

# **Eorr Emaiyan Water Report**

Prepared for Rotary International

Written by Prescott College in Conjunction with MERC

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## **Executive Summary**

This report was created by Prescott College students in conjunction with MERC (the Maasai Institute for Education, Research, and Conservation) and the community of Eorr Emaiyan in order to provide information to Rotary International on the impact of the Eorr Enkitok water project which is scheduled to be completed by December 2014. Our research will provide a baseline for future yearly surveys beginning in June, 2015, in order to understand the effects of clean water on the quality of life in Eorr Emaiyan. This research also offers more general information about the meaning of sustainability in the context of similar water projects in other communities. The report is divided into three sections. The first presents our research methods, the second describes the current issues as expressed to us by the community, and the third outlines the ways in which the community will ensure the sustainability of the water project. Finally, an appendix contains full transcripts of each interview and a map of Eorr Emaiyan.

During the course of our research, a few key points stood out; these points arose out of our conversations with individual families and speak to the hardships this community has endured for many years as a result of poor access to clean water. In Maasai communities women bear the brunt of the water scarcity, walking many kilometers daily in order to retrieve the small amount of water that is stretched toward every necessity, including cooking, washing dishes, bathing children, and keeping young livestock alive. After many years of carrying twenty-liter jerry cans of water, the women develop severe back pain, as well as indentations in their heads from the straps on the jerry cans; but these are only outward signs of the daily struggles that are often internalized. The responsibility of the water weighs heavily on their consciences, and they are reminded of it constantly; they are unable to have any respite without jeopardizing the survival of their families. The children are also affected, especially in terms of education. The schools reported high rates of absenteeism, made worse in times of drought. Without water they are unable to provide lunch for the children, who go without food or drink for the ten hours they are at school or walking. This lack of nutrition, along with the lack of hygiene, leads to serious repercussions in students' abilities to concentrate in class and do well on exams, and few are able to continue on to secondary school. Many people in Eorr Emaiyan are afflicted with water-borne diseases; these stem directly from the quality of the currently accessible water. This water, contaminated from chemicals and erosion, and often stagnant and covered in algae, is not fit for human consumption. However, there is no alternative, and consequently the community is plagued by diseases such as typhoid, highland malaria, and cholera.

The community of Eorr Emaiyan has a holistic perspective on sustainability, encompassing the health and resiliency of the people as well as that of the land and water, and this attitude extends to their vision for the water project. The area of Eorr Emaiyan has been part of Maasailand for many years; Maasai people are traditionally pastoralists, and treat land as a "commons" that is used by the entire community. Because of this, the community understands that many of their current water problems are a direct result of land use changes that have occurred over the last 100 years. They have repeatedly expressed a need to care for the "source" of the water, Mau Narok, the heart of their watershed in the north of the county. Previously part of Maasailand, Mau Narok was taken by colonialists and has since been converted into chemical-intensive, large-scale agriculture, the runoff from which pollutes the two rivers that make up

their only source of water. When talking of the future, the people of Eorr Emayian have plans for regenerating the riparian areas in the community through a reforestation project, one of the many community initiatives that will be able to commence in full once the water is in place.

The community of Eorr Emayian experienced a failed water project in 1975, a government-funded project that neglected to include the community at any point during the process. As a result, the water project did not adequately meet the needs of the community and they felt no ownership, which led to the project's failure three years later. Because of this, they understand how to avoid failure in this current project, and are doing everything in their power to make it sustainable for many years to come. This commitment to sustainability is apparent in the way they have organized their management committees (an umbrella committee as well as cluster committees for each village, in which class and gender are equally represented). They have also repeatedly expressed a need to ration the water so that it will not be wasted and everyone can have equal access. Despite their hardships, the community of Eorr Emayian has held a clear vision for the newfound water. For instance, the schools have plans to create boarding facilities in order to offer students better education, as well as a polytechnic—a vocational college—for those students who are unable to go to secondary school. There seems to be no end to the community's ideas for positive development in the years to come, once the water project is established and the energy of the people is no longer exclusively consumed by current water problems.

Sincerely,

Julia Glennon, Eleanor Healy, Angela Hewitson, Charles Lazarus, Sasha Timpson

Narok, Kenya. July 18, 2014

*“Thank you, we have been waiting for a long time and thought that maybe it wouldn’t happen.*

*Now we are having faith that things will continue with the project. The water will bring a reflection of change in this community. The water now is very dirty because of dust and because of the plowing it is not fit for consumption. A huge problem is that the water is very far for the livestock to walk. Other people are not at this meeting because they are currently struggling to find water. Now there will be an alternative and we can get water for the community.”*

Nasheluni Ene Sedera, community member.

## Introduction

The area of Eorr Emaiyan has traditionally been occupied by the Maasai people. The Maasai are pastoralists who depend on their livestock—cattle, goats, and sheep—to support their livelihoods. They share large swaths of land to graze their animals and have complex kinship systems in order to maintain the health of the community and the land. Like indigenous peoples all over the world, Maasai employ the philosophy that “people must look after the land so that the land can look after the people.” They have always understood the relationship between water, soil, animal, plant, and air health and that of their people and culture.

During Kenya’s colonial era, a substantial amount of land was taken from the Maasai people and redistributed to European settlers. When Kenya established independence in 1963, much of this land was transferred to central Kenyans who had allegiances to the new governmental figures. These land grabs forced Maasai populations to move closer together. Among these land confiscations, the Maasai lost a big portion of their land within the Mau forest. This piece of land was of particular importance to the community because they used this area as a drought reserve, meaning that they would only take their livestock to graze this water-rich region during times of severe drought. They also recognized that this area was the source of the watershed on which they and their livestock depended. However, once this area was taken from the Maasai, it was subsequently used for massive agricultural production, mainly chemical-intensive monocultures of corn and wheat. The entire watershed has felt the repercussions of these changes in land use.

The people of Eorr Emaiyan, formerly Eorr Enkitok, mainly source their water from two rivers that find their origins in the Mau Forest. They have seen the quality of water coming from this region degrade exponentially as rapid deforestation makes way for expanding agricultural practices. This water serves five villages, two primary schools, an orphanage, and numerous churches in the community, all of which are suffering from various issues related to the lack of clean water. Because of the dire state of these rivers, representative members of the community formed a proposal for the drilling of a borehole in this town, and presented it to Meitamei Olol Dapash of MERC (Maasai Institute for Education, Research, and Conservation). MERC brought the proposal to colleagues in Rotary, in Arizona and North Carolina, as a recommended new joint project; MERC and Rotary have collaborated on two previous large scale water projects in Erusiai and Mosiro, both in Narok County, Kenya. From the start, this community has taken the initiative to implement this project in the most sustainable manner, and in a way that will uphold the cultural values of their people. This past June, the Rift Valley Management Authority of the government of Kenya came to the borehole site and drilled; the government had extra funds to spend before the end of the fiscal year and decided to use it to support this project. The next step

in this process is to build a distribution system that allows the community to access this water at various kiosks and cattle troughs along the main road that runs through this region. That will be done with the funding provided by Rotary, and will be initiated this month.

Eorr Emaiyan, once communally owned as grazing lands, is now made up of individually-owned parcels, whereupon multiple families share settlements and practice agriculture. Although Maasai are traditionally pastoralists, this community has adapted to the advent of private land ownership by planting small kitchen gardens, called *shambas*, and growing wheat and corn as a form of income. This money is often used to pay for children's school fees. Because the influence of the market economy is growing in this region, Eorr Emaiyan has seen more development than other parts of Maasailand. However, positive development is hindered by the fact that clean water is inaccessible to the members of this community.

The purpose of this report is to communicate the hardships felt by this community from a lack of clean and accessible water. This data will provide a framework for which to compare with future surveys on the quality of life for the residents of Eorr Emaiyan once they are benefiting from this new source of water. This and subsequent reports will become resources to help us understand how exactly the community is benefiting from this water project and will be used as a tool for the implementation of future water projects in other communities. This report is outlined into two major sections, preceded by an explanation of our methods and research strategies. The first section presents the community-expressed nature of water-poor realities. The second section outlines the ways in which this community will ensure the sustainability of this project since sustainability is both a priority of Rotary International and the people of Eorr Emaiyan. Finally, an appendix section contains full transcripts of each interview and a map of Eorr Emaiyan.

## Research and Methods

This report was built on a partnership between Prescott College, MERC, Rotary International, and the community of Eorr Emaiyan. Our research team was made up of Prescott College professors Mary Poole and Pramod Parajuli, and five undergraduate students, Eleanor Healy, Angela Hewitson, Charles Lazarus, Sasha Timpson, and Julia Glennon. This research team was instructed and accompanied by Project Manager Charles Ole Takai, and Water Management Committee members, Chairman Ole Kisuuna and Secretary Pastor James Ole Mailugo. Ole Takai is currently the Program Manager for MERC's community water projects, and has many previous years of experience working with various NGOs in Narok County, including World Vision, from 1988 to 1996, and Rotary International. Chairman Kisuuna is a retired school teacher from the area of Eorr Emaiyan and Ole Mailugo is the pastor at the Eorr Enkitok AIC church.

The team conducted research over a period of seven days, from the 23<sup>rd</sup> of June to the 30<sup>th</sup> of June, 2014. During this time, the team held interviews with members of the community; these interviews were organized by Ole Takai. While conducting family interviews, the research team was split into two groups and each group was led to different villages in the community. Because there were two separate interview teams, the resulting transcriptions reflect some inconsistencies of this process. The first group visited homes within the Kantai (made up of Kisii, Kikuyu, and Maasai peoples), Ole Karia, and Eorr Emaiyan villages. The second group went to homes within the Olganchemi and lower Rotian villages, which contain the highest and second highest populations, respectively. These five villages make up a large community of more than 10,000 people.

Ole Takai chose to elect the interviewees at random to ensure a wide array of representation. The time constraints only permitted the research team to visit a select number of homes in the community, sixteen in total (see appendices for full interview transcripts). At each of these homes, the research teams asked the following set of questions:

1. *What is the average current daily water use per family? How is water rationed between domestic use and livestock?*
2. *You have had this water problem for a long time, how do you cope with such a problem?*
3. *What are the biggest problems, in your opinion, from the lack of clean and accessible water?*
4. *How does the community describe the quality of the accessible water?*
5. *What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?*
6. *Is the water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?*
7. *Which groups in your community will most benefit from clean water?*
8. *What, in your opinion, would a "sustainable" water project look like in Eorr Emaiyan? What would be mechanisms for sustaining the water project?*
9. *How many water-borne illnesses occurred in the communities in the past year and of what kind?*

These questions were drafted by Mary Poole and were subsequently altered by Ole Takai. During the interviews, these questions and answers were translated by the committee members between Kimaasai or Kiswahili and English. In the course of this translation process, the nature

of certain responses may have been altered slightly, at times resulting in varying degrees of accuracy. The research teams received a warm welcome from most of the families, who offered up tea and food during the interviews. It was in the context of this hospitality that the researchers were exposed to the current water situation at each home.

The research team also interviewed teachers and students at the two primary schools in the community, Eorr Inkitok Primary and J.S. Ole Naeku Primary. On both occasions, the researchers were welcomed by the head teachers and introduced to the teaching staff; the team then proceeded to ask the assembled teachers the following questions:

1. *Number of students enrolled at this school? How many of each gender?*
2. *Will access to water improve education, especially for girls?*
3. *How many teachers/staff? How many are government or parent-supported?*
4. *How does the lack of water affect learning activities in this school?*
5. *How does the lack of water impact the ability of the school to retain teachers?*
6. *What is the main impact of the lack of water on vacancy rates of the students?*
7. *What is the impact of the lack of water on the performance of the school?*
8. *What is the main impact, from the perspectives of the teachers and students, of the lack of accessible water?*
9. *What do you imagine could happen here with water that does not exist now?*

It should be noted that other questions arose in the course of these interviews, and are including in the attached transcriptions. The team also interviewed a group of the top students from classes 5-8, who were selected by the teachers of each school. However, these questions were not previously scripted.

At the end of this week, the researchers also attended a meeting conducted by the Eorr Emaiyan Water Management Committee; this meeting served to further illustrate the structure of this working group and its intentions to sustain the project once the distribution is complete. The research team also conducted a final interview with Rachel Nyanchama Masi about the community's reforestation initiatives.

These compiled interviews contributed to the researcher's overall understanding of the community's dedication to sustaining this water project. The collection of this informative data will help to highlight the progress of this community in subsequent years, as well as future water projects for this and other communities funded by Rotary International.

## **Current Problems**

This section outlines the hardships currently faced by the communities in Eorr Emaiyan from the lack of clean and accessible water.

### **I. Community-Expressed Issues and Needs Related to Water**

The main sources of water are the Siyapei River and the Sikinderr River, which create the east and west borders of the community. Both have their origins in the Mau Forest to the north. The Siyapei River has a greater volume of water and starts in the middle of the Mau agricultural region and is therefore more heavily affected by chemical runoff. Deforestation in this region is leading to increased erosion and chemical runoff into these rivers, which has diminished the water quality substantially. Now, the community is sometimes forced to make use of smaller sources for their water, including dams, wells, and/or rainwater catchment systems. When families become desperate, they may walk very far distances to access clean sources of water, such as a small spring visited by the Sururru family. “We tap the water from a stream and wait for hours while the containers fill up,” says Pauline Sankok. “We go very early in the morning or sometimes at night with a torch; the site is beyond the river. There are lots of people who wait in line for this drip” (Interview 8b).

Families walk various distances to collect the water, ranging from six to twenty kilometers round trip. These trips span between two and eight hours total (see table for more details). If they walk with the children it can take longer. Some families in the community have donkeys, allowing them to carry more without hurting their backs. However, even the families with donkeys often also need to carry water on their backs, to increase capacity or because the donkeys become overworked. Being a communal society, those that do not have donkeys borrow them from those that do. Since the donkeys are highly sought after, finding a donkey to use can be a time-consuming task.

