fluids during diarrhoea, it is crucial that children with chronic diarrhoea receive rehydration treatment rapidly. ORT should be administered at the first sign of symptoms up until the diarrhoea stops. The management of chronic diarrhoea in developing countries has proven to be difficult because parents often delay seeking treatment due to cultural beliefs about diarrhoea, leading to low ORT use rates. Without social mobilization of local communities, ORT use rates will continue to decrease. Health education is a necessary component to addressing cultural influences on diarrhoea treatment. As mentioned earlier, before hygiene education can take place, an assessment of a rural community's perception of the causal factors, severity and type of diarrhoea is needed. This would enable health care providers to better understand how parents, particularly mothers, detect when their children have diarrhoea and how they go about administering treatment.

While conducting assessments of different cultural perceptions of diarrhoea, researchers have found that certain types of diarrhoea are perceived as less dangerous than others. Until

parents notice symptoms that they perceive as life-threatening (i.e. blood or mucous in stools), they will typically delay treatment. For example, diarrhoea associated with overeating or with teething in infants is not considered a serious illness amongst certain rural communities in Nigeria, and thus may not receive immediate treatment. Oftentimes, the decision to get outside care is made as a community. A mother may seek advice from relatives, neighbors, and elders. Another cultural issue researchers encountered was the manner in which parents obtained medication for their children. In some cases, parents buy antibiotics from pharmacies, local chemist shops, street vendors, and health institutions. Many times the antibiotics purchased are inappropriate and often unnecessary for the treatment of diarrhoea. This overuse of antibiotics and under use of ORS for childhood diarrhoea is a significant problem and can led to the development of antibiotic resistance and chronic diarrhoea.<sup>31</sup>

In May 2002, the World Health Organization (WHO) announced that it would be using a new formula of ORS that will save millions of children's lives. This new formula contains lower concentrations of sodium and glucose and reduces the severity of chronic diarrhoea by decreasing the amount of vomiting, the number of hospitalizations, and the need for costly intravenous fluid treatment by 33%.<sup>32</sup> Use of this new formula will begin in early 2003 beginning in India. Although ready-made ORS is the preferred treatment for diarrhoea, UNICEF still encourages local production of RHF.

Now that it is established that prevention and treatment are necessary components to combating diarrhoea in children, it is important to explore in what context such interventions would be made most effective.

## **COMMUNITY-BASED WATER AND SANITATION MANAGEMENT**

The continent of Africa has the world's lowest total water supply coverage, with only

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<sup>31</sup> [http://www.who.int/dap-icium/posters/1c3\\_fin.html](http://www.who.int/dap-icium/posters/1c3_fin.html)

62% of the population having access to proper water supplies.<sup>33</sup> A serious disparity exists between water supply coverage in rural and urban areas. Eighty-five percent of all urban areas have coverage compared to only 47% of rural areas.<sup>34</sup> Similar disparities occur between rural and urban access to clean sanitation, although in some countries the disparity is far worse. In some countries, the disparity is far worse. Niger, for example, has the worst disparity in sanitary conditions in West Africa with only 5% of the rural population having access to proper sanitation compared to 79% of the urban population.<sup>35</sup> Studies attribute this disparity to the fact that many countries use a supply-driven approach for water and sanitation. The supply-driven approach is a top-down model in which national governments provide and manage all water delivery and sanitation systems. Studies have proven that this approach is ineffective and unsustainable for rural communities because national governments have more vested interests in providing adequate water and sanitation to urban areas where industry and commerce exist. More impoverished and marginalized populations, on the other hand, inhabit rural areas. Therefore, governments have less interest in ensuring that these populations have adequate water and sanitation facilities. In order to improve the facilities in rural areas, governments must adopt a demand-responsive approach (DRA) should be adopted as a means of promoting community involvement in the planning and maintenance of water delivery and sanitation systems in villages.. The DRA places incentives in the hands of those who have the most to gain and the most to lose from inadequate water and sanitation.

