

Improving Water Systems: Well Installation in Kenya's Deserts

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Executive Summary

3.3 million Kenyans are experiencing hunger issues due to lowered production as a result of drought. Rainfall is often sporadic, and travel between wells can reach 25 miles, usually accomplished by simple foot traffic.

Improving Water Systems: Well Installation in Kenya's Deserts, addresses the growing concern of water shortages in Kenya that result in decreased quality of living, lower life expectancy, poor drinking water, excessive travel for low quality water, unhealthy livestock, and limited crop production.

The Kimlocke and Merrueshi villages have been chosen because they represent villages experiencing great turmoil from ongoing drought. Both villages are situated in an area that receives little rainfall, and few to no wells, requiring extensive travel.

The proposal allots money for cattle in each village in the Maasai area. A breed of cattle, commonly referred to as "Maasai" cattle, will be provided. Because cattle are the focus of the Maasai tribes and the primary contributor to their livelihood, it is important that they are large, well muscled, and high producing/yielding.

The project seeks to identify areas in Kenya with significant drought issues in a populous area through utilization of a complete and accurate country profile. Knowledge of geography, culture, and governmental structure will play vital roles in implementing the project designed to provide humanitarian aid to Kenyan farmers.

Improving Water Systems: Well Installation in Kenya's Deserts will improve Kenyan agriculture and life through development of a series of wells in Kimlocke and Merrueshi villages, with access provided to the nomadic Maasai. Full access will be granted to each village and/or tribe, provided problems do not arise.

The project will partner with organizations possessing similar objectives and adequate finances to assist in the overall success. The United States government, in conjunction with the Kenyan government, will assist in financing and monitoring the program. The Clearwater Idaho Aid, Portadown College, The University of Idaho, and the Outreach Foundation will collaborate to form a strong union of resources.

The aforementioned organizations will assist in funding Improving Water Systems: Well Installation in Kenya's Deserts. A detailed budget is provided.

Installation of two wells in Kenya's deserts will lead to several outcomes, including increased small field production, healthier livestock, healthy people, increased water conservation, and the potential for expansion.

Evaluating the project is an essential portion for ensuring overall success and predicting future growth and development. Several experts from fields associated directly with the project have been assigned to evaluate specific issues based on goals further outlined in the proposal.

***The two villages are located in Southeastern Kenya, in the Kajiado District, along the Tanzania/Kenya border.**



Agricultural Development and Country Profiles

The project relates to and draws upon the content of the country profile in that the climate of Kenya is suitable for a project of this type because it is mostly desert area that does not receive much rainfall. The geography of the country also suits this project in that the villages are very spread out throughout the country, but there tend to be several in a given area.

Unlike most governments in less developed countries, the government of Kenya is not a corrupt government; they strive to help make Kenya a better place to live. The government of Kenya is usually very helpful when it comes to organizations that want to help their country improve the life of its people. The project will be able to be completed with their help, and not be burdened with the fight over power that may arise if they were not supportive of humanitarian efforts.

Stories have been told of the willingness of the Kenyan people to get involved in projects designed to improve the quality of life in Kenya. The Outreach Foundation, one of the project's partners, tells of Kenyan people getting involved in a development project, digging trenches enabling water to be brought to the villages. Before this, the women of Kimelok, deep in Maasai Land, would have to walk 12 miles one way to get water every day of their lives. With the new trench, they only had to walk five miles to get water. The goal of this individual project is to eventually bring water to the villages.

The Maasai Association installed an electric well in the Merrueshi community, and the elders helped dig trenches to transport water from the well to the school compound. They lined up the pipes along the trench, and buried it after the pipes were glued together. The people were very excited to get this well in their community and wanted to

help in any way they could.

Goal

The goal of this project is to improve the quality of Kenyan life by improving drinking water quality and availability for livestock and people. When the drinking water is poor, (ex: fecal matter present), people become sick, as do the animals. There are also communities that have to travel long distances to reach their water, forcing both people and animals to travel.