Daily water consumption ranges between 20 and 400 liters per family. However, the majority of families are on the lower end of this spectrum. Out of the sixteen families visited, eleven use one hundred liters or less, and the ones that use more dedicate a larger percentage to their young, old or sick livestock. This number depends on many factors, such as whether or not the family owns donkeys, if they have catchment tanks on their property, and how many people and animals are relying on that water. Usage also fluctuates between the wet and dry season, with considerably more water consumed during the rainy times of the year. For instance, the Sedera family uses one hundred liters during the rainy season and only forty liters during dry season. A portion of this water goes to the livestock who cannot make it to the river (the babies, new mothers, elderly, and sick livestock); the healthy livestock make trips down to the river to drink. The remaining water is rationed between household needs. The household uses consist of cooking, washing utensils, bathing, and occasionally irrigation. Schoolchildren also have to take two to three liters to school with them. Clothes are taken down to the river once a week on Saturdays for washing. It is often cold at the river, so they build a fire to warm themselves while they are washing. Sometimes families also use that time to bathe themselves in the river. Because these families must ration a small amount of water between numerous uses, they cannot

afford to waste one drop of this resource. As it is, there is insufficient water to adequately clean and nourish these families.

Some families have rainwater catchment systems, usually a small tank close to the home. Since the tanks attach to the roofs of the houses, they can only be used by families that have the right type of roof. Families that have cow dung houses often have insufficient roofs to be able to install catchment systems. Catchment tanks are either purchased by the family or are gifted by their church. In most cases, unless a family is well off financially, it is the latter. A family is only eligible for a water tank from the church if they are an active member within the church. Elderly and widowed families are favored. While water tanks keep the water close and clean, they dry up during the drought. One elderly man received a water tank from the church after his wife died, but even then his eldest granddaughter had to drop out of school in order to take care of the family and collect water from the river. This is not an uncommon occurrence of young girls leaving school if the mother is sick or passed away. There are dams that are dispersed throughout the community where families can collect small amounts of water. The issue is that the water in these dams remains stagnant and is not suitable for consumption. Some families have been able to spend time and money digging a well. These range in size and depth. Others will dig deep holes or trenches that act as rainwater catchment systems, and are either used for the people in the household or are designated as troughs for livestock.

With limited access to clean water, numerous health issues are present within the community. Typhoid is the most common of the water-borne diseases. John Koileren Sempele explained, “Typhoid can be found in almost every home because of water” (Interview 4a). Along with typhoid, there is also highland malaria, amoebas, and other stomach problems such as diarrhea, vomiting, and nausea. Many people also develop coughs. When diseases become severe, there is a possibility they will turn into cholera. The small children often suffer the most from water-borne diseases because of the lack of hygiene. Flies are attracted to their unwashed faces which can lead to eye problems. Many of the families prefer to treat water-borne diseases with local medicinal plants, such as the roots from the *olsokonoi* tree, or various bitter herbs. Some women will travel to the Mau Forest to harvest a plant called *eseketek* for its powerful healing properties. They take these herbal medicines in the form of a tea, which they need clean water to make. Unfortunately that often means walking twice as far to find water that is clean enough. Many people respond well to these herbal treatments, but if they do not, they will go to the nearest hospital.

Water purification is not widely practiced in the Eorr Emaiyan community, and many people laughed when the question was raised. As one member of the Sedera household reported, “Maasai don’t boil water” (Interview 4b). This is because many people feel that they have developed an immunity to the water after drinking it for so many years. Those who do boil primarily use firewood, because charcoal is too expensive (500 ksh/bag), and is not always available. Some families boil a small amount of water to be used for drinking. Boiling water adds an additional time and energy commitment to the already busy workday, and many times it is foregone for this reason alone. Nasheluni and Kisyongo Sedera clearly expressed this burden, saying: “Sometimes we boil our water but often times we are just too tired” (Interview 4b). A few families said that sometimes they buy a water purification mechanism called Waterguard, or when the river water is especially bad they may prefer to use bottled water for drinking. Both of these options are expensive, however, so they are purchased infrequently. Many of the families

just let the sediment in the water settle to the bottom of the containers and then pour off the top for drinking and cooking.

The most serious problem that each and every family articulated is the poor quality of the available water. As previously mentioned, the rivers are affected by erosion and chemical runoff from the agricultural production at the source of the watershed. This becomes especially bad during the rainy season, when the rivers are filled with eroded soil and turn muddy. Napolos Kaelo, Nalotuesho Dikirr, and Nashipai Kaelo described this phenomenon as, “the water browns because of the plowing, and the water is already the color of the tea leaf before we even make tea. We don’t buy white clothes because the water is so brown. Even the ugali [local subsistence corn meal that should be a white color when cooked] turns brown” (Interview 6b). Sometimes during the rainy season there is so much water that the river floods, and one family reported an instance when the river flooded as they were doing laundry, and all of their clothes were swept downstream. They were forced to purchase new clothes for the entire family, which was a financial burden.

During the drought, the runoff is not as bad, but the community is plagued by a different problem, that of stagnant water. The rivers begin to develop a strange smell and a green film builds up on the surface of the water. When the rivers become this low they can also be contaminated by the livestock and wild animals who are also using them. Nairoshi Kaelo explained that when the river stops flowing, “we search for ponds, which are stagnant. We dig holes in the sandbars in the river to create a flow of water” (Interview 7b). During the drought it is also difficult to cook food adequately, because there simply is not enough water, so food is only partially cooked. At all times of the year there is a fear of the wild animals at the river, including large snakes that are able to eat the goats and sheep, for which they have to be on constant lookout.

The schoolchildren can develop terrible anxiety from the lack of water. They are required to bring a small amount (2-3 liters) with them to school every day, but this means they have to run down to the river after school before it gets dark. They develop chest problems from running back and forth with the water containers. If they do not have time to fetch water, they become distraught because they know they will be caned by their teachers the next day. They would rather stay home from school than endure the punishment from the teacher. As one mother, Nashipai, explained: “They develop stress at night because the teacher will cane them if they don’t bring water to school. Sometimes they refuse to go to school” (Interview 6b). When asked who will benefit most from the water project, the responses were fairly consistent. Women, the elderly, the vulnerable, schoolchildren, and small livestock are the groups that will benefit most from the implementation of the new water project.

When asked how they cope with so little water, many families expressed that they are just able to sustain themselves, but no more. Especially during the droughts, each drop of water is needed to keep the families and livestock alive until the rains come again. This sentiment was echoed repeatedly from family to family. Isaiah Muntet explained that “we preserve during the dry season” (Interview 3b). The Sedera family said, “we just preserve because we have no alternative” (Interview 4b). Agnes Kosen said, “Without water, we cannot survive, especially in a large household” (Interview 4a). While water is always a huge part of life in this community, during the dry season it becomes all-consuming. The men have to take the livestock farther and

farther away to find pasture, and the women must make multiple trips to the river. Thus there is no time for anything else, and no time to rest.

## II. Women's Role

In Maasai culture, women are responsible for retrieving water for their families and community. This role also encompasses all washing, cooking, healing, and childcare responsibilities, and thus women must work very hard to ensure that their families are healthy and well-fed. Even for women who have donkeys to carry water, the walk to the river is extremely time and energy consuming. Some women in the Kisii community balance five gallon buckets on their head as a method of carrying water. However, Maasai women transport water in large jerry-cans or buckets; they have tied straps to the jerry-cans and walk with the strap on their head and the jerry-can resting on their backs. Each jerry-can holds twenty liters of water and weighs around forty pounds. This is a tremendous amount of weight for the women to carry, especially because the distance they walk is riddled with steep hills. The weight from the water causes serious back and chest problems and many women in this community have deep indentations in their heads from the jerry-can strap. Many women suffer from debilitating injuries to other parts of their bodies as well. For example, Joyce Siameto Kuluo recently received an operation on her legs because they were so damaged from the ten kilometer walk to the river each day; she is currently bedridden, and the other women in her family now assume the role of carrying water for the Kulus. Women also lack sufficient time for other responsibilities. In fact, Naiyiolang Mporrnuk assured us that “in the woman’s daily calendar, water consumes 60-70% of our day” (Interview 8b). This water project will especially benefit the women in this community because they will endure far less physical hardship and will have more time to tend to other daily tasks.

In the course of this interview process, countless Maasai women described how their walk to the river was both physically and emotionally painful. Some women explained that they faced the threat of wild animals as well as rape from non-Maasai charcoal-burners down by the river; because of this reality, they choose never to walk to the river alone. This pain stays with the women long after they have returned home. Kitaleki Muntet recalled: “During the night, I remember the distance of the far walk to the river. I walk this distance over and over in my head” (Interview 3b). Women are exhausted when they return home from carrying water, and yet it was not uncommon to hear that some women made this trip twice in one day during the drought. Nasheluni Sedera stated, “Sometimes our bodies refuse to work but we force ourselves to walk because there is no alternative” (Interview 4b). Even the donkeys struggle from the weight they carry, usually fifty liters per animal. These women are extremely conscious of their animals’ health, and try not to overburden their donkeys. During the drought especially, women and their animals are in particular need of rest. When a woman is in her last two months of pregnancy or has just given birth, the other women in her family and/or village become responsible for fetching her share of water for the household. The same goes for those who are too sick or elderly to collect water; when someone is unable to walk to the river, the village takes on the weight of their burden.

It is the women’s responsibility to cook and provide medicine for the members of her family. Both of these tasks require the use of clean water, especially the latter. Maasai use different herbs and trees to treat illness. When a family member falls ill—usually because they have contracted a water-borne disease—the women must find clean water to mix with these

medicinal plants. Often this means that they have to walk twice as far to find a cleaner source of water.

Women in this community are extremely resilient, both physically and mentally. Although they must endure such an arduous task each day, not one woman we spoke to could even imagine abandoning her responsibility of bringing water to her family. These women go to impressive lengths to provide for their families. Once in place, this water project will enable women to care for their families without having to sacrifice their health or the majority of their day to fetch water.

### III. Problems faced by the schools

Schools face a different set of problems than the families, but they are just as affected by the lack of water. To start with, both schools expressed a problem with lack of hygiene and cleanliness. Students and teachers are unable to clean the classrooms, their uniforms, and their bodies, which leads to a decline in health. The students only have one uniform each, which they are only able to wash once a week, but when they come to school dirty they are caned by their teachers. When the classrooms become dusty it affects their lungs and they can develop coughs and respiratory problems. The dust also precipitates great thirst, but there is no water for drinking. When the children perspire and become dirty while playing outside, it can affect concentration in the classroom. As the head teacher from Eorr Enkitok Primary school, James Mukoma, noted: "They avoid playing because they can't wash after they play. Being dirty in the classroom is not conducive to learning because it affects their concentration" (Mukoma, Interview 11). Lack of water for hygiene especially affects girls during menstruation, and they often stay home from school in order to clean themselves. There is also no water to wash hands after using the toilet, which spreads germs amongst the children.

Another serious issue from the lack of water is the inability of the schools to provide food for the children. Many of the children have to walk long distances from their homes, and arrive to school already hungry. Then they have to go from seven in the morning until five in the evening without any food or drink. Currently neither school supplies lunch to the students. This lack of nutrition makes it extremely difficult for students to focus in their classes, especially by the afternoon. Pauline Meitamei, the head teacher at J.S. Ole Naeku School said, "Up until one pm, there is good attention. After this point, the children are very hungry and they lack concentration" (Interview 11). Sometimes they even fall asleep during class. This lack of concentration has serious repercussions on the students' ability to do well on exams. Students must pass these exams in order to continue on to secondary school.

The inability to do well on exams is also related to absenteeism, a concern voiced by many of the teachers. As Pauline Meitamei said: "the students aren't poor, they just have poor attendance" (Interview 11). In other words, the students have the intellectual capacity to do well on the exams, but because they miss so much class they are not able to keep up with the work. There are three levels of secondary school—national, county, and village—and placement into these schools depends on exam scores. As a result of absenteeism, students from Eorr Emaiyan schools rarely, if ever, place into national schools. In the Maasai community, only twelve percent of students go on to secondary schools. If they are able to go to secondary school, they go to the village school, but many students are not even able to do that. These students who perform poorly on exams and do not move on to secondary school are often left in a state of limbo, and

sometimes resort to loitering around the villages and causing trouble in the communities by stealing. Frequently, students are absent for multiple days at a time. When we questioned the students at J.S. Ole Naeku School, all of them said that they were absent at least two days every week. On an average day, twenty-two percent of the students are absent from the school. This is primarily due to water-borne illnesses, but during the dry season many girls have to stay home in order to fetch water with their mothers. If children have diseases that are especially bad, they may be out for weeks at a time, which sets them back in their studies significantly.

The lack of water at the schools has a huge impact on the overall well-being of the children. As one student from Eorr Enkitok Primary summed up the problem: “You come to school without washing your uniform. You miss school, you are thirsty in class, and you can’t concentrate on learning because of the dust. You miss two to three days of school at a time” (Paris Muntet, Interview 11). After school, they do not return home until it is late, at which point they have to fetch water and do other household chores. Some students expressed fear of wildlife on their nighttime walks to the river, such as leopards and snakes. It is also too dark and too late to do any studying when they get home.

All of the children have to bring water to school every day, and if they fail to do so they will be punished by their teachers. Often this water is given to the teachers or used to clean the classrooms. During the drought, class time may be used to fetch water. Also, part of the school properties are used to grow wheat, which is sold to raise money for the school. At J.S. Ole Naeku School, children are responsible for collecting water to mix the herbicides for the wheat, and this is done during class time. There is also no nurse or healthcare facility present on or near school property.

The lack of water has implications for hiring and retaining qualified teachers. Most of them live far away and commute to school, because there is not enough water at the schools for them to live there. It is especially hard for the older teachers, who are physically no longer able to make the trip to the river, and have to rely instead on the water that the students bring to school with them. At times they are forced to buy bottled water, which they cannot afford. The lack of water is detrimental to the overall wellbeing of those who work and learn at these schools. James Mukoma expressed that “Both teachers and students have trouble staying here, mentally, physically, and emotionally” as a result of this issue (Interview 11).