### ***1. The Demand-Driven Approach***

The World Bank has demonstrated that community water and sanitation projects are more

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<sup>32</sup> <http://www.who.int/inf/en/pr-2002-35.html>

<sup>33</sup> Global Water Supply and Sanitation Assessment 2000 Report. WHO/UNICEF 2000.pg. 41

<sup>34</sup> Global Water Supply and Sanitation Assessment 2000 Report. WHO/UNICEF 2000.pg. 41

<sup>35</sup> Global Water Supply and Sanitation Assessment 2000 Report. WHO/UNICEF 2000.pg. 41

sustainable when they use a demand-responsive approach (DRA).<sup>36</sup> By encouraging community involvement, project managers hope to improve the reliability and sustainability of water and sanitation systems, introduce services that communities are willing and able to finance, increase sense of ownership, and finally improve health.<sup>37</sup> The DRA could potentially be overwhelming for rural communities because adopting a bottom-up approach shifts a large portion of the financial, operational, technical, and managerial burden to the local community.<sup>38</sup> In order for such a change to become a reality, communities must be provided with the necessary education and training to take up these tasks. An example of how the DRA was used successfully in a community water and sanitation management project is Ghana's Upper Regions Community Water Project in 1994.

## **2. Case Study: Ghana's Upper Regions Community Water Project**

Soon after Ghana achieved its independence in 1957, water supply systems were entirely provided by the government's monopoly Ghana Water and Sewerage Corporation. Under this government monopoly, the rural water supply remained extremely limited compared to urban centers and sanitation was insignificant. Between 1973 and 1993, 7,000 drilled wells and 40,000 hand dug wells were built to access groundwater. However, by 1993 most of these wells were in poor condition. Hand pumps were either entirely broken or malfunctioned and had not been repaired for various reasons including poor yields, nonpayment of tariffs or even lack of spare parts.<sup>39</sup> Researchers found that these systems had failed to be successful in rural communities for several reasons including the social unacceptance of the rural community, lack of incorporation

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<sup>36</sup> Key Design Principles for Community Water and Sanitation Services, World Bank Water Supply and Sanitation: Rural. Accessed at <http://lnweb18.worldbank.org/essd/essd.nsf/>

<sup>37</sup> Accessed at [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf). pgs. 168-169.

<sup>38</sup> Accessed at [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf). pg. 147

<sup>39</sup> George Aduko Yanore. "Upper Regions Community Water Project, Ghana.1994. Rural Water Supply Unit Quarterly Report. March 1994. Pg. 138

of community resources, lack of ownership, and wrong site location.<sup>40</sup>

In response to this failure, the Ghanaian government chose to adopt the DRA and established a community water and sanitation project. One of the greatest challenges that the community project faced was changing people's attitudes. Many people in the rural Ghanaian communities had a difficult time understanding the concept of clean water. Many believed that all water could satisfy a person's thirst, making no distinction between pure and dirty water. They also encountered some difficulty asking people to make financial contributions towards the water and sanitation systems because many of them viewed water as a gift from nature that should not incur any financial cost.<sup>41</sup> Asking communities to pay for some of the services was also problematic because many of them earned insufficient incomes that barely covered the cost of food and clothing. The community project managers concluded that further assistance was needed to establish a fund to assist poor rural communities in building and maintaining their rural water and sanitation systems.<sup>42</sup> Another common problem that they faced was attempting to change people's perceptions of disease causation. Many times it was difficult for women, the main caretakers of children, to make the connection between diarrhoea and water quality. Furthermore, women often did not consider all forms of diarrhoea as life-threatening to their children. Thus it was agreed that it would be most helpful to advocate for community-wide education about the biology of diarrhoea. Integrating a basic biology education into local schools would be useful for children. Educational activities should also be provided for women since they have the most extensive interaction with children outside of school. With these lessons in

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<sup>40</sup> G.A. Yanore, "Upper Regions Community Water Project, Ghana.1994. Rural Water Supply Unit Quarterly Report. March 1994. Pg. 136

<sup>41</sup> Kofi Asamoah, Ghana: The Community Water and Sanitation Project, Presented at the Community Water Supply and Sanitation Conference, May 5-8, 1998, The World Bank, Washington D.C.