An example, provided by the Maasai Association, identified the Merrueshi community, prior to their new water system, as a society experiencing such a problem. Cattle from the Merrueshi community used a water system located 15 miles away from the community. Cattle are the main source of livelihood to the Maasai people, and when the cattle are undernourished, the Maasai people are also malnourished. Healthy cattle mean adequate food supply, school fees for Maasai children, and good health. This will help to reduce diseases and death rates due to drinking water while improving the life of the people of Kenya.

Timeline

The timeline for this project will be five years. The group will begin the project by researching and collecting sponsorship from different agencies. During the second year, all of the equipment used for the project (drilling well, pipes, etc.) will be used in Kenya. Also, the drilling the wells will begin and the water will be sampled to ensure that it is safe to drink. After being in Kenya for three years, the two wells will be in place and running efficiently. Over the next two years, the wells will be maintained while

being tested every six months to monitor the safety of the water. Throughout the five years of this project, the Kenyan government, will take water samples and evaluate the progress. A staff member will also travel to Kenya once every two years, or as problems arise, to assist in fixes problems that arise.

Objectives

When considering drilling for water in the Maasai, Kimlock, and Merrueshi territory, attention must be drawn to the rights of these groups and overall the benefits that well drilling will bring to these indigenous people. When implementing a project of this magnitude and overall size, analyzing the overall outcome of the project is imperative to its success. Thus, objectives must be formed and followed in order for the project to gain knowledge about its success. After analyzing the importance of this project, and considering the needs of these people, objectives have been clearly formed and are in place to see that the project is a success. The objectives are as follows:

1. The Merrueshi village will have full access to wells with water that is suitable for drinking, in a section of the 960,000 square kilometers that they inhabit by five years from the start of the project.
2. The Kimelock village will have full access to wells with water that is suitable for drinking, in a section of the 960,000 square kilometers that they inhabit by five years from the start of the project.

3. Both groups will see the benefits of the well project, and will be able to maintain the wells and operate the wells on their own without outside resources after a seven year period from the project start date.

In more depth the Merrueshi village after five years will have full access to wells in a portion of the 960,000 square kilometer area that they inhabit, for their personal use. Secondly, the Kimelock village, after five years, will have access to wells in a portion of their inhabited land that they may use to better their personal living arrangements. Thirdly, both villages will see the benefits of the wells, and will be able to maintain the wells and operate the wells solely and independently after a five year period. Through these objectives the hope is to initiate success in these areas and to allow for these villages to have clean efficient drinking water that has no true cost to them.

The first and second objectives as stated above shall be implemented after a period of five years and will have follow up periods of up to two years. This is, of course, after exhaustive research has been done and after both the Merrueshi village and Kimelock village have voiced their opinions about the needs of their personal communities. Not only will consideration be given to both inhabitants, but, consideration will also be given to the area which exhibits the most need and will benefit from the wells the most.

Other issues such as land development, natural wildlife refuges, migrant populations, and government policies will also be considered when accomplishing this objective. Not only is it planned that both of these villages have active sources of water for years to come, it will also bring in new attention to these areas which will lend itself to development and allow both villages to gain a better lifestyle for their people.

Through this objective, both of these populations will be able to also better their livestock, by having a water source that they can water their livestock from. This does not mean that these water sources will be solely used for agriculture and the development of their agriculture, but the water source will be concentrated for the use of sustaining human life.

Thirdly, once wells have been set up and are functional for both communities, there will then be a training period that will give members a chance to learn how to operate the hand driven wells, while also teaching them how to maintain the pumps. This is one of the most important objectives because it gives an opportunity for the community members to take ownership of the new town well. Along with providing ownership and giving members' accountability for the operation of the well, the training process will also provide the people with a chance to maintain the wells. This is extremely important because once the wells have been installed they will need to be maintained by someone other than the installer.