All of these issues compound a hard life for those living in Eorr Emayian. It is apparent from the research and personal interviews that this new clean water source will alleviate many of these problems, allowing rejuvenation in this community. As the development of this borehole continues, the subject of sustaining the project will be addressed in the following section.

## **Sustainability of Eorr Emaiyan Water Project**

### **I. History of the Commons as a part of Maasai Identity**

The district of Eorr Emaiyan boasts a landscape of impressive beauty. One can see clusters of hills and valleys for miles in every direction, gaze across impressive fields of shining wheat, and find ecological biodiversity among the stands of forest that scatter this terrain. The Eorr Emaiyan region, once dominated by lush forest, has been occupied by the Maasai community for many generations. The Maasai people are herders and have traditionally used livestock as a means of communicating with the environment and as a means of survival. Because this culture is inextricably tied to the land, Maasai have always attached tremendous importance to their practice of preserving and cultivating the commons; ecological sustainability is intrinsic to their survival as a culture. Traditionally, Maasai have established complex social structures that decide where members of the community can graze their animals during the rainy season and times of drought; this system allows for Maasai to manage the land without depleting resources or harming the natural environment.

The people of Eorr Emaiyan started practicing agriculture not long after Kenya established independence in 1963. Although the introduction of agriculture in this region first brought greater food security, it became tied to an ideology of privatization that conflicted with the Maasai's reverence for the commons. Fluid borders and communal ownership of land have been gradually replaced with land titles and permanent settlement in this district. The people of Eorr Emaiyan now find themselves straddling the line between communal and private resource ownership, especially as they enter into the agricultural market economy.

As previously mentioned in this report, the majority of residents in Eorr Emaiyan source their water from either the Siyapei or Sikinderr rivers; while both these sources have been serving the community for generations, they are no longer viable sources of water for human or livestock consumption. In the course of our interviews with community members, we were continuously told that the poor health of these rivers is attributed to large-scale, chemical-intensive agriculture in the Mau Narok region. They not only recognize that their whole watershed is being jeopardized by the amount of chemical and fertilizer runoff in these areas, but also explained that as forests within the watershed are being cut to make way for agriculture and used for fuel, soil is rapidly being eroded from the landscape. The community is already establishing reforestation initiatives on their land in order to recover these areas and bring more rainfall to the region. The Maasai people of this area have a deep understanding of the ways in which their poor health is related to the environmental damage that is occurring in Mau Narok. This community maintains a philosophy which holds water systems as valuable communal resources. For this reason, Maasai people do not settle close to the rivers; this mechanism prevents people from abusing their rights to water consumption. This community understands that the sustainability of water, and thus the health of the people, depends on the rehabilitation of their local watershed. We have continuously heard from the men and women of Eorr Emaiyan that they will apply this same ethic to the newly drilled borehole, so as to manage the source of their newfound water properly and justly.

### **II. The Eorr Emaiyan Water Project of 1975**

The people of Eorr Emaiyan saw the construction of a water project take place in their community in 1975. This project was initiated by the Kenyan government and served as an attempt to support the community's poor water supply. A tank was built in the upper region of Eorr Emaiyan on Jacob Siameto Kalou's—a community member—property. Water was pumped from the Siyapei River to the tank site from a generator without an additional distribution system attached. The project failed after three years and its failure can be traced to several key factors. For instance, this project was initiated and constructed by the government without any attempt to first consult the community. Because the community was not involved in the decision-making process, they felt that they held no responsibility to maintain and fix the infrastructure or create a system of management that would ensure the proper and fair distribution of this resource. In 1978, the pipes needed fixing; however, there were neither funds nor management to carry out the necessary repairs. This project also suffered as a result of unequal community water usage. It became clear not long after the tank was constructed that some community members were overusing the resource, while others were not benefitting from the new infrastructure at all. This unequal ownership of the source was being perpetuated by the fact that the tank was not even located on community land.

Several community members referenced this failed project when they were offering their vision of sustainability for the current Rotary water project. During the interview process, most everyone adamantly declared that a local, unbiased, and experienced water management committee must oversee this project during its establishment and throughout its existence in the community. The people of Eorr Emaiyan asserted that each village must be equally represented within this committee, and at least half the members must be women. Many community members also requested that a fee be put in place for water usage so that this resource will not be abused by individuals. What's more, the sustainability of this project is enforced by that fact that the borehole has been drilled on community land rather than private property.

### III. Sustainability of Representation and Management

A significant concern of the community is to secure the sustainability of representation and management for this project. Many members of the community believe that without an organized committee that equally represents each village and rations the water in order to mitigate waste, the project will fail. The water committee founded within the Eorr Emaiyan area believes that social distribution and management of the volume of water in the area is vital. One important aspect of this project's resiliency is recognizing the limits of a natural resource. The community understands that there are more people that could benefit from the borehole; however, they also realize that the resource might be less abundant if they use the water too liberally. The communities benefiting from the water are organized into an umbrella steering committee, otherwise known as the management committee, and five cluster committees that facilitate the water usage of each village. This system of decentralized local governance acts as a 'checks and balances' function in order to secure an abundance of water for each of the villages within the community. Each of these committees will continue to evaluate and monitor water usage, as well as ensure that the equipment functions properly and adequate funds are raised to pay for electricity and maintenance.

Elections are held every three years for committee positions to encourage stability and ensure the commitment of each member to the needs of the community. As a function of the committee, there is a built-in social audit that serves as an evaluation process for committee members. This

contributes to the working group's commitment to avoid excessive control of the resource. The management committee includes members of the local community and government. Their responsibilities include handling highly sensitive issues, and constructing proposals for external funds and support from the government, though it is preferred that they raise funds locally. By writing local and county authorities to fund the project, the community could potentially benefit from subsidies such as the Constituency Development Fund (CDF). The committee contains members of the Rift Valley Water Resource Management Authority, but currently no funds have been allocated for development from this entity. Finally, five gender-balanced cluster committees, each representing one village, have been designed to regulate the day-to-day rationing of water and facilitate conflict resolution at a community level.

One of the significant roles of the water committee is to determine the cost related to this project. They will decide upon a minimal fee to charge community members at the kiosks, and this money will go towards the maintenance fund. These fees will also cover the cost of electricity that will be needed to pump water into the borehole tank from the source. In their opinion, salaries will also be required to hire a watchman to look after the borehole site and a fulltime plumber in the case of any broken pipes. Although electricity will be used to pump water to the surface, the committee believes that building the tank at a higher elevation will allow the water to flow from the borehole tank to the community access points without electricity, thereby enhancing the sustainability of the project. This will also contribute to the committee's efforts to minimize the cost and increase affordability for community members. The nominal fees currently being discussed is five shillings per twenty liters.

Another critical piece to securing the sustainability of the project is project ownership. "This thing is ours, it has not been brought to us; we initiated it" (Committee Member, Interview 13). A main problem with the last water project in 1975 was that the community lacked a sense of ownership. The representation constructed exclusively by the community is a fundamental example of transferring the weight of the project into the hands of those who will be benefitting from this water. Ntrekeya Ole Muntet, a community member, states that "If there are mechanisms in training for proper management, then the community will take care of the water. When the water comes close to the people, it is good because the people own the water. The water doesn't belong to the donor but to the people" (Interview 2b).

The committee intends to provide intensive training for management and cluster committee members to ensure that each individual knows how to care for the project and learns how to effectively communicate with bureaucrats and other parties. This includes a component in which cluster committees learn how to resolve conflicts among community members before speaking to the management committee.

#### IV. Community Initiatives

*"We have land, knowledge, and skills, but we have no water."*  
-John Koileren Sempele, Interview 6a

The community trusts that with water, a flow of change will spread throughout the area. When clean, accessible water approaches these homes, it is widely understood that time, energy, and skill will be allocated in alternative positive directions. The community, eager to expand its opportunity to thrive, believes that "the water will promote many other types of projects, such as

polytechnic and forestry programs. We will also encourage the community to think about a permanent dispensary and health center” (Water Committee Member, Interview 13). With water comes increased health in the homes and schools of this community. Once new community development initiatives are established, the local economy will begin to improve. Thus, the community feels that these projects should commence immediately. This will happen as soon as the water begins to flow through the region.

#### A. Reforestation

Before the majority of the forest in this region was cleared for agricultural use, there were many more rivers and streams that contributed to the water system. Today, all of these streams have disappeared and only the Sikinderr and the Siyapei rivers remain viable for human use. The community is highly aware that the loss of forest is directly related to the increased drought in this area and the overall impact of climate change. Currently, the government discourages the destruction of trees in the remaining forests.

Several initiatives around Kenya promote the country-wide necessity to establish reforestation programs. One of these programs, which concerns the Sikinderr River, has been sponsored by the Narok Water Resource Users Association (RUA) at Eorr Enkitok Primary School. Local members of this association have promoted this project, as well as a corresponding project for the Siyapei River at a secondary school for girls. Rachel Nyanchama Masi, a graduate from Kenya Forestry College—the only forestry school in East Africa—runs and facilitates the project on the school campus. The main role of the project is to facilitate a multi-purposed approach to water conservation. Increasing tree populations along the river will serve as a method of cleaning the river and attracting rainfall, while also producing more food for livestock. Indigenous species of trees will be planted along the river. By Kenyan law, riparian areas must be unoccupied by people within 100 meters of each bank; nonindigenous species are also prohibited from being planted in these areas. In addition, other species of trees will be given to community members to be planted on private land.

In Rachel’s expert opinion, the Eorr Emaiyan water project can only be sustained alongside these reforestation initiatives. Forests can hold underground water thereby increasing the level of the water table: “Without trees, the water level will go down. Trees trap rainfall. Central Kenya never experiences drought because it is covered. If you don’t have trees, you have a big water problem.” (Interview 14). Additionally, the plants along these rivers are being negatively impacted from agricultural chemicals. The implementation of appropriate and resilient tree species will prevent erosion and purify the water. Chairman Kisuuna of the Water Committee states that:

Local people who have never been to school see the negative effects of fertilizers. They know they are getting side effects from the chemicals sprayed on their farms. Because it is a foreign substance and they don’t know what is in it, they are less likely to use it producing an easier transition for [introducing] organic farming to small farmers. (Interview 14).

By 2030, the forestry program hopes to encourage each family to have 10% tree coverage on their properties. Rachel states: “Currently, there is 6.465% coverage. It is the problem with

water that prevents me from planting more trees" (Interview 14). Eorr Enkitok Primary School uses several acres to operate the program where students, grades 5-8, assist Rachel with the project through the Environmental Club. This past March, 380 orphans were given seven seedlings per home to plant on their properties. Rachel will also teach the farmers personally about inter-cropping as well as how and where to plant trees.

The access to water opens up the potential for the establishment of edible forests, which will increase food sovereignty and boost the local economy. As a part of the agro-forestry program, Rachel plans to promote the production of woodlots on individually-owned land within the community. A woodlot is a small forest containing up to 300 trees. Since the Maasai community owns a good deal of agricultural space, this is an ideal place to construct woodlots, especially those that incorporate inter-cropping and edible forestry. If every farmer puts away just one acre for a woodlot, the community will be well on its way to contributing to the bigger water issue. Recognizing this, many volunteers contribute to this project and learn from Rachel about agro-forestry methods. Every Monday, sponsorship members arrive at the site "to help keep the river alive" (Interview 14).

As funds for this project are low, the RUA association is only able to pay 10,000 shillings to Rachel every month; this amount of money goes to her salary as well as necessary supplies for the project. However, the community has already begun to contribute to the project's efforts by providing more land to germinate more seedlings. "They see that it works and so they give more land because of it," says Rachel (Interview 14). She recommends that the community land where the borehole is located (a total of four acres) is an ideal space for a woodlot. This feature would assist in protecting the site, and would serve as an example for community members to plant their own woodlots.

This nursery program serves as an effective model for the community's vision for reforestation. Many of the families interviewed stated that in order to sustain the project, their knowledge of indigenous trees was the key to securing the resiliency of the forest and increasing water levels. These trees, such as the *Oretati* fig tree, are sacred to the Maasai and are restricted from being cut down. They are considered to be beneficial to the surrounding land and grow near family wells, such as the one owned by the Nampaso family. Other beneficial trees are expected to increase groundwater and produce shade coverage by the rivers to minimize evaporation (see list in appendix). As is shown by this initiative, community members fully understand that human health is inextricably tied to land and water health. John Koileren Sempele, a community member, adheres to this commitment, stating,

The committee will make sure that everyone will plant trees on 10% of their land. It was recommended before the borehole was found, to plant trees and have a nursery like the one at the school. We will come together as a community where you can give ideas for projects and we will work together so that in a few ways this place will look very different (Interview 6a).

With time, Rachel expects to teach community members how to use less firewood. The use of firewood and charcoal among community members is one of the current contributing factors to deforestation. Community members are aware of this issue and are taking more authority to police their forests so that outsiders cannot come in with large trucks and chop down trees. This

concern is growing and the community are ensuing discussion around the possibility of using manure for fertilizers and bio-gas as is being done in central Kenya.

#### B. Education:

At both of the schools we visited, the teachers and students are very aware of the amount of time that they will save when they do not have to walk to the river each day to fetch water. Teachers will be able to offer better teaching, more thoughtful lesson plans, and cleaner classrooms to their students. The head teacher at J.S. Ole Naeku Primary School enthusiastically stated, "When you come back here in one year, we will have done a lot. We will have moved. These teachers are so creative. We are already imagining a school with water, and we are going to use good use of this water!" (Pauline Meitamei, Interview 11). Water will also improve student concentration during class and greatly diminish current absenteeism issues. When students are able to spend more time in the classroom and focus on their studies after school, more children will choose to pursue secondary education and receive better scores on their national examinations. Furthermore, the quality of future generation's education will be one of the vital tools to ensure the long lasting health of these water projects sustained from within the community population.