<sup>42</sup> Kofi Asamoah, Ghana: The Community Water and Sanitation Project, Presented at the Community Water Supply and Sanitation Conference, May 5-8, 1998, The World Bank, Washington D.C.

mind, project managers are continuously reevaluating how they can better implement the demand-responsive approach in future projects. Overall, the Ghana Community Water and Sanitation Project succeeded in communicating the project's intentions to community members, fostering community involvement and accountability, enhancing a sense of ownership, and increasing female involvement.

### 3. *The West Africa Water Initiative (WAWI)*

As discussed earlier, the DRA involves three main players: communities, governments and service providers. Service providers have the most complex role in the DRA because they oversee water and sanitation projects, and they educate and train local communities. An example of a recently formed service provider is the West Africa Water Initiative, also known as WAWI. WAWI is a \$41 million public-private partnership spear-headed by the United States Agency for International Development (USAID) and the Conrad N. Hilton Foundation. The goal of the partnership is to provide potable water and sanitation to rural villages in Ghana, Mali and Niger. The initiative is an extension of a twelve year rural water project in Ghana.<sup>43</sup> WAWI consists of ten partners including USAID, World Vision International, UNICEF and the Conrad N. Hilton Foundation. Each of WAWI's partners will be providing different types of assistance to the rural water and sanitation projects in Ghana, Mali and Niger. Table 3 outlines the different services provided by each partner.

WAWI is focusing on the link between access to clean water and health, specifically examining trachoma, guinea worm and diarrhoea. By the year 2008, WAWI expects to have established 825 new water boreholes, 100 alternative water resources, and 9,000 latrines in Mali, Ghana and Niger with the hope of reaching more than 500,000 people.<sup>44</sup> The partnership also hopes to provide thousands of adults, children and teachers with safe hygiene education and

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<sup>43</sup> <http://www.usaid.gov/about/westafricawater/>



sanitation practices.

As shown in table 2, World Vision, WaterAid and the World Chlorine Council will all be involved in providing water and sanitation supplies to rural communities in Mali, Niger and Ghana. The World Chlorine Council in particular will be donating well pipes to the various projects in each region. Although contributions of hardware are certainly needed for these rural projects, free donations can be problematic. Studies have shown that when communities are given free hardware for water supply systems as well as free repair and maintenance, the communities are often led to believe that it is not their responsibility to maintain the systems.<sup>45</sup> They thus have no incentive to maintain the pumps and pipes in their rural communities nor do they see any reason to collect maintenance fees from community members. The DRA addresses this problem by ensuring that communities are well informed about their role in WAWI. When communities are treated as legitimate partners in these projects and required to make some financial contribution to the installation, maintenance, and repair of the systems, their sense of ownership is enhanced.<sup>46</sup> This results in greater sustainability of water systems.

This policy paper makes recommendations based upon evaluations of Ghana's community water and sanitation project. The recommendations are directed towards WAWI's partners concerning how best to attack the problem of diarrhoea in rural settings. An introduction to the Republic of Niger ensues as a classic example of the deplorable problem of inadequate rural access to water supplies and sanitation, and why WAWI is choosing to invest its resources in the West African health sector.

The Republic of Niger is the largest country in West Africa as well as one of the poorest nations in the world. Seventy-five percent of the country is described as having a hyper-arid

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<sup>44</sup> <http://www.usaid.gov/about/westafricawater/>