The main objective is to be in these areas for approximately five years, thus, if both sets of people can take accountability for making sure that the wells are maintained, then investor groups will not have to come in as much to make sure that the wells are functioning and operating as planned and will only need to check back every six months for the first year and once more after that for the next year. Once both communities have taken ownership of the wells, then they will from this objective be able to properly maintain and operate the machinery. Although, the wells will be fairly simple, and will not require any electricity, there will still be some technicalities in making sure that the wells are well maintained.

All of these objectives will be accomplished through a tremendous effort to gain funding and trust. Trust, of course, must come from the tribes and communities in which the group wants to help. While funding which is discussed later in this paper, is absolutely imperative to the success of the project. Through hard work and dedication, both of the communities will be given the opportunity to have a safe and active water source. They will also be able to maintain and operate the fully functioning wells. All three of these objectives are imperative to the success of the project. By focusing the project, the successes will be goal oriented and of significant magnitude.

Partnerships

Drilling wells in Kenya will not be possible without the help of many partners and community members. University of Idaho students are attempting to help improve the available fresh water in Africa, our group wants to join with others that might be doing the same. The Clearwater Idaho Aid, students from the University of Idaho, in both the College of Agricultural and Life Sciences and the College of Engineering, are willing to take part in this project.

According to the campus engineering website, engineering students have been working to improve the quality of drinking water through the development of a bio-filter. This would use local materials to filter out contaminants that are both biological and natural particles. They have already traveled to the outskirts of Nairobi and Kenya to work with the Maasai Tribe and to see what further developments can be made to improve the filter quality, such as making the filter more travel-friendly for these tribes. Through partnership with this team, insight can be gained in the areas that were

strengthened on their travels. Collaborating with them will assist in supplying fresh, safe water to the people and tribes of Africa.

Clearwater Idaho Aid is also working with The Outreach Foundation of the Presbyterian Church Inc., based out of Franklin, Tennessee. The Outreach Foundation has helped in a wide variety of areas around the world, but has the most extensive knowledge working with the people of Africa. Functioning with this group will allow funding to be received for the projects that will undergo completion. In the past, the team has spent \$20,000 on one water project that helped reduce the walking distance for the tribal women and children. The Outreach Foundation will be used as a source of funding, as well as for their resources, including; knowledge of the area of people, and larger equipment that they possess. This will help with the large budget that is currently needed to make this project more affordable and eye appealing to the public.

Portadown College, University of Idaho Geological Services, Kenya and the United States governments are groups that could better the focus and help reach the goals of this development. Currently, the Portadown College is working to build schools in which rural African children can attend. The goal is to help increase the literacy rates of these outlying areas that do not have access to schools. Hopes are that with the combined effort of both groups, there will be a school that will have water amenities nearby.

The group is working with University of Idaho Geological Services to help identify areas that will have a lasting and good water supply that will support these tribes for a long term time span. Finally, the group will work with the United States and Kenya governments to see what funding is available, and if any troubles arise, to make sure that the group is able to return home safely.

According to The Outreach Foundation website, “water is a precious commodity in East Africa. In remote areas of Kenya, women and children spend an average 40% of their time collecting and fetching water. If they had water close by, that time could be spent going to school or on more productive endeavors. In the village of Kimlock, deep in Maasai Land, the women walk 12 miles one way for water.” It is important that these people are able to get an education so that they can be more productive in the future, and with the group’s attempts, this can be achieved.

Within this non-profit organization, individuals are divided to better undertake some of the tasks that need to be accomplished. At this time, partnerships with several different groups that are going to help build understanding of the area have been developed. The group is working to add to that list to expand the expertise, so that there will be experts in each area and to look for groups that can aid with funding for this project.