Once water is distributed to the schools in this community, both Eorr Enkitok Primary and J.S. Ole Naeku Primary are planning to establish lunch programs to feed their students. J.S. Ole Naeku Primary once had a lunch program that was funded by a donor in the United States for five years, but we were told that the program was discontinued without explanation. This school recognizes that they can create a more sustainable program which will feature food that has been grown on the school grounds when water becomes available to them. J.S Ole Naeku plans to establish an agricultural demonstration site on the school compound so as to teach students how to grow their own food. When these kids gain more access to consistent education, their ability to circulate their learning to and from their home life will encourage parents to ensure a deeper, communal understanding of aspects of ecology aiding in the sustainability of not only this water project, but others as well. Anthony Silombe, an upper primary teacher at J.S Ole Naeku, explained that with water, "we can start a greenhouse and a garden for vegetables. The children don't have enough to eat now" (Interview 10). Both of these schools have more than fifteen acres of land at their disposal; the arrival of water will undoubtedly lead to a resurgence of creative agricultural and land-based teaching initiatives on these campuses.

The two primary schools in this community maintain a vision of becoming boarding schools. This vision is reinforced by the fact that current absenteeism rates are unacceptable and the long walk to school for many students is riddled with dehydration, the threat of encountering dangerous animals as well as many other dangers. Students who board at school will be fed properly and concentrate more on their studies. Both schools emphasized that girls will especially benefit from this development. Girls will not be discouraged from attending school during menstruation with improved sanitation system on the campus. Not only will this water provide the means for frequent hand, body, and clothes washing, but students will no longer have to endure the daily dusty walk to school when they are boarding at the campus. Primary teacher Mpoe Kolampia expands on the vision for Eorr Enkitok:

This will become a boarding school when we have water. And we want a polytechnic program here too. If we get this water we will build this program. The local community

supports this school. For children who cannot go to secondary school, they can go to polytechnic school and in that way they can get a university education. They can be a carpenter or a tailor. Now, after class eight, children get lost. (Interview 10)

Educational improvements such as this vocational school will help the community become increasingly self-reliant and foster positive development initiatives for the district.

All of the interviewed students showed tremendous excitement for education, and have dreams to excel in secondary school and beyond. For example, Faith Kwongoi, in class seven, wants to become a doctor so that she can cure water-borne diseases. John Tapote, in class eight, dreams of becoming the Minister of Water in Kenya so that he can initiate water projects like this Rotary project. These children are not only aware of the lack of water in their community, but understand the ways in which their families, communities, and their own lives have the potential to improve tremendously with the resurgence of this clean, accessible resource. The community views education as a valuable investment for the social, economic, and environmental growth of this district. This research demonstrates that educational initiatives in Eorr Emaiyan will take a dramatic stride in a positive direction while remaining in the control of the community.

## **Conclusion and Recommendations for Follow-up Research**

It is clear that the people of Eorr Emaiyan currently face tremendous hardship as a result of having poor access to clean water. However, this community also holds a vision for a prosperous future with the newfound water from this project. This vision encompasses not only the health of their families and livestock, but also the regeneration of the watershed on which life here depends. The community has experienced firsthand a failed water project, and thus is taking great measures to ensure that this project is sustainable. This commitment to long-term resiliency is reflected in their representative management committees, reforestation initiatives, and thoughtful plans for positive development and improvement of education programs. Agnes Kosen, a committee member, claims that “everything will change—education, health—these problems will not be here if we get this water” (Interview 8a). It is important that the community owns this project in order to ensure that it remains functional for many generations to come. This report will serve as a reference to understand how this community is benefitting from this project in the years to come. This method of data comparison will help in the planning and implementation process for future water projects in other communities.

Based on our research, we recommend that the 2015 assessment of improvements made by the successful implementation of the water project should consider the following questions. Indicators of increased quality of life should not only be drawn from individual financial gain but instead are deeply entrenched in changes in health, education, and allocation of time. Thus, inquiries should be made directly into those aspects of life. For instance, what is the frequency of water-borne diseases? Without the long walk to the river, how is time being used differently, and what are examples of women’s daily schedules? At the schools, have lunch programs been implemented? Have enrollment rates increased, and absentee rates gone down? Questions should also be brought to the water committee about the types of repairs that have been needed, and how that process has been resolved. Have there been any serious issues they have had to address in relation to the management of the project? Has there been business development in the community? How many people are actually accessing the new water, and how many are still fetching water from the river? How much water is being purchased? What is the state of the river after some of the pressures on it have been alleviated? What is the overall sense of well-being (emotional and physical) in the community? This set of questions is not meant to be all-inclusive, rather, the hope is to provide an idea of the direction that is needed for comparison with the 2014 assessment.

## Olorropil Ward, Enabelibel Sublocation Community Interviews

Interview # 1a

Name of Family: Karai

Name of Person Interviewed: Joel Karai, Lameria Karia, Silvia Karia, Grace Karia

Location: Eorr Emaiyan, next to Karia community

Date: 24 June 2014

Names of Interviewers: Angela Hewiston, Eleanor Healy, Pramod Parajuli.

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

There are seven people living in this household and they use 80L/day (about 4 jerry cans). There are only two women that can carry water so they have to do two trips per day to get enough water for the family. When the younger children come back from school they will carry 5L back home. Often they will contribute half a jerry can to the families on the way back to the house because they are elderly or sick.

They take the cattle to the river which is 3KM away.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

During the rain, there are small pools of water that they can collect from. But the rest of the time they go to the rivers.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

The water is always dirty. Often the collected water has chemical run off from the farms upstream.

**4. How does the community describe the quality of the accessible water?**

The water is always dirty. Often the collected water has chemical run off from the farms upstream.

**5. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

6KM roundtrip, twice a day with two people. This takes about 3-4hrs each trip.

**6. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

No

**7. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

The women will. Often the women have horrible back problems from carrying all the water. The women must do this otherwise the kids have drop out of school to help get the water.

**8. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

They are willing to pay money to hire groups of people to manage the project and they request a meter to be put in place so that they can measure how much water they are using. There is a concern that the distance from the kiosk is still 2KM away, the hope is that pipes will extend to the homes from those kiosks for better water access.

- 9. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

There are cases of typhoid of which they must go into town to get to a doctor.

Interview # 2a

Name of Family: Kisuuna

Name of Person Interviewed: Pauloo Konala Ole Kisuuna, Magdelin, Naseoko,

Location: Eorr Emaiyan

Date: 24 June 2014

Names of Interviewers: Angela Hewiston, Eleanor Healy, Pramod Parajuli.

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

20L/day.

Animals: water from the rivers, and from the dam on the property. The water from the tanks is just for human consumption.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

The first tank was from a women's group that Magdelin was a member of. It was built in 1995 by the Ministry of Health.

They also have a rain water catchment which was donated by the church that Paulloo had founded.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Before they had the tanks the forest was dense and therefore there was a stream close to their home. But this was before massive deforestation in the area.

The wildlife in the area used to drink all of the water in dry times, and during those times they had to take donkeys to get water elsewhere, which was about 5KM in all directions. They ended up digging a dam on their property for better water access.

Because of the two tanks, the dam on the property which is exclusively for the animals, this family has secure water access.

**4. How does the community describe the quality of the accessible water?**

The water inside the tanks is far better than the water from the dam which is muddy and has chemical run off from farms

**5. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

Tanks on property

**6. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

If the color of the water doesn't look good they will boil it using firewood.

But if the water looks fine then they don't boil it.

**7. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Everyone will benefit. The community will no longer have to rely on the seasonal patterns of rain to have good access to water. Therefore this water project creates more comfort for the entire community.

**8. What in your opinion would a "sustainable" water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

They would use like to plant more trees which would allow the rivers to rise again and more rainfall will be produced. Before the forest was destroyed, there were many more rivers.

Hopefully the wildlife will come back with the rivers. The community is very aware that planting trees is encouraged in the name of climate change. The government discourages the destruction of trees both in the forest and on private property.

**9. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

Because of their tanks, they have not seen any water borne illnesses.

Those who don't have tanks are more susceptible to illness. 3 out of 10 people have tanks in this area

Interview # 2b

Name of Family: Muntet

Name of Person Interviewed: Ntrekeya Ole Muntet, Napolos ene Muntet, Kisyonigo ene Muntet, Keseme Ene Muntet, Norkisango ene Muntet, Namanu ene Mpoe, Karsis ene Mpoe, Phoebe ene Mpoe (and many children)

Location: Lower Olgenchemi

Date: 24 June 2014

Names of Interviewers: Charles Ole Takai, Pastor James Malego, Charlie Lazarus, Mary Poole, Julia Glennon, Sasha Timpson

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

Napolos: 60 liters per day (per household?).

**2. You have had this water problem for a long time. How do you cope with such a problem?**

Kisyiongo: we use the little that we have. Sometimes we overwork the donkeys and take them on a second trip down to the river.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Kisyiongo: The plowing in Mau Narok from agriculture puts chemicals in the river, which makes it unsuitable for consumption. The river turns muddy, and there are water-borne diseases as a result of this contaminated river. The cows and sheep get weak from thirst.

**4. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

Napolos: 3 hours both ways.

**5. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

Napolos: We let the dirt settle because we've built an immunity to disease (Karsis laughs).

**6. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Napolos and Kisyoingo: The elders, then the women, and then the other vulnerable groups.

**7. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

Ntrekeya: if there are mechanisms and training for proper management, then the community will take care of the water. When the water comes close to the people, it's good because the people own the water. The water doesn't belong to the people but to the people.

**8. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

Kisyiongo: coughing, typhoid, and highland malaria. God sent you, do more effort.

Ntrekeya: bless you all your lives.

Notes: 6 houses (and a new one being built) and at least 4 donkeys. One woman making bracelet. Big chicken coop, and several rainwater catchment tanks. As we walked away we saw cattle grazing on the hill opposite from us. When we asked for their questions, everyone wanted to know when the water would be here.

Interview # 3a

Name of Family: Nampaso

Name of Person Interviewed: Bernard Nampaso, Lillian Nampaso, David Sadera, Agnes Nampaso

Location: Eorr Emaiyan

Date: 25 June 2014

Names of Interviewers: Eleanor Healy, Angela Hewitson, Pramod Parajuli

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

6 people on the property that use 50 liters of water per day.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

The family has a dam for livestock use and a small tank (rainwater catchment) for person use. There is also a small well on the property

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

They have to fetch the water such long distances. During the week, Bernard and his wife collect water at the river. On the weekend, the children join Lillian in collecting the water.

**4. How does the community describe the quality of the accessible water?**

The family describes the water as being bad (“torono”). There are chemicals in it from the pesticides from farming that runs off into the river. There is also mud in the water from the Mau Narok area.

**5. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

When it is dry, they take the cattle to the river which is about 8km away. They have many donkeys to fetch large amounts of water with. They have two donkeys. The travel time is about 5-6hours to fetch 80 liters of water per donkey. Following this journey they are too tired to do more work. They don't fetch water everyday, rather they fetch every other day.

**6. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

They do boil their water using charcoal. Charcoal costs about 500 shillings per bag.

**7. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

The Nampaso family states that children, women, men, and cattle will benefit most from the clean water in this order.

**8. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

They strive for an importance in taking care of the project, at a managerial level, making sure that they actually get clean water. To increase sustainability, they think that more trees should be planted. Beneficial trees to increase ground water and shade coverage by the rivers to minimize evaporation include: cypress, gravilia, ole Africana, cedar, olive, fig tree oretiti(?), and various fruit trees. The oretati is a sacred tree in Maasailand. It grows near wells. The Nampaso family has dug a small well near the one on their land for water access. They say lightning avoids this tree, whereas the cedar attracts lightning. The white sap from this tree isn't poisonous and has a milky appearance. Children and birds eat the fruit.

**9. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

There are lots of issues with diarrhea in the family from using bad water. This happens in their home as well as in the community affecting children and adults.

Interview #3b

Name of Family: Muntet (2nd)

Name of Person Interviewed: Isaiah Ole Muntet, Kitaleki ene Muntet, Helen ene Muntet, Karsis ene Mpoe, Pheobe ene Mpoe

Location: Lower Olganchemi

Date: 24 June 2014

Names of Interviewers: Charles Ole Takai, Pastor James Malego, Charlie Lazarus, Mary Poole, Julia Glennon, Sasha Timpson

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

Kitaleki: 80 liters per day (4 containers- 2 for livestock and 2 for household). Wash clothes down at the river once a week.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

Kitaleki: we find a balance during the rainy and dry season.

Isaiah: we preserve during the dry season. We also have rainwater catchment tanks.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Isaiah: First, the water is far. Clean water will also reduce diseases and help our kitchen garden.

Kitaleki: there have been livestock deaths as a result of the lack of water during droughts in the past.

During the night, I remember the distance of the far walk to the water. I walk this distance over and over in my mind.

**4. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

Kitaleki and Isaiah: 4-5 hours round trip, not sure how far, but it's far.

**5. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

Kitaleki: we boil 5-10 liters of this amount for drinking.

Isaiah: we like to use firewood more than charcoal.

**6. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Kitaleki: The weak animals, then the women, and then the vulnerable and the old.

**7. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

Isaiah: the committee is good. We need it well-organized and not biased. We need them to see the source of the water (our connection to the Mau forest watershed).

Kitaleki: we need to take care of the water and ration it, even the water that reaches our home.

**8. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

Isaiah: People are plowing in Mau Narok, which creates chemical runoff and contributes to water-borne diseases. Stagnant is also a problem. Typhoid and coughing is a problem.

Notes: four houses counted. We sat outside with the interviewees. Weird European cattle next door. No Donkeys

Interview # 4a

Name of Family: Sadera

Name of Person Interviewed: John Sembere (main responder), John Nampaso, Patrick Oruwasa, Jaquo Siameto Kulurr, Agnes Morra Machoka, Joyce Annos Sadera (wife, main responder), Sampson Sadera, Agnes Kosen (main responder)

Location: Kisiriri

Date: 25 June 2014

Names of Interviewers: Eleanor Healy, Angela Hewitson, Pramod Parajuli

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

There are 6 people in the household.