<sup>45</sup> A.L. Obiols, "Sustainable Systems for Operating and Maintaining Afridev Pumps in Mozambique" presented at the Community Water Supply and Sanitation Conference May 5-8 1998, The World Bank

climate covered with desert. Annual rainfall is low and extremely erratic, and the country experiences extreme heat and temperature variations.<sup>47</sup> The Niger River, an internationally shared resource, runs through the southwest portion of the country and provides water to the capital of Niamey. Ample supplies of good quality groundwater provide water in the south of the country, predominantly inhabited by rural populations. Eighty percent of Niger's population lives in rural communities. Ninety percent of the land area occupied by 23,000 villagers contains considerable groundwater reserves.<sup>48</sup> However, these groundwater aquifers are not readily accessible because of their depth and wide distribution. According to United Nations statistics, Niger has the highest under five mortality rate in the world, the lowest school attendance rates for girls, as well as the highest illiteracy rate in West Africa.<sup>49</sup> At any given time, approximately 30% of the country's hand pumps are broken because they are too old. Education is one of Niger's greatest areas of need, and WAWI hopes to encourage both formal and non-formal education programs in the country. WAWI also intends to target women in rural communities, encouraging their participation in hygiene education with their children. In addition to hygiene education, people in rural communities in Niger also need to be educated about ORT use.

The following recommendations outline how the DRA can be applied successfully as a framework for WAWI and its partners as they embark on their rural water projects in Niger, Mali and Ghana. This approach has proven to be quite successful in Ghana, and well received by the local communities there.<sup>50</sup> Although WAWI's efforts are focused on three West African nations, these recommendations can be generalized to rural communities outside of West Africa.

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<sup>46</sup> A.L. Obiols, "Sustainable Systems for Operating and Maintaining Afridev Pumps in Mozambique" presented at the Community Water Supply and Sanitation Conference May 5-8 1998, The World Bank

<sup>47</sup> Niger Towards Water Resource Management Accessed at <http://lnweb18.worldbank.org/>

<sup>48</sup> <http://lnweb18.worldbank.org/essd/essd.nsf/>

<sup>49</sup> <http://wvintranet.wvi.org/africa.nsf/> and <http://www.childinfo.org/eddb/Diarrhoea/database.htm>

<sup>50</sup> K. Asamoah, "Ghana: The Community Water and Sanitation Project," presented at the Community Water Supply and Sanitation Conference May 5-8 1998 The World Bank, Washington, D.C.

## **Policy Recommendations**

1. *Inform rural communities about the difference between “community participation” and “community management.”*

One of the first steps that WAWI must take in its initiative to improve water supplies and sanitation is to identify rural communities that are willing to play an active role in improving the health of their children and community at large. Communities must be approached in a non-threatening way so that they completely understand what WAWI’s intentions are. The implementation of a rural community water and sanitation process is a gradual process consisting of seven steps, each of which is outlined in Figure 1.<sup>51</sup>

A central aspect to approaching rural communities and attempting to change their management of rural water supply and sanitation systems is gaining a thorough understanding of their existing water supply sources and waste disposal systems (steps 1-3).<sup>52</sup> Communities that have developed along rivers usually have a less structured management system because water is readily available to everyone. However, in communities where water supplies are scarcer, such as in Niger, there may be stricter management that distributes individual rights along gender, religious or socioeconomic lines. Such differences need to be taken into consideration and whenever possible, projects should attempt to strengthen or empower the existing traditional arrangement.<sup>53</sup>

It is also important that dialogue occur between WAWI and the community about the distinction between simple “community participation” in the initiative and “community management.”<sup>54</sup> Simple community participation involves having service providers dictate how

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<sup>51</sup> [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf)

<sup>52</sup> [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf), pg. 150

<sup>53</sup> [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf), pg. 151

<sup>54</sup> [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf)

communities should change their water and sanitation systems and does not allow for any contributions from communities. On the other hand, community management is entirely based upon incorporating communities in every aspect of a project. Community management occurs at three levels: cost-sharing, contractual arrangement, and decision-making. Service providers, such as WAWI, should encourage communities to make collective, financial contributions towards maintenance. Any contracting that occurs should occur between service providers and local governments, not between providers and national governments. Finally, any decision made, ranging from where to place hand pumps to choosing appropriate types of latrines, should involve input from local representatives. Decisions regarding placement of water delivery systems in particular should involve women since they are usually in charge of collecting water. As a service provider, WAWI's utmost priority should be to contribute to the communities' efforts, and not vice versa. WAWI should operate as a mere support system for an initiative led by the community. Community management promotes accepting responsibility for community health, educating communities about dangers to health, and embracing change.