Activities

A. Continuous development of more partnerships

1. Bring groups from all aspects

II. Areas of Interest

1. Kimlock
2. Merreuishi

B. Work with geological services to find locations within our areas to drill and develop a ‘watering-hole’

1. Locations have a good, consistent water supply
2. Locations have the potential to have clean and safe water

3. Areas has been evaluated for time during drought

C. Drill Wells

1. After dependable location are found drill wells
2. Install proper equipment
 - a. Little maintenance
 - b. Low maintenance costs
 - c. User friendly

III. Evaluations (discussed later)

Funding

The project will be funded through several different organizations. The United States government will be the primary funding agency. America's government will be willing to help with African aid because of the relationship that the United States and Kenya have developed in terms of humanitarian aid. This can help the United States by allowing them to also enter into better trade situations where more products could be shipped to Kenya.

Next, the Kenyan government will be looked to. In the past, as well as currently, the Kenyan government has been encouraging the Maasai tribe to become less of a nomadic society. The group believes that the Kenyan Government will see well drilling as a possible way to promote their idea of more farming. This is also a project that will directly help and affect Kenya.

Another partner that will be involved with the incentive of funding is the Outreach Foundation. This is a foundation that has Presbyterian roots, but is also looking to provide clean water for Kenyans. The joint efforts will be an effective way to promote

agriculture. The Outreach Foundation is actively looking for ways to provide high quality water, and the two organizations will be very excited to work with each other.

The group will also be working with the University of Idaho geological services and the University of Idaho College of Engineering. Two entities for laboratory testing, as well as the clean water aid group that is currently working in the College of Engineering on developing a way to create clean water from dirty water for Kenya will also be involved. The goal is to apply for joint funding through grants and philanthropy organizations to receive more money, allowing for the two projects to expand.

Budget for implementation of Well Drilling Project:

<i>Items</i>	<i>Cost per Unit</i>	<i>Units Needed</i>	<i>Total Cost</i>
House Rental	\$ 200,000.00	1	\$ 200,000.00
Hotel	\$ 600.00	30	\$ 18,000.00
Transportation	\$ 60,000.00	2	\$ 120,000.00
Shipping	\$ 150,000.00	1	\$ 150,000.00
Well Driller	\$ 300,000.00	1	\$ 300,000.00
Specialists	\$ 50,000.00	8	\$ 400,000.00
Wages	\$ 200,000.00	6	\$ 1,200,000.00
Translator	\$ 50,000.00	2	\$ 100,000.00
Food	\$ 25,000.00	1	\$ 25,000.00
Airline Travel	\$ 2,500.00	25	\$ 62,500.00

Cattle	\$ 1,000.00	100	\$ 100,000.00
Geological studies	\$ 20,000.00	2	\$ 40,000.00
Lab Fee	\$ 5,000.00	2	\$ 10,000.00
Medical	\$ 10,000.00	1	\$ 10,000.00
Pump/special casing	\$ 1,000.00	2	\$ 2,000.00
Piping	\$ 15,000.00	2	\$ 30,000.00
Research	\$ 200,000.00	1	\$ 200,000.00
All money is shown in United States Dollars			\$ 2,967,500.00

Additional information on budget items is provided:

The first expenditure is the cost of renting a house that will have enough room for everyone to stay for five years. The main group of six will stay all five years and the others will be a little more intermittent, depending on when they are needed. This project will also require some time in hotels as travel is required to and from our rental.

Instead of renting vehicles, the group will be purchasing them in the United States to ensure that vehicles are safe, well maintained, and best suited for their cause. The equipment will be shipped by merchant vessels, and the space needed for accommodation has been provided for. The well drilling rig that will be purchased is a used 1998 model that is in good operating condition.

Being in a foreign country, translators will be required. Two individuals will be hired to translate to allow for the group to split up and still accomplish goals.

The group's major cost comes in the next sections. Wages, specialists, food, and airline travel are a very large expense. The two hundred thousand that is allotted to each of the six team members is shown as a one time cost, however, it will be paid out over a five year time which breaks down to a \$40,000 wage. Some specialists will be brought in to document our geological findings. To review and evaluate the work, someone who is knowledgeable in each field will be brought in so they can properly evaluate progress. Because of these people, and the six in the group, several plane tickets will have to be purchased for transportation.