They use 400 liters a day. They will use 120 liters or 5 buckets for kitchen use, cooking, and washing utensils. They use 200 liters a day for their cattle. Other 80 liters is miscellaneous.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

When it rains there is a dam across the road that they use. When it is dry they go to the river which is 5km away, 10km round trip. This consumes their entire day. They have no rainwater catchment tank, but they have dug a deep well that acts as rainwater catchment which is cleaner than the water at the dam.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

They are afraid of diseases from the dam water so they prefer to use the water from the hole. Women have indentations on their heads from carrying 20 liters of water in a jerry can, which can take up to 5-6 hours of carrying each day. "We have really struggled to educate our children. Without water, we cannot survive, especially in a large household."

-Agnes Kosen

**4. How does the community describe the quality of the accessible water?**

The dam and river water is very dirty.

**5. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

When it is dry they go to the river which is 5km away, 10km round trip. This consumes their entire day. They are accompanied by 2-3 people with 4-5 donkeys. The family goes every day when it is dry because cattle require a lot of water due to dehydration.

**6. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

They do not boil the water for regular use but they do for tea and cooking.

**7. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Women will benefit the most because they are responsible for fetching the water as well as cooking and cleaning. It was emphasized that women wash every day while men wash every other day or once a week.

**8. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

They want to plant more trees so the river has more coverage and is less susceptible to evaporation. The wish is to get water as close to home as possible so there is a tap to get water immediately, especially for the elderly. The vision for the use of water is to grow more food for consumption and to sell more food to earn more money to help pay for children's education. "Everything will change, education, health; these problems will not be here if we get this water." – Agnes Kosen

**9. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

John Sembere- "Typhoid can be found in almost every home because of water."

Interview # 7b

Name of Family: Paranai Kaelo

Name of Person Interviewed: Paranai Kaelo; Nairoishi Kaelo (entasat); Naponu Kaelo; Kakeny Kaelo; Taleo Kaelo (16 years); and 8 small children

Location: Rotian

Date: 26 June 2014

Names of Interviewers: Charles Ole Takai, Charlie Lazarus, Mary Poole, Julia Glennon, Sasha Timpson

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

Paranai: 9 children in the household, plus husband and two co-wives (12 total). 4 containers of 20 liters each, plus 2 smaller containers (100 liters total). 2 containers go to livestock. This is not enough for us to be satisfied, but sustained only. 1-2 washing the children, and 1 for cooking. We wash at the river while the donkey is tied up and eats grass.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

Paranai: during the drought the cattle search for grass and the donkeys go too. So the women carry the water and can only carry 2 jerry cans (only 40 liters for the whole family). Sometimes we can't cook food well enough because there is so little water. The children stay home from school to help get the water for their family.

Nairoshi: sometimes the river stops flowing so we search for ponds, which are stagnant. We dig holes in the sandbars in the river to create a flow of water.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Paranai: This water is not good for our health and people start to develop diseases such as typhoid and amoebas. During the severe drought the water builds algae and develops a funny smell. When there is lots of the rain the Siyapei River (which is closer, 5 km) develops a funny smell so we pack our donkeys early in the morning and walk to the Sikinderr River which is twice as far (about 9 km). The Siyapei river flows from the middle of Mau Narok, so there are much more chemicals flowing into the river.

**4. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

Paranai: 5-6 km to the Siyapei River and about 10 to the Sikinderr River.

**5. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

Paranai: there is no herbal medicine to purify the water so we just let it settle for 2-3 hours and then drink it. We have built an immunity to the water.

**6. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Paranai: women, small and weak livestock, calves. The vulnerable and the elderly and the school children. The kids lack concentration in school because they are so thirsty.

**7. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

Paranai: they must ration the water and set rules to not use the water excessively or carelessly. We must oversee the flow of the water. We are also responsible for the source. If we get the water here it does not mean we are not responsible for the source. We are also responsible for the election of good people to take care of the water. The community must have a say as to who is on the committee.

Nairoishi: just because the water comes to us does not mean we shouldn't care for the water.

**8. How many water-borne illnesses occurred in the community during the past year and what kind?**

Paranai: typhoid, cholera and amoebas. We use the roots of the Olsokonoi tree to treat stomach problems. If it persists we go to the hospital. The other herb we use is called sekitek from Mau- this is for amoebas and it's very powerful and strong.

Notes: 5-6 dung houses. Beautiful view from where we sat under the tree. Paranai and Nairobi are co-wives.

Interview # 5b

Name of Family: Bishop Kaelo

Name of Person Interviewed: Naramat (Agnus) ole Kaelo, Melua (Janet) ole Kaelo, Naiyere (Ester) ole Kaelo

Location: Bishop Kaelo's house, Rotian near the primary school

Date: 26 June 2014

Names of Interviewers: Charles Ole Takai, Pastor James Malego, Charlie Lazarus, Mary Poole, Julia Glennon, Sasha Timpson

**10. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

Agnus: 3 donkeys with a total of 6 containers (20 liters) for 10 people. Some of the cows can't get to the river so 2 containers is allocated to them. 20 to small sheep and goats. 40 for cooking and 20 for washing dishes. Once a week we carry clothes to the river. We light a fire there because its very cold. The donkeys carry the clothes and the water, but the women still carry some of the water back up.

**11. You have had this water problem for a long time. How do you cope with such a problem?**

Agnus: for those who have a water tank, they catch rain (still usually is not enough). We get rain for 6 months, and during the drought we just cope.

Janet: Before these modern roofs, we would take donkeys to the river 2x daily. We would spend all day walking the livestock to the river so they would survive during the drought.

**12. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Agnus: water-borne diseases, diarrhea (esp. young children), and highland malaria.

**13. What is the average distance per day traveled per family to and from the rivers to obtain water?  
How much time is used?**

Agnus: 14-15 km roundtrip. We leave at 8:30 and come back around 1. It's a very heavy load and we get bad back aches. Back when there was no electricity, we also had to walk a long distance (sometimes to Narok) to grind grain, because the mill was a water mill.

**14. Quality of accessible water?**

Agnus: sometimes we prefer bottled water for drinking because the river water is really bad. We prefer borehole water because a green film develops on the stagnant river water during drought. The rain at Mau Narok brings the dirty water. We still use the river water because there is no alternative, but there is no flow during the dry season.

**15. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

Agnus: when the water is dirty, we usually just pour it into a bigger container and let it settle. Sometimes we boil (using firewood because charcoal isn't always available), and sometimes we use Water Guard to purify the drinking water.

**16. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Agnus: women, elderly, vulnerable (including pregnant women)

**17. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

Agnus: a well organized committee that contains smaller committees to make sure that water is used respectfully. We need to have intensive training for people so that we know how to maintain the resource.

Notes: in the early 90s, the volume of the water was very high and now it has gone down because 'of what is happening' (agriculture, deforestation). Nice home, served hot chocolate. Son is going to Nairobi University- was on his phone the whole interview, and there was music bumping in the family room. Well educated children.

Interview # 5a

Name of Family: Kuluo

Name of Person Interviewed: Jacob Siameto Kuluo, Joyce Siameto Kuluo

Location: Between Eorr Emaiyan and Kisiriri

Date: 26 June 2014

Names of Interviewers: Eleanor Healy, Angela Hewitson, Pramod Parajuli

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

There are 7 people in the family, 3 workers, so 10 people total in the house. They use 200 liters a day for human consumption. 160 liters for cattle but 200 liters during the dry season.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

Water is drawn from the river with donkeys and many people. They have one large rain water catchment tank. This dries up during the dry season so they go to the river (10 km round trip).

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Water is dirty for washing and drinking. Animals will refuse to drink the water out of the dams. Joyce had to receive an operation on her legs because of carrying so much water and walking so far.

**4. How does the community describe the quality of the accessible water?**

The water is dirty.

**5. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

10km round trip, 3-4 hours with donkeys. Without donkeys it is a huge struggle. They will make sometimes two trips a day.

**6. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

They boil the water for the fear of typhoid. They use firewood from the nearby forest.

**7. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Mothers will benefit the most due to the division of labor. Right now they spend all of their time cooking, washing, fetching water, and finding a donkey.

**8. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

The community's health will take care of the project. Where the local community will take full responsibility. Joyce has a lot of faith because she is a local resident and she was here when the previous water project failed. She is sure more care will be taken. Given her age she is so thankful for that when water arrives she will be much more comfortable.

**9. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

There's the fear of typhoid.

Interview # 7a

Name of Family: Machoka

Name of Person Interviewed: Agnes Machoka

Location: Kantai Community, Kisi settlement, between Kisiriri and Eorr Emaiyan

Date: 26 June 2014

Names of Interviewers: Angela Hewitson, Eleanor Healy, Pramod Parajuli

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

There are 4 people in the home who use 60 liters. Their hens and chickens (about 30 of them) use 20 liters. They have not been able to keep animals like cows because of the lack of water. They are unable to dig a well due to lack of funds.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

They harvest rain water in a small container. She goes to the river when it is dry, carrying a 5 gallon bucket on her head. Usually she will go alone, unless other people need to get water as well.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

The time going to the river, in her opinion, is time wasted, as she could be doing other more productive things.

**4. How does the community describe the quality of the accessible water?**

The water is a very bad quality. When it rains in the high country, the water becomes even more dirty from erosion. Even in the dry season, the water quality isn't better, due to chemicals from pesticide runoff.

**5. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

From the road, the distance is 7km. From her house it is 4km (8km total). The trip takes her about 2 hours.

**6. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

They boil water using firewood that is collected from the forest nearby. It could be an issue in 2-3 years when there is the possibility of no more trees or the owners of the forest land won't let them collect there anymore. They plan of planting trees to have in the future.

**7. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

She says the mothers will benefit the most. Children, mothers, and women are the ones who will rest when they have the clean water.

**8. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

They plan on planting trees to help replenish the water and preserve it. The committee will make sure that everyone will plant trees on 10% of their land. It was recommended before the borehole was found, to plant trees and have a nursery like the one at the school. "We will come together as a community where you can give ideas for projects, and we will work together so that in a few years this place will look very different." -John

**9. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

There is always the issue of typhoid.

## Olorropil Ward, Enabelibel Sublocation Community Interviews

Interview # 6a

Name of Family: Koileren

Name of Person Interviewed: John Koileren Senpele, Monica Nadopoi Koileren

Location: Kisiriri

Date: 26 June 2014

Names of Interviewers: Angela Hewitson, Eleanor Healy, Pramod Parajuli

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

5 people in the household using 80 liters per day.

They have 5 dairy cows that consume 160 liters per day.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

They have a dam in front of their property in order to irrigate their land. In 2000 they dug a hole 40ft long by 6ft deep in order to store rain water for human consumption. A hole 8ftx8ft and 100ft deep was dug as a well for cattle consumption. They also have one small rain water catchment tank. During the dry season (2-3 months each year), these water catchments dry up. They have to go to the river to collect water which is a 10km roundtrip.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Although they store as much water as they can, they are still susceptible to water borne illnesses. Monica had typhoid last month.

**4. How does the community describe the quality of the accessible water?**

The water is often brown colored, and described as being “always dirty.”

**5. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

The distance to the river is 10km round trip. This takes around 4 hours.

**6. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

They do not boil their water for regular drinking water, but they do for cooking and making tea.

They do use firewood from the forest, but the family's next project is looking into bio gas to replace the firewood.

**7. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

The family says that with the population growth, it is important to have clean water. The children will benefit because of high costs for schooling. The family had to sell 10 Maasai cows for 1 dairy cow (which produces more milk) so they can sell more milk to pay for schooling. It will help during the dry season comes so they can still produce vegetables to sell.

**8. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

The family was advocating for education. Their parents didn't go to school so they didn't know all of the benefits of clean water. They are sad because they are aware that the water will not be pumped up to their area. They worked really hard to dig these holes to prepare for no water, and they shall be ready for whatever needs to be done so they can get clean water.  
"We have land, knowledge, and skills, but we have no water." -John

**9. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

Monica had typhoid last month.

Interview # 6b

Name of Family: Napolos Kaelo

Name of Person Interviewed: Naiyere ole Kaelo, Nopolos ole Kaelo, Tito ole Kaelo, Karsis ole Kaelo, Nashipae ole Kaelo, Nalotuesha ole Dikirr, Nampaio ole Dikirr

Location: Rotian

Date: 26 June 2014

Names of Interviewers: Charles Ole Takai, Charlie Lazarus, Mary Poole, Julia Glennon, Sasha Timpson

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

Napolos: 2 donkeys, 50 liters each. 100 liters per day for 20 people. Livestock consumes about 2.5 containers and the rest is for washing and cooking. The children take about 2-3 liters a piece to school and we spend about 5 liters daily for the school.

Nashipae: This affects the kids performance tremendously because if the child is small, they develop chest problems because they run back and forth to the river with the containers of water. They develop stress at night because the teachers will cane them if they don't bring water to school. Sometimes they refuse to go to school.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

Nalotuesho, Nashipae, and Nopolos: during the drought the rivers don't flow. The water is stagnant and there are many diseases. Wild animals and livestock use the same river and so the water becomes smelly. The water browns because of the plowing, and the water is already the color of the tea leaf before we even make tea. We don't buy white clothes because the water is so brown. Even the ugali turns brown.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Nopolos: So many problems. Water-borne diseases, diarrhea and typhoid. The children do not wash and attract lots of flies, which leads to eye problems. We all have to wash our bodies at the river because there is not enough water. During the rainy season, sometimes we lose our clothes at the river because it becomes so high. We then have to buy new clothes which are very expensive.

**4. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

Nashipae: 4-5 hours roundtrip. If you go with children it takes a lot longer because they cannot walk fast. The trip is about 10 km roundtrip.

**5. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

Everyone: we don't boil the water, we let it settle so that the residue sinks to the bottom. At school they boil the water for the students, but we believe that we have built up an immunity to the dirty water. We use firewood.

**6. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Nopolos: women, especially the pregnant women. It's difficult with pregnant women but the whole community helps them when they are in the last two months of their pregnancy and after they give birth. The elders and the old/young livestock will also benefit. The women can use a donkey if they have one, but they have to wait for someone to come to the river to help them lift the cans onto the donkey. The stomach ailments from the water can be treated with the bitter medicine that comes from the trees. Many people respond to these herbs but if they don't we have to take them to the hospital. We also used to use these herbs for de-worming children (the herb is called Isekitek) and also the fertile goats. We boil it in water with small fat and give only very little because it is a powerful drug (enkalasi). The elder takes a

full cup but children only take half a cup. We have to look for clean water to use this medicine, which is a much longer walk (maybe 10 km) because we can't use the brown water.