*2. Focus on the key role of women in hygiene education and the management of water delivery systems.*

Women need to be placed in charge of the management of water delivery systems because they are often responsible for water collection in rural settings. This is known as the “gender approach” to water and sanitation projects. This approach may be problematic in settings where males make all decisions and are seen as the owners of all property in the community. Project managers do not want to upset any well-established gender roles in the community or undermine men's roles in the society by introducing this “gender approach.” The “gender approach” emphasizes that women should not be seen as competitors, but rather as helpful agents

in the effort to combat diarrhoea in children.

*3. Educate communities about the causes of diarrhoea and the importance of ORT, hygiene and breastfeeding.*

Hygiene education is needed to introduce the community to the fact that there is a link between water quality and diarrhoeal disease in their children. WAWI should conduct a thorough analysis of local beliefs about diarrhoea and its link to water. A community spokesperson, preferably a woman, would be invaluable in relaying local beliefs to the project manager and help with the education of the community. Simple practices such as washing hands with soap before preparing food and after an evacuation should be targeted towards women. Educating women and children about diarrhoeal transmission may be difficult in a community that is largely illiterate, but this could easily be addressed using picture diagrams. Peace Corps volunteers could also assist in such projects by serving as translators for these educational sessions. More research is needed on the effectiveness of teaching materials used to transmit health messages to largely illiterate populations.<sup>55</sup> Hygiene education should also involve a thorough assessment of women's views about breastfeeding. The educational programs should strongly advocate women to breastfeed. This is particularly important in light of the fact that infant formula companies are rapidly targeting women in Africa, and infant formula is increasingly being seen as an empowerment tool for women.

In addition to preventative hygiene education, it is equally important for there to be education about treatment of diarrhoea, specifically ORT use. Current WHO/UNICEF recommendations call for increased fluids and continuous feeding of infants (IF/CF) during a diarrhoea episode.<sup>56</sup> Because ready-made ORS are not always readily available, WAWI should

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<sup>55</sup> G. Laverick, et. Al., "Participatory Learning Materials for Health Promotion in Ghana - A Case Study," *Health Promotion International* Vol. 12 No. 1, 1997, pg. 26.

<sup>56</sup> <http://www.childinfo.org/eddb/Diarrhoea/progress.htm>

compile a picture list of local foods that can be prepared and fed to children with diarrhoea. Feeding recommendations should be compatible with foods available in the community. It is important that the foods selected be energy-rich, low bulk, soft, and partially liquid.<sup>57</sup> WAWI should seek the help of Peace Corps volunteers to customize these lists for each community. Peace Corps volunteers would once again be extremely helpful because they are currently very involved in rural settings in West Africa. They travel alongside traditional midwives in villages encouraging local women to seek primary care when their children are ill. They would be critical forces in educating women about detecting serious cases of diarrhoea, overseeing the proper making and use of ORS. WAWI could use Peace Corps volunteers as record keepers of ORS use rates. In addition to compiling a recommended home foods list, Peace Corps volunteers would also be extremely helpful in assisting local women in establishing local soap production using ingredients available in the environment. Soap production could potentially be a source of revenue for these women, and serve as their own financial contribution to the establishment of rural water and sanitation systems.

*4. Create committees to distribute responsibilities and ensure accountability.*

The WHO has found that too often project managers fail to acknowledge that within a given community, there are marked differences between members such as gender role differences, differences in education, and differences in occupation. Acknowledgement of these differences is necessary when delegating responsibility for various tasks. The formation of committees is the key to successful implementation of any rural community water project. The number of committees formed would be a function of the community's size. Table 4 provides a list of all the possible rural committees that could be formed. The committee members should be democratically elected by communities; they should be encouraged to reserve a certain number

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<sup>57</sup> [http://www.who.int/child-adolescent-health/New\\_Publications/CHILD\\_HEALTH/](http://www.who.int/child-adolescent-health/New_Publications/CHILD_HEALTH/)

of seats in each committee for women seeing that they are the main water handlers in families and communities.<sup>58</sup> The committees are crucial because they delegate responsibilities to various groups in the community, thus promoting accountability.