The \$100,000 that is being spent on cattle is being done so that a good working relationship with the Maasai tribes and villages can be built. The Maasai tribe and surrounding villages value cattle, so by giving each tribe fifty cows, a great base will be built. The next cost is to cover the geological laboratory fees and to research and provide information on the water tables and exact location in the village to best place these wells.

The most inexpensive item budgeted for is the pump itself which is a hand pump that can be run off a solar powered battery unit in cases where large amounts of water are needed in a short period of time. Overall, the budget is to be estimated at \$2.97 million.

Expected Outcomes

Improving Water Systems: Well Installation in Kenya's Deserts is a program designed to improve the Kenyan quality of life within two villages facing extreme drought. Through well installation, the following will be achieved:

1. Increased Small Field Production
 - a. Through installation of two wells, Kenyan farmers will gain access to water available for limited irrigation of crops in small fields of production

- b. Increased small cropping will lead to Kenyans with less nutritional deficiencies and higher life expectancy
- c. Allowing growth of small farms empowers Kenyans by allowing a higher level of sustainability
- d. Allowing growth of small farms empowers Kenyan women by providing an outlet for social interaction and tangible productivity

2. Healthier Livestock

- a. Kenyan farmers gain availability to a clean water source for livestock purposes
- b. Livestock are healthier, more productive, and live longer
- c. Kenyan's gain the ability to trade, transport, and better manage all livestock in possession, with the option of expansion

3. Increased Health for Children and Adults

- a. Cleaner, more available, drinking water will result in a decrease in water born illness, one of Kenya's largest problems
- b. Dehydration will be significantly reduced
- c. Problems associated with transport of water (long distances on foot, extreme weather conditions, etc.) will be eliminated, leaving Kenyan's with more time to focus on profitable endeavors

4. Kenyan Water Conservation

- a. Though no formal education program will be implemented, over time, Kenyans will naturally develop a working knowledge of water conservation associated with their specific farming practices

5. Potential for growth

- a. Kenyan farms, livestock operations, and villages will experience growth as a result of an increased quality of life
- b. Well installation has the potential to expand to include additional Kenyan villages if later evaluations show success.

Assessment and Evaluation

Improving Water Systems: Well Installation in Kenya's Deserts will be carefully evaluated to assess use of monetary donations and overall effectiveness with the potential for growth.

The project will be evaluated utilizing the following:

1. Representatives of the project will be sent every 6 months to villages utilizing wells installed by the project
 - a. An individual specializing in each of the following will perform the evaluation:
 - i. Water conservation
 - ii. Sustainable farming
 - iii. Health care
 - iv. Animal Science
 - v. Economics
2. Evaluations will be based on:
 - a. An increase in small farming
 - b. Efficient use of well water
 - c. Improved standard of living

- d. Higher moral
- e. Healthier livestock
- f. Steady, even, achievement of goals
- g. Kenyan ability to develop and achieve goals
- h. Quality of wells and well installation
- i. Water quality testing monthly for first year

If the project is determined to have met goals and objectives, and has begun to achieve the expected outcomes, the project has the potential to continue and expand. If the project is not successful, measures will be taken to improve the situation and meet the needs of Kenyan farmers. Potential problems and solutions might include:

- 1. Lack of Water Conservation
 - a. Solution: Formalized education
- 2. No change in small farming
 - a. Solution: introduction of new crops, new farming techniques
- 3. Social problems stemming from water disagreements
 - a. Installation of additional wells

Improving Water Systems: Well Installation in Kenya's Deserts is designed with the idea that growth will occur someday, eventually initiated by Kenyan efforts. Evaluating the success or failure of this project is essential in solving the drought Kenyan's continue to face as they further develop their agricultural systems.

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