**7. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

Naiyere: We should have a watchman to watch the borehole at night (orata) and a well organized committee

Nopolos: the committee must be good people who aren't biased. They must have a love for the people and have perseverance because there is no pay. They must be hard working. There should be more women than men on the committee because the men have a lot to do and the women are the caretakers of the water. So, women should be many.

Notes: small room, lots of flies, many children. Maa radio. We were all packed in. A woman in the next room had just given birth, was listening from the next room. Very direct women, asserted that they want the water ('we see you, but we want the water').

Interview # 7b

Name of Family: Paranai Kaelo

Name of Person Interviewed: Paranai Kaelo; Nairoishi Kaelo (entasat); Naponu Kaelo; Kakeny Kaelo; Taleo Kaelo (16 years); and 8 small children

Location: Rotian

Date: 26 June 2014

Names of Interviewers: Charles Ole Takai, Charlie Lazarus, Mary Poole, Julia Glennon, Sasha Timpson

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

Paranai: 9 children in the household, plus husband and two co-wives (12 total). 4 containers of 20 liters each, plus 2 smaller containers (100 liters total). 2 containers go to livestock. This is not enough for us to be satisfied, but sustained only. 1-2 washing the children, and 1 for cooking. We wash at the river while the donkey is tied up and eats grass.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

Paranai: during the drought the cattle search for grass and the donkeys go too. So the women carry the water and can only carry 2 jerrycans (only 40 liters for the whole family). Sometimes we can't cook food well enough because there is so little water. The children stay home from school to help get the water for their family.

Nairoishi: sometimes the river stops flowing so we search for ponds, which are stagnant. We dig holes in the sandbars in the river to create a flow of water.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Paranai: This water is not good for our health and people start to develop diseases such as typhoid and amoebas. During the severe drought the water builds algae and develops a funny smell. When there is lots of the rain the Siyapei river (which is closer, 5 km) develops a funny smell so we pack our donkeys early in the morning and walk to the Sikinderr River which is twice as far (about 9 km). The Siyapei river flows from the middle of Mau Narok, so there are much more chemicals flowing into the river.

**4. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

Paranai: 5-6 km to the Siyapei river and about 10 to the Sikinderr river.

**5. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

Paranai: there is no herbal medicine to purify the water so we just let it settle for 2-3 hours and then drink it. We have built an immunity to the water.

**6. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Paranai: women, small and weak livestock, calves. The vulnerable and the elderly and the school children. The kids lack concentration in school because they are so thirsty.

**7. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

Paranai: they must ration the water and set rules to not use the water excessively or carelessly. We must oversee the flow of the water. We are also responsible for the source. If we get the water here it does not mean we are not responsible for the source. We are also responsible for the election of good people to take care of the water. The community must have a say as to who is on the committee.

Nairoishi: just because the water comes to us does not mean we shouldn't care for the water.

**8. How many water-borne illnesses occurred in the community during the past year and what kind?**

Paranai: typhoid, cholera and amoebas. We use the roots of the Olsokonoy tree to treat stomach problems. If it persists we go to the hospital. The other herb we use is called sekitek from Mau- this is for amoebas and its very powerful and strong.

Notes: 5-6 dung houses. Beautiful view from where we sat under the tree. Paranai and Nairobi are co-wives.

Interview # 8b

Name of Family: Surrurru/ Mporrnuk

Name of Person Interviewed: Naiyiloang Mporrnuk, Noomalie Mporrnuk, Pauline Sankok, Naiyou Esupat, Regina Okise, Narikunenkera Surrurru, Lydia Surrurru

Location: Just across the border from Rotian in Olgencchemi

Date: 26 June 2014

Names of Interviewers: Charles Ole Takai, Pastor James Malego, Charlie Lazarus, Mary Poole, Julia Glennon, Sasha Timpson

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

Naiyiloang: 6 containers (with 3 donkeys) used by 8 adults (plus many children). Livestock use 3 containers (60 liters), 1 container for school children and washing, and the last 2 containers are used for cooking/washing utensils.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

Pauline: We tap the water from a stream and wait for hours while the containers fill up. We go very early in the morning or sometimes at night with a torch; the site is beyond the river (past the borehole). There are lots of people who wait in line for this drip.

Narikunenkera: the women make this walk and the men go look for greener pastures with their livestock during the drought.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Naiyiloang: to get clean water sometimes we have to buy water for drinking and use the river water for washing. This is very expensive.

Narikunenkera: Sometimes the Siyapei river becomes brown and forces us to buy a water purifier like Water Guard.

**4. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

Narikunenkera: We travel from 8 in the morning to 1 pm.

Naiyiloang: the trip is 4-5 km one way. In the women's daily calendar, water consumes 60-70% of our day. A woman cannot get any time to rest.

**5. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

Naiyiloang: we boil the water and let the residue settle. We use firewood because charcoal is too expensive.

(Regina leaves to do laundry with a huge bag of clothes on her back. Maybe going to the river to do laundry?)

**6. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Naiyiloang: women, children, and elderly will benefit most. The pregnant women will also benefit because they need lots of help during the last two months of their pregnancies.

**7. What in your opinion would a "sustainable" water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

Naiyiloang: Select people to manage this process and keep records of what's going on. Transparency is key. The ministry of water can come and train people to fix broken pipes, etc.

**8. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

Naiyiloang: Typhoid, stomach diseases, vomiting and diarrhea, amebiosis which leads to cholera sometimes because the water is very polluted.

Notes: one of the poorest communities that we visited during the whole interview process. 3-4 children/ babies present during the interview. Sat outside.

Interview # 9

Name of Family: Ole Mwanik

Name of Person Interviewed: Cheryl Kasaini (Swahili), Sharon Miyun (Swahili), Jane Mwanik, Eunice Parrtungus, Norkiropi Parrtungus, Purity Pisoii Dikirr, Noltetiang Parrtungas

Location: Just across the border from Rotian in Olgencchemi

Date: 27 June 2011

Names of Interviewers: Charles Ole Takai, Pastor James Malego, Charlie Lazarus, Mary Poole, Julia Glennon, Sasha Timpson, Alice McKusick, Angela Hewittson, Ellie Healy, Pramod Parajuli

**1. What is the average current daily water use per family? How is water rationed between domestic use and livestock?**

Eunice: Two donkeys per family, 50 liters per donkey. Jane: 2 go to livestock and young animals; 1 goes to schoolchildren and the children each bring 3 liters to school; 1 is used for washing utensils; 1 is used for cooking. There is an average of 7-9 people per family.

**2. You have had this water problem for a long time. How do you cope with such a problem?**

Eunice: The water becomes very bad when people further up wash clothes in the river. Develop diseases. Jane: We have to walk very far to get clean water. In droughts we only get a little water.

**3. What are the biggest problems in your opinion from the lack of clean and accessible water?**

Jane: The vulnerable livestock will die. Also much time is wasted; cannot do any other useful things.

**4. What is the average distance per day traveled per family to and from the rivers to obtain water? How much time is used?**

Everyone laughing. Jane: 5-6 kilometers one way. Leave at 9 am, come back at 1 or 2 pm. Purity: 9 km to the other river.

**5. Is water typically boiled or purified in some other fashion for drinking? Do you use charcoal or firewood to purify water?**

Cheryl: Sometimes, but not frequently. Most of the time just let the water settle and drink from the top. People build immunity to the bad water.

**6. Which groups in your community will most benefit from clean water? (women, youth, vulnerable group for example)**

Eunice: Older people, pregnant women, and women in general.

**7. What in your opinion would a “sustainable” water project look like in Eorr Enkitok? What would be mechanisms of sustaining the water project?**

Eunice: we need an organized committee that includes older, experienced members.

Norkiropi: we need equal representation for each village in the committee. This committee must consider the poorest community members who can't afford the water.

Mary: how will that management help?

Jane: it will help to ration the water to minimize waste. There are many people who use and waste a lot of water so we will need to ration it. Younger women are more likely to waste the water.

**8. How many water borne illnesses occurred in the communities during in the past year and of what kind?**

Eunice: Typhoid, coughing, colds, cholera (when these diseases become severe). Many women develop back aches and chest problems from carrying the water, especially those who don't have donkeys. But even the donkeys are suffering from the weight. At the river you have to wait for someone to help you lift the jerrycans up onto the donkeys.

Jane: there is a danger of leopards and other animals at the river. Buffalos and big snakes especially. These snakes wait at the river and eat our goats and sheep. When women go to the river, there is also sometimes a fear rape from non-Maasai charcoal burners. Because of this we can't go to the river alone.

Notes: Sat outside. Most of the process was uncomfortable, and most of the women sat with their backs to us (sign of disapproval).

## **Eorr Enkitok School Interview**

**24 June 2014**

Interview #10

**Names of Interviewees:** Teachers: Lillian Kantamo (teaches classes 6 and 4) Mary Sameto, Mpoe Kolampia, Leah Mpoe, Jane Sayialel, James Mukoma (Head Teacher)

**Names of Interviewers:** Mary Poole, Pramod Parajuli, Chairman Kasuna, Charles Ole Takai, Angela Hewitson, Charlie Lazarus, Eleanor Healy, Julia Glennon, Sasha Timpson.

### **Number of students enrolled:**

346 total in primary

1a: 17 boys, 14 girls

1b: 16 boys, 15 girls

2: 22 boys, 25 girls

3: 33 boys, 23 girls

4: 26 boys, 18 girls

5: 21 boys, 20 girls

6: 18 boys, 19 girls

7: 17 boys, 17 girls

8: 8 boys, 17 girls

178 boys total, 168 girls total

### **How much water do children have to bring to school?**

(nervous pause)

The teachers can go the whole day without drinking water.

Mpoe: during the rainy season we have a rainwater catchment system.(we saw several tanks behind the school near the plant nursery) But during the dry season we have to use water from the nearby dam, which is stagnant and does not contain water suitable for drinking. The water turns green but we have no other choice.

Head teacher: both teachers and students have trouble staying here, mentally, physically, and emotionally. We use most of the time in the morning getting water.

### **How does the lack of water affect learning and your ability to teach?**

Mpoe Kalampia: It affects learning. Teachers/people conduct is not up to date (meaning?).

Mpoe Kalampia: More water will encourage teachers to stay. Only one teacher lives in the compound currently and the other teachers walk to school, which is a far walk for most.

Will water improve students' performance?

Mpoe Kalampia: girls stay away from school during their periods, and especially during the dry season. They want to wash themselves but they can't.

James: girls take a lot of time fetching water too.

There is generally a lot more absenteeism during the dry season which affects students' performance tremendously.

Without water, children stay out of school. If water is available, it will encourage attendance rather than students having to fetch the water.

### **Takai: what about the lack of water on performance?**

Mary Sameto: it causes poor performance on the exam. They don't perform well at older levels. They are absent so much that they do not pass their 8<sup>th</sup> grade exams and end up causing problems in the village. It

affects the whole community. Because of that problem, we could have a boarding school here for girls with water.

Mpoe: we don't have a lunch program. With water we could have a garden with vegetables that sustains the children during the day.

**Pramod: how is the land used by the school currently?**

We have a small lot of wheat that is rented out.

**How does the lack of water impact learning activities in the school?**

Mpoe: Kids love to play and they sweat when they play.

Mukoma: They avoid playing because they can't wash after they play. Being dirty in the classroom is not conducive to learning because it affects their concentration.

Mpoe: They can't work with clay in the younger classrooms because they need water for this activity.

Mukoma: the classrooms are very dusty which is not good for the children's health.

**Kasuna: performance is not just how students do on the national exam, but also how the students perform in relation to teachers' expectations.**

Mary Sameto: the hope is for great improvement and thus better results. If they don't have to fetch water they can study more at night.

Mukoma: If water is available they (students) can be more healthy and active, and not dull.

Mpoe: most children and parents are affected by typhoid. So the water will help first with health and then food. The money they have to spend for hospital fees can be used to buy food and books.

Mukoma: in 3 years we will have 1000 students at this school because of the water.

Mpoe: this will become a boarding school when we have water. And we want a polytechnic program here too. If we get this water we will build this program. The local community supports this school.

For children who cannot go to secondary school, they can go to polytechnic school and in that way they can get a university education. They can be a carpenter or a tailor. Now, after class 8, children get lost. If the water becomes available, the polytechnic program and boarding school can be constructed. The gov. encourages a vocational program to promote self reliance.

Mpoe: Parents support to the school right now is low. If there is water, more people will start income-generating activities. They will be economically empowered and will start giving more money to the school.

**Parents vs. government-funded teachers?**

3 primary and 1 nursery school teachers are supported by parents.

**Absentee-ism?**

Mary: students don't attend school regularly. Some girls drop out. Girls are married early and drop out of school. FGM is happening but ppl are hiding it from the government. The primary schools teach students that FGM is bad. It's a cultural practice that is important and that is why it is still done by the Maasai.

**Diseases? Is there a clinic at the school?**

Kisuuna: we have a new system of government that is closer to the people. Now, the closest clinic is far away (researchers had different numbers written down: 20 km to Narok clinic, 10 km to Narok clinic, and 5 km to clinic in the other direction). If the water becomes available, this community and school will become more attractive for doctors and the creation of a dispensary in town. A government doctor will come and stay here. There is community land that is available for a dispensary. Population growth is anticipated after the water comes, and it will increase the amount of teachers and students at the school. Child mortality will also decrease.

**Tree Nursery project:** the trees will help the community by attractive rainfall and will encourage the surrounding areas to continue planting more trees. Notes: the tree project is pretty big, and Rachel is head of this project. Uses a lot of water currently.