Two committees that are central to the demand-responsive approach are the financial committee and the training committee. The financial committee's main role would be to discuss financing options with the project manager in order to assess what level of facilities the community is willing and able to build and sustain. Typically, communities are expected to contribute 5 -10% of the capital cost of the new water system.<sup>59</sup> They are also responsible for all recurrent costs of the system, rehabilitation expenses as well as maintenance. For an example of water system costs see Table 2. In order for communities to be able to sustain water delivery systems, a training committee must be created to oversee the training of local artisans, carpenters and plumbers so that they will be able to make minor repairs to systems. Because the committees will be well involved with the project manager, the water delivery systems will not be so technologically advanced that they would require expertise beyond what is locally teachable.

The DRA's financing schemes have encountered some difficulties in poor rural areas, especially with the collection of revenues needed to sustain water supply facilities.<sup>60</sup> Many times rural communities claim that they are unable to fund the installment of water supply systems. However, researchers have argued that the problem often does not lie in an inability to provide funds, but rather in the mismanagement of funds by the community.<sup>61</sup> The Ghana Community Water and Sanitation Project suggested establishing a fund for local communities. Such a fund

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<sup>58</sup> Women and Family Health, Dialogue on Diarrhoea **Online** Issue 30 - September 1987, pg. 1. Accessed at <http://www.rehydrate.org>

<sup>59</sup> G.A. Yanore, "Ghana's Rural Community Water Management." 1994. Rural Water Supply Unit Quarterly Report, March 1994. Pg. 136

<sup>60</sup> F. Dahito, "Managing Maintenance in Benin's Village Water Systems," presented at the Community Water Supply and Sanitation Conference May 5-8 1998 The World Bank Washington, DC

<sup>61</sup> [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf)

would be based upon contributions from the community, and gathered by the finance committee members. The value of financial contributions from the community is not as important as the fact that these collections would help to enhance a sense of ownership. The rest of the fund would have to be supplemented by the private sector. Both the committee and the project manager would manage the fund. Governments would be particularly helpful here in seeking private sector donations. If private sector organizations are informed by national governments that the fund also receives contributions from local community members, they may have a greater incentive to donate money because they would realize that the communities are not just passive recipients of their benevolence.

Rural communities have also had difficulty acquiring supplies for the installment of their water delivery systems because distributors were located in larger cities and towns. These suppliers were often unwilling to procure the supplies in rural areas because of the lower demand there. It is important that the service providers advocate for the establishment of distribution centers in various districts and the donated supplies should be given to local traders who would in turn sell them to the various communities in need. National governments would be greatly helpful in facilitating this process. Creating contracts between service providers in cities and local carpenters and technicians would serve as an additional source of revenue in rural areas, and part of the income gained from such a contract could be contributed towards the water delivery and sanitation systems' fund. In the case of WAWI in Ghana, Mali and Niger, the WAWI partners are providing most of the supplies, thus the contracting would occur between WAWI partners and the locals.

*5. Establish evaluation criteria to measure WAWI's success.*

The ultimate indicator of WAWI's success with the DRA is the incidence of diarrhoea

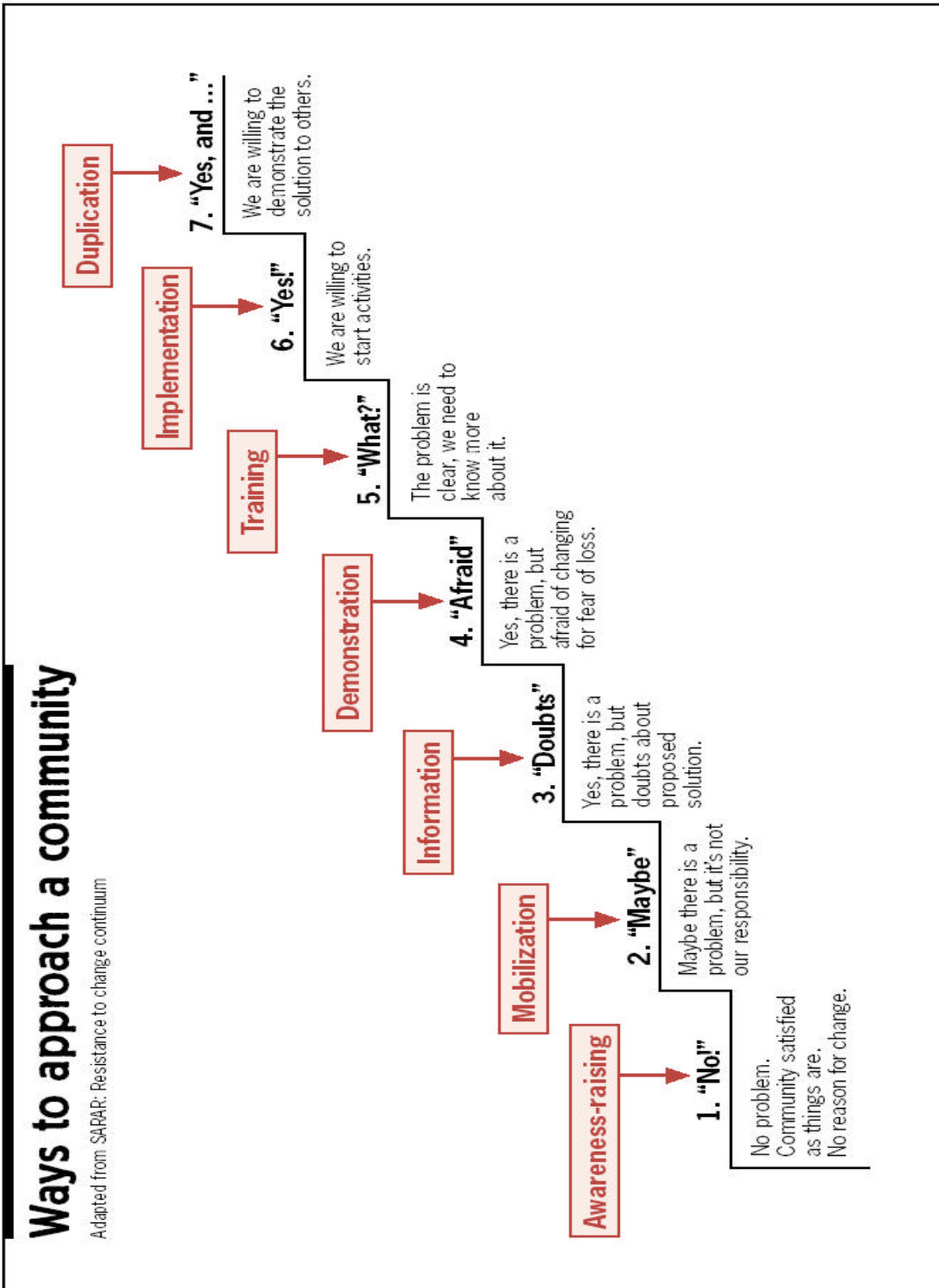
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cases reported amongst children, as well as the infant mortality rates of diarrhoea. Monitoring would preferably be conducted as a joint effort between WAWI and Peace Corps volunteers. At the end of every month, data collected by Peace Corps volunteers should be given to WAWI project managers who would then compile monthly reports. In addition to measuring success in terms of health outcome, it is also important to monitor the conditions of the water delivery and sanitation systems. Records should indicate the number of pumps still working, the cleanliness of the areas surrounding the water sources, and the conditions of latrines. A final indication of how successful the DRA has been would be to track the amount of community participation in the project, particularly the involvement of women. Results from the monthly reports should be shared with communities in order to prove to them that they are indeed empowering themselves and making valuable changes in their lives. Being told that they are helping to save their children's lives would serve as a powerful incentive to continue to sustain their water and sanitation systems.