### **Student Interviews**

Students: Timpian Sordo (class 8) dream: surgeon, Paris Muntet (class 7) dream: doctor for people, John Tapote (class 8) dream: to be a minister of water (I want to do projects like this rotary project), Joshua Toporti (class 7) dream: ambassador, Felix Nambasu (class 6) dream: judge, Sharon Nasieyku (class 5) dream: pilot, Kevin Sanari (class 5) dream: engineer, Nantayian Nchoye (class 6) dream: lawyer.

### **Mary Sarmeto: you are being asked about the problems you have at school because of the lack of water.**

Paris: You come to school without washing your uniform. you miss school, you are thirsty in class, and you can't concentrate on learning because of the dust. You miss 2-3 days of school at a time.

Timpian: you get home at six after dark and then you have to go get water. we are already very thirsty when we get home from school. Its very dangerous because there is wildlife at the river such as elephants and lions.

Paris: breathing dust in the classroom affects our lungs. Kids get sick from the dust.

Timbian: On Friday we are supposed to wash the classrooms but we can't. We have to carry water from home to wash the rooms, but we don't always have water at home so this is very hard.

Paris: there is no time to do homework or study at home because we have to fetch water.

John: we get sick with cholera and typhoid from not washing our hands, especially after using the toilet.

Timpian: we could use the time spent going to the river on studying after we get water.

Joshua: if we get water it will increase our concentration in class because we won't be thirsty.

### **Notes:**

-School established in 1969, 16 acres of land owned by school.

6 team teacher (funded by the gov.)

4 Primary teachers (funded by the gov.)

4 pre-primary teachers (funded by the community)

At the project site (near the borehole) nursery: 80 children

95 total in pre-primary

-the main facet for social networking in this town is the church community (resource pool). With a lack of economic resources in the town, there is a lack of event-building and activities in town. Lack of infrastructure, besides those that exist because of the churches. How will water become a mobilizer of resources and perhaps decentralize power holds that are located in the church community?

Naeku gave some land for this school, back in the 50s.

### **Questions:**

Future development and finances to allow school to become a boarding school and hold more students?  
The school is already pretty cramped with the amount of students who currently attend school.

## Interview #11

J.S. Ole Naeku School, Rotian Interview

25 June 2014

**Interviewers:** Mary Poole, Pramod Parajuli, Charles Takai, Pastor James, Angela Hewitson, Sasha Timpson, Julia Glennon, Ellie Healy, Charles Lazarus.

### **Teachers present:**

Head teacher Ester Sedera (class 1), Mrs. Kisanto (class 4-8), head teacher Pauline Meitamei (class 5-8), Madame Kamwero (4-8), Anthony Silombe (4-8), Deputy head teacher- Samuel Gichiaah (5-8), Victor Ochiem (6-8), Margaret Kisosien, Clementine Kumumware (4)

Started with a prayer.

**Students enrolled:** 428. 227 boys, 201 girls.

### **How is education going to be improved?**

Pauline: water is life—it is essential. Our children will be able to come to school because their parents will be able to wash their uniforms. It is very dusty here, and most students can only wash their uniforms on Saturdays, once a week. Parents cannot wash the clothes at night so they go the whole week without washing the uniforms. Many people (teachers and students) suffer from chronic typhoid. They will be able to access clean water for drinking and cooking food once we have the water.

Anthony: we can have improvements with students' hygiene. Water will also help to initiate projects at the school, like the creation of a dairy. We can also start a greenhouse and a garden for vegetables. The children don't eat enough now.

Ester: we can have an irrigation/demonstration farm at the school and increase veggie production. The school has 17 acres and is currently registered by the KECP. We have wheat growing on 5 acres for the school. We rent out 4 acres to other growers. With water we will be able to cultivate our land.

### **How many teachers?**

Pauline: we have 11 teachers who are paid by the gov. and 1 teacher paid for by the parents in the primary school. In the nursery school there are 2 teachers who are paid for by the parents.

### **How does the lack of water impact learning activities at the school?**

Pauline: It really does affect them. We are growing wheat at the school and we have to spray it with herbicides. We give the children jerry cans to go get water and mix it with the herbicides to put on the wheat. The children miss a whole day of school getting the water for this task.

Samuel: the lack of water prevents the students from using flush toilets. The kids get diseases and it affects their learning

Anthony: they also don't wash their hands after they use the bathroom and they get sick and have to stay home.

### **Pramod: vacancy rates?**

A sample day of absenteeism at this school:

Grade	Boys	Girls	Total
1	6	9	15
2	4	6	10
3	8	12	20

4	7	10	17
5	3	5	8
6	4	5	9
7	5	6	11
8	2	1	3
Total absent out of 428	39	54	93
22% absent.			

Pauline: one boy was out for 2 weeks because of water-borne disease. This is very common. There is also no school lunch and hunger is a big problem. Students come from home already hungry and are here at school from 7 in the morning to 5 at night without meals. They fall asleep in class. We used to have a donor who supplied funding for school lunches but he discontinued these funds and now we have no lunch program.

Samuel: we can revive this program when we have water.

#### **How does the lack of water impact your teaching?**

Pauline: it really affects us. We are old and walking to the river is hard for us. We are expected to be in the class, and that's why we have the children bring the water.

Samuel: we have to buy water which affects us financially

Pauline: the learner always loses.

Anthony: the teeth are brown because of the lack of good water. Maasai people usually have good teeth, but these children have brown teeth because of the brown water.

#### **What is the main impact of the lack of water?**

Samuel: The upper classes do not carry lunch and are not well attended.

Pauline: Up until 1pm, there is good attention. After this point, the children are very hungry and they lack concentration.

Samuel: during the dry season, the children take the animals herding and they must take the day to look for water instead of coming to school.

Pauline: There are three levels of secondary schools (village, county, then national schools). We can't produce national school candidates because there are so many student absences. The students are not poor (in terms of their intelligence), they just have poor attendance.

#### **What will be made possible at this school with water?**

Pauline: life will be wonderful with water. We will get many more children, start growing veggies, keep cows to produce milk and porridge for the children. We will be able to get kids to go to college and our enrollment will get up to 600 children. We will be able to convert the school into a boarding school so kids don't have to walk as far

Samuel: sanitiation will also be improved

Anthony: we will be able to improve the environment by watering trees and flowers. This place will be beautiful.

Mrs. Kisanto: Skin diseases will decrease. Parents will also become more involved.

Anthony: it will improve the meaning of education and students will be more present for afternoon classes.

#### **What are the biggest hindrances on the school right now?**

Anthony: food is a big issue. The students don't pay any attention in the afternoon because they are hungry. Absentees are a big issue here.

Samuel: Parents don't know the meaning/importance of education because of cultural practices such as early marriage and FGM.

**Takai: what is your dream for the environment here?**

Pauline: we have a dream to plant trees all over this compound and along the road to cut down on dust and wind at the school.

Anthony: in social studies we talk about trees. So we can use these trees to teach our lessons. They will be valuable teaching aids.

**Strategic plan for the school?**

Pauline: we want to go from a day school to a boarding school. This will avoid girls dropping out of school because of early pregnancy. We will be able to take proper school of the students and feed them well. There is a plan for secondary school and possibly vocational school to accommodate academically talented students here. We can lecture parents about the importance of education.

Takai: Mission statement of the school?

Samuel: we want to produce holistic students who strive to excel.

**Any Qs for us?**

Pauline: thank you very much. When you come back here in one year, we will have done a lot. We will have moved. These teachers are so creative. We are already imagining a school with water, and we are going to use good use of this water! Please make sure it arrives as soon as possible. Will there be a tank here at the school?

Takai: yes.

Pauline: will it only be for our use? We want to keep strangers out.

Mary: the purpose of this project is to provide water for the community, not just the schools.

Samuel: who will maintain the source?

Takai: management committee, the water is very clean and safe.

**Student interviews**

Names of students: Sitoya Letodruo (class 7) dream: engineer, Faith Kwongoi (class 7) dream: doctor to cure water-borne diseases, Nicolas Leshan (class 8) dream: journalist, Alice Kohl (class 5) dream: journalist, Benjamin Mwangi (class 5) dream: pilot, Sision Kalari (class 6) dream: lawyer, Peter Mwangi (class 6) dream: pilot, Simiayie Samamuala (class 8) dream: doctor.

Pauline: introduced us to the students by explaining, 'you see these people, you see water. These people aren't here to punish you. They just want to hear from you about water. Tell them the truth. They will take you back to America.'

**What is the water problem here?**

Simiayie: classes become very dusty. We want water to clean our classrooms.

Peter: many people die because there is no water. The water from the river is very dirty and far. Our bodies and clothes are very dirty too.

Sision: we come to school without washing our clothes. Our shoes and socks are very dirty. There is a bad smell in class because there is no water to wash.

Benjamin: water borne diseases are killing lots of people.

Alice: our lungs are dirty and we cough a lot.

Nicolas: the river is very far. The water from these rivers is very dirty and not good for consumption. The classes are dusty, and there are many diseases and death because of the bad water. The teachers complain about our smell. There is also not clean water to take our medicine.

Faith: our flowers and trees need water. When there is no water there is no life.

Sitoya: water supports life. There are many skin diseases. We cannot wash our hands after going to the toilet. We also miss days of school and lessons because of the walk to the river.

**How many of you carry water and how often?**

Everyone: we all carry water, every day.

**How many days do you miss a week and how much water do you carry?**

1-5 days are missed by the students. They carry 5-20 liters of water every day.

Simiayie: we spend more time fetching water than coming to school.

Peter: we walk too far to get water.

Sision: we sleep in class and cannot concentrate

Benjamin: when the teachers ask us questions we can't even concentrate

Alice: it's very dark when we open our books to read and study

Nicolas: It takes a long time to fetch the water. We get very tired and it is also dangerous. We sometimes come across animals like leopards.

**What will happen when water comes?**

Simiayie: I would like our school to turn into a boarding school. I would like to live at school.

Peter: the road to school is very dusty. We get punished for being late and dirty. We can't even wash our shoes and socks so we have to walk barefoot to get water.

Sision: we will be able to irrigate the trees on our compound and diseases will be reduced. The water will bring a better environment for learning.

Benjamin: I would like this school to become a boarding school because it is a very far walk to the school from home.

Alice: we will be able to cook food for ourselves with this water.

Nicolas: When we get to school in the morning, we are often tired and late because of the long walk. As we all know, cleanliness is next to godliness. When this school becomes a boarding school, we will be clean and avoid wild animals in the early morning.

Faith: we can have crops and cattle here. We can be happy.

Sitoya: we can water the trees. I live very far from the river. I can't do my homework because I get home so late from fetching the water. With water, we won't miss our classes anymore.

**Notes:** the teachers made us tea. The students were so direct about getting punished when they are dirty in class. Transparent interviews. The students asked us about how our local government manages our water and if we have water problems where we live.

## Interview #12

Ole Naeku Family Interview, 27/6/14

**Interviewers:** Mary Poole, Pramod Parajuli, Charles Takai, Julia Glennon, Eleanor Healy, Angela Hewitson, Charles Lazarus, Sasha Timpson, Alice McKusick

**Interviewees:** James Ole Naeku, Martha Naeku, Diana Twala, Charles Takai

### **What is the agro-pastoral history as well as the ecological and cultural history of this place?**

Martha: As I know, we (Maasai community or herself?) came here (rotian) in the early 60s. We found nothing but very thick bushes. The Maasai huddled together in small houses, living together in big villages or manyattas. There were no single houses. (AKA no private property). Initially they were entirely living on cattle, without schools or churches. My father was a chief in the early 1900s when the white people came. He knew about farming and so I learned from him. I got married and started doing some farming. People were very hungry here so I started training them to farm. I made them work to get this food.

Ole: Let me interrupt. You taught before that.

Martha: Yes, I was initially a teacher in Trans Mara in '62, got married in '63.

Ole: I was a manager at the sheep farm at Purko in Mau Narok.

Martha: I joined him on the farm in Mau Narok. I told the ladies what to do and they worked together to dig and get their own food. A Kikuyu woman stopped me saying that the Maasai people weren't buying their food, because I was teaching them. After that, I realized that there was no church in this area. The old man gave land to the school, where I began working with the teacher to teach about Jesus Christ and God. I started a Sunday School too. This is was the starting area to teach the Maasai men and women about God. The Maasai women started teaching the Maasai men about God. I told the women to plant shambas. Before, the people didn't have food, and they would come and take my food at night. But now the people have food so they don't steal mine.

Martha: The people work for me for a month and I would teach them how to farm. They then move on and practice themselves. I enjoy working with the Maasai, we are very lucky to live with them. They are good people.

Ole: Not only good but generous.

Takai: She planted the seeds of agriculture in this area and the word of God.

Diana: I was a teacher as well and got married in Trans Mara. Now I work breeding cattle (siuol), a dual purpose animal, for milk and beef. All my knowledge come from them (her parents), agriculture flows in their blood.

### **Pramod: What is your vision for the schools?**

Martha: They need cattle. Milk is more profitable. The land is small so they can have a few cattle. So by then (the future) they won't have to work as hard. Also, to put shambas in place at the schools.

### **Mary: I'm curious about the schools, can you tell us more about them?**

Martha: Maasai like school so much. The government sends us good teachers and encourages the children to have good ambitions about school. In the future we want this to be a boarding school, especially for girls. Once we get girls properly educated, we can have them build proper homes. At home, kids don't learn properly, they have too much work to do taking care of home and cattle, delaying their education. At boarding school, they concentrate on their work. In the 1950s, the school I went to in Suswa, was very small and far from home. The teachers were not very educated. The fathers told the girls, after class 3 or 4, to go home and get married. The school we founded was in 1965, the same time we donated the land.

Ole: It was founded by missionaries from Illinois (AIC).

Martha: Missionaries have done so much in this area.

Ole: This school has produced so many lawyers, doctors, engineers. Even our member of parliament was from this school.

**Mary: Has this always been Maasailand?**

Ole: Yes but families were also moving everywhere because of the grazing. There were not many changes following the 1904 Agreement.

**Mary: This region was forested until the 1960s?**

Ole: The region was forested before the 1960s. Maasai never wanted agriculture because it was destroying their grass feeding their cattle. There was a value for livestock over agriculture. If someone wanted to cultivate, they may be cursed by the community.

Martha: When you cultivate land, you remove the roots of the grass.

Takai: The Maasai do not like change.

**Pramod: Gradually this changed?**

Martha: Today they like agriculture more than anything else. They moved from Mau Narok to here when agriculture started to be prolific there.

Ole: When I started farming, I had a problem. I was advised from the Ministry of Livestock to construct a cattle dip. Cattle had disease- the ECF (East Coast Fever). I wanted to spray the cows and get a cattle dip but the Maasai were against it because they believe the cattle had an immunity against the disease and the cattle dips would remove that immunity, so it was hard to convince them.

Martha: Maasai cattle do have the immunity to this disease that ticks often spread.

**Mary: Are there group ranches here?**

Ole: Maasai cattle are unproductive, they produce little milk or meat. Government group ranches did not occur here. I was the first man to fence my farm and the Maasai were against it. They thought it was very European. I had to fight very hard to convince them. But now they know it is good to have your own area. It is better for everyone to have their own title than to have community land.

**Mary: Does communal land create problems?**

Ole: Yes, because no one has the rights for their land.

Martha: They were finally convinced to give Ole this land because he had over a thousand cattle. Since he had over a 1000 cattle he felt entitled to be recognized by the community. If you do not have cattle you are not recognized, even if you have a big house. Even today, if you do not have cattle, you do not deserve the land. Cattle are very important. He is a typical Maasai man, the more cattle he has, the more respect he has, the more like a man he feels. He still owns many cows. He was given many wives to look after the property but he denied them because his madam was enough.

**Pramod: Then Martha comes in and says that this land can be cultivated!**

**Mary: Have there been any other big changes here?**

Ole: Yes many, but slowly. I was a member of the Purko Sheep Ranch in Mau Narok. We had sheep and grew wheat and barley. We brought that idea to this area. In those days they said that this area was not suitable for wheat, but we tried and saw that wheat grows very well here. We found that this soil is very good for agriculture.

Martha: Even now people are growing more trees which is very good. This school was the first school and has produced so many more schools. There are three big things. First, the first school really brought everything such as the churches. Second, there has been harvesting of water so people do not carry the jerry cans as before. They are not walking far. Thirdly, they are not looking for food, they have their own shambas. They grow their own food, storing their own seeds and then later growing them. And also, people are clean now, they are healthy people with less diseases. Now to give birth, they go the clinic, they do not give birth at home. People have gone far and now they have their own small cars. We used to drop people into town, but now they have their own. I say thank you God because everyone is getting their own things. When you work hard, you are known. Once you have your own cup of tea and everybody else has their own cup of tea, you are happy and you thank God.

Ole: Back then, we had to cut down the forest. In these days, the ministry and government were not very strict and we hired bulldozers to clear our bushes but not trees for farming.

**Pramod: Because the forest was cleared, how does that affect the water?**

Ole: Yes, this caused a lot of erosion affecting the water levels. People are burning charcoal too.

**Pramod: How do we heal the ecosystem?**

Martha: To me, this cutting of forest is a way of getting money. They do not burn the charcoal themselves but give people the wood from the forest to burn. More boreholes will help people to plant more trees to raise water levels. Bringing water will bring more trees, bring more cattle, bring more for the kitchen.

Diana: The Maasai should be encouraged to use an alternative method of energy such as biogas. They can burn cow dung in their houses instead of charcoal.

Ole: I still have forest here, so people come here and take my wood.

Martha: People surrounding us tried to steal our firewood.

Ole: In 1970, I started supplying people water here up to today, a span of 44 years. We have a small stream. I even helped the schools. People come here for the water. I have a pipe from the stream to the school. This side of the road is cleaner than the Siyapei River unless it rains, then the water is dirty and brown. The water is even dirty in this river. We purify our water but it is very expensive.

Martha: Now the pipes are rusted. Today, these people are still demanding water from us but we do not have strength to replace the pipes. People even come to my house asking for water. Am I supposed to

feed the whole village? And they expect water because we started this. I am very happy you are bringing water here. I can afford water from town but the people can't. I cannot give the entire community water with one drum. I have dairy cattle and they need water. My cattle will get diseases from the river. Water shared between everyone has diseases because of one sick cow.

**Takai: How much water do you use a day?**

Martha: 50 cubits

**Mary: Why is the Siyapei River so dirty?**

Ole: Mau Narok plowing puts chemicals into the river. Those areas are very steep and the chemicals run off into the river.

**Mary: Can the river be healed alongside agriculture?**

Ole: The only way to bring back the river is to plant trees to bring more rain and clean out the rivers.

Diana: We need to plant more bamboo. People are planting more trees in Mau Narok. The Ministry of Forestry and NGOs are directing these projects in the Mau Forest.

Ole: But, they do not have enough water, they are lacking funds.

Martha: Everyone is working on planting more trees. These people of ours, they never knew about money before burning charcoal. People come to Narok because they can make money here. Now that they know money and want to send their children to school, they use the forests and charcoal to get money to get school fees.

Takai: The Ministry of Agriculture is very reluctant these days; they don't care about the charcoal. The poverty level goes up because now they need money for school fees- that is why the charcoal production goes up.

Ole: People will cultivate on the slope.

Takai: And on the terraces and contours.

Ole: Newcomers come from outside of my land and they don't know or care about where to plant.

Martha: People only think about today, not tomorrow.

Mary: We have been interviewing people and have heard from the community that they care deeply for the water. People here think about people and the health of the environment as the same thing. If the land isn't healthy the people are not healthy.

Diana: Trees are sacred to the people. The forest should be taken care of and without water, the cattle will not survive and the people will die.

Pramod: But now Kenya has the potential to "leapfrog" from ecological development into a healthy place of living.

**Takai: What about Mau Mau rebellion and the colonial era?**

Martha: When Mau Mau happened, we were not here.

Mary: I'm amazed by the schools being here so early in Maasailand. I am very honored to see this contribution.

Martha: Today there are so many boys and girls going to university. They need to continue being educated to better treat the land and our surroundings.

Notes: Question came up about piping water to the new borehole to their home. Martha expressed concern in only wanting to pay the maintenance fee if everyone had to pay.

## Water Committee Meeting

Interview #13

Location: African Inland Church (AIC)

Date: June 28, 2014

Interviewers: Mary Poole, Pramod Parajuli, Charles Takai, Alice McKusick, and Mark Kasoe

Committee Members: Chairman John Kisuna, Steven Sanamwala (Committee Member from Rotian), Joel Karia (Community Member), Noinkishu Muntet (Committee Member), Mary Mpoe (Treasurer), James Mailugo (Secretary)

Students Present: Ellie Healy, Sasha Timpson, Julia Glennon, Charles Lazarus, Angela Hewitson

**Mary: Thank you for having us. We know a lot of thought and work went into this. What is the vision that led you to create this project? What will make this project sustainable?**

Committee Member: The committee is in charge of the cost related to this project. We need minimal fees for the water to go towards the maintenance fund for a watchman to look after the borehole site to hire a fulltime plumber just in case the pipes break. We want to gather funds from our people instead of looking towards external sources. Another part in making this project sustainable is project ownership. "This thing is ours, it has not been brought to us, we initiated it." We want to recreate the cattle dip with a new committee. The water will promote many other types of projects, such as polytechnic and forestry programs. We will also encourage the community to think about a permanent dispensary and health center

The nominal fee we are discussing thus far is five shillings per twenty liters.

**Mary: When we asked the community what the biggest problem was about water they mentioned disease, the time involved in carrying water, the hardship on women and everyone. They also talked about the "source" of the problem in Mau Narok with the plowing up there which destroys the rivers. We specifically heard that the water committee leadership needs to understand the source. What did the community mean by that?**

Committee Member: We need love for the source. We need to care for the water and the chemical spraying pollutes the water but we haven't had any alternative. There is typhoid, highland malaria, and stomach problems. The chairman of the peace committee, a member of the water committee, also is a part of the water ministry of the government. The objective of this peace committee is to protect the source of the water and its forest. They do tree planting and reforestation and look at what destroys the watershed of the Rift Valley for the Mara River and the Mau Forest. The government realized that Mau was getting out of hand and so they have to start involving the communities on conservation projects. They realize that the preservation of the water is the same as the preservation of the forest. They form committees of people who live near the Mau Forest which are very powerful which can allow or reject borehole proposals. They can also arrest people who drill illegally and protect against exploitation. Boreholes are not allowed to be drilled within five km of each other to save the groundwater. Indigenous trees are planted to clean the rivers. When it rains, soil washes into the rivers which smells awful due to

the chemicals- a highly sensitive issue. People start developing cancer from this water because of these chemicals.

**Mary: What challenges have you faced? What challenges do you anticipate?**

Committee Member: The borehole water is a lot better than the river water, but that is all we have. We are worried about being fully reliant on one source because we don't know how much water the borehole site has. When it rains a lot even livestock refuse water. "You can bring the cattle to the water but you cannot force them to drink." Change is really difficult. Changing people's minds is difficult to convince them that the borehole water is better for them. A challenge is that we do not know if people will agree to pay for the water and what the charge will be like for livestock consumption. A challenge is that people that live close to the river will have to travel farther to get water from a kiosk or the borehole site. Also because the water from the river is free, it discourages people to pay for the water at the borehole site. We will have to sit down as a committee to figure out how to bring this water closer to people.

**Takai: How will money get raised locally and outside the community?**

Committee Member: We are looking for additional funds and support through local fundraisers by charging the members of the community who want access to water. Externally we are seeking support through the Constituency Development Fund (CDF) by writing a local authority to fund the project. There is another option to write a proposal for county government funding. We are members of the Rift Valley Water Resource Management Authority but no funds have been allocated for development.

When the polytechnic program, boarding school, cattle dip and dispensary developments are finished, these projects will be the biggest users of water.

**Mary: When will there be new elections for leadership?**

Chairman: Elections just happened, if the community sees that you are doing anything you are out of the committee. We operate under a socialist rule system and have reelections every three years.

Question: Are the AIC and Compassion International Church (CCI) in competition with each other?

## Interview #14

Forestry Interview with Rachel Nyanchama Masi- Kenya Forestry College

This nursery program serves as a model for this community's reforestation plan:

### **Who sponsors this project?**

RUA- Resource Users Association (Enkare Narok) sponsors the reforestation project at Moi Primary School. Sponsorship members belong to the Sikinderr River arriving every Monday to help Rachel keep that river alive. This association struggles with funding and is only able to deliver 10,000 shillings to Rachel every month.

### **In what other areas of Kenya is this project in place?**

There are many other projects in Kenya like this one such as the Green Zone, Tukana, and other counties.

### **What is the role of this nursery for reforestation?**

The main purpose of the project is to conserve the river and produce fodder (food) for the farmer's livestock.

### **Is this program for Narok as a whole or for this specific village/section of the community?**

There is another project for the Siyapei River at the secondary school for girls(find the name).

### **What are the reforestation plans for both rivers? Private lands? School grounds?**

Land where trees are planted is on private land. By law, a hundred meters is left on both sides of the river to specifically plant indigenous trees.

When the seedlings get bigger, Rachel will teach the farmers personally about inter-cropping as well as how and where to plant trees. By 2030, each family is encouraged to have 10% tree coverage on their piece of property. Currently, there is 6.456% coverage. Students, grades 5-8, assist Rachel with the project through the Environmental Club. Last March, 380 orphans were given seven seedlings per home to plant on their properties.

The problem with water prevents her from planting more trees.

### **Is this program a part of the initiative for creating green schools?**

This program is not part of a green school initiative.

### **What about private family farmers in regards to woodlots?**

Woodlots demonstrate a place where up to 300 trees are planted to produce a small forest. Since the Maasai community here have a good deal of agricultural space, this would be an ideal place to construct woodlots, especially through inter-cropping.

Rachel will try to sensitize woodlots, "...just establish one acre for a woodlot."

The community land space where the borehole is located has a total of four acres on either side

of the road and is an ideal space for a woodlot and can serve as an example for community members.

### **Is this nursery related to agroforestry?**

Rachel's project is a part of agroforestry program. This will help encourage intercrop and edible forests.

### **Could we have a list of the plant names (Maasai and biological)? What are their purposes (medicinal, if they increase/decrease water levels)?**

Moringa Olevera encourages root growth, water level increase, and does very well in drylands. (very expensive)

Bamboo can only be propagated, not seeded, and will never die in dry weather. Bamboo is a resourceful tree that can purify water.

See list of 52 plant species.. create a table..

### **What is your expert opinion on the relationship between rainfall, groundwater, and the trees and forests?**

The forest can hold underground water. Without trees, the water level will go down. Trees trap rainfall, central Kenya never experiences drought because it is covered. "If you don't have trees, you have a big water problem."

On pesticides..

Pesticides affect the plants along the river and they will die because of it. Trees will prevent erosion and purify the water.

Local people who have never been to school see the negative effects of fertilizers. They know they are getting side effects from the chemical sprayed on their farms. Because it is a foreign substance and they don't know what is in it, they are less likely to use it producing an easier transition to organic farming for small farmers. This community has a lot of livestock and can use the manure for fertilizers and biogas like in central Kenya.

With time, Rachel expects to teach community members how to use less firewood. Community members are taking more authority to police their forests so that people cannot go in with a large trucks and chop down trees.

Rael (Rachel) Nyanchama Masi

[Rachelmasi95@gmail.com](mailto:Rachelmasi95@gmail.com)

### Plants and Tree Species in Eorr Emayain Area

	Tree Species	Common Name	Purposes & Uses
1	<i>Acacia abyssinica</i>	Flat-Top Acacia	<ul style="list-style-type: none"> <li>-Fuel wood</li> <li>-Poles/posts</li> <li>-Shade to other crops</li> <li>-Ornamental</li> <li>-Improvement of degraded land</li> <li>-Nitrogen fixing to the soil</li> <li>-Fodder (leaves)</li> <li>-Bee forage</li> <li>-Medicinal (bark and roots)</li> </ul>
2	<i>Acacia mearnsii</i>	Black Wattie	