## Appendix

Figure 1: Approaching Rural Communities<sup>62</sup>



<sup>62</sup> [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf)

**Table 1: Recommended Solid Foods**<sup>63</sup>

Soft Rice	Milk and Sugar	Rice Pudding	Ripe Banana
Ripe Papaya	Boiled Potato	Mixed Vegetable Soup	Fruits
Egg	Fish	Chicken	Green Coconut Water

**Table 3: Sample Water Costs**<sup>64</sup>

Handdug well with bucket	\$60
Handdug well with handpump	\$100
Boreholes with handpump	\$250
Pipe systems	10% of cost

<sup>63</sup> <http://www.icddrb.org/manuals/manual.html>

<sup>64</sup> Yanore, G.A. "Ghana's Rural Community Water Management." 1994. Rural Water Supply Unit Quarterly Report. March 1994. Pg. 136

**Table 2: WAWI Partners**<sup>65</sup>

<b>USAID</b>	will help strengthen the integrated water resources management orientation of the initiative through support to livelihoods and income generation, policy and enabling environment, gender mainstreaming, and hydrologic information management in both rural and peri-urban settings.
<b>World Vision</b>	will be responsible through its regional water and sanitation technical team in Ghana for the installation and management of all Hilton-funded borehole interventions, modeled on its 12-year Ghana Rural Water Project.
<b>UNICEF</b>	will support the capacity building of rural water supply programs at the national and sub-national levels and will introduce school sanitation and hygiene education programs in Ghana, Mali and Niger.
<b>Desert Research Institute</b> (Nevada)	will train technicians in all three countries in the science of locating water, and analyzing hydro-geologic data and water quality.
<b>Winrock International</b> (Arkansas)	will field test and introduce micro-irrigation systems among small farmers in Ghana.
<b>WaterAid</b> (United Kingdom)	will improve water resources for the urban poor in Bamako, Mali, where fewer than 40% have access to running water, and hopes to assist in providing rural sanitation facilities in Ghana.
<b>Cornell University's International Institute for Food, Agriculture and Development</b> (New York)	will continue environmental conservation and land use planning program in Ghana.
<b>Lions Clubs International Foundation</b>	will carry out yearly month-long campaigns on trachoma (blindness infection) prevention and control in Mali and Niger.
<b>World Chlorine Council</b>	in conjunction with the Vinyl Institute, is donating PVC pipe for wells, chlorine for water disinfection and educational materials on sanitation and hygiene.

<sup>65</sup> <http://www.usaid.gov/press/releases/2002/pr020820.html>

**Table 4: Possible Committees**<sup>66</sup>

## Forms of community management

The forms of community management vary according to the size of the community, the technology used, the local context, and national legislation. Basically, community management operates through a Committee whose members are elected by a General Assembly of users. The following forms can be found:

- **Tap or Neighbourhood Committee**

Responsible for operating and maintaining a specific water point.

- **Water Committee**

Responsible for all activities (managerial, operational, technical and financial) of a particular scheme, which covers a larger area than a neighborhood and possibly the whole community.

- **Village Association**

Responsible for all development activities concerning the village, and includes overseeing water and sanitation.

- **“Coordinating” Water Committee**

Responsible for managerial and financial matters and coordination of several smaller committees (tap/standpost or neighbourhood committees), which retain responsibility for operation, maintenance and collection of fees.

- **Water Committee contracting a private body**

Responsible for general management and control, but contracts a private body (an individual, a mechanic, a group of artisans, or a firm) to operate and maintain the system.

- **Delegated responsibility by local authority**

Ownership and decision-making are held by the local authority, while the water committee operates and manages the system.

- **Inter-community Federation of Committees**

When several communities share the same pipe source or water source, each community has a water committee to operate and maintain its own water point and collect fees, part of which goes to an Association or Federation of Committees for maintenance of the whole system (pipes, source).

<sup>66</sup> [http://www.who.int/water\\_sanitation\\_health/wss/O\\_M/RuralPart2-3.pdf](http://www.who.int/water_sanitation_health/wss/O_M/RuralPart2-3.pdf)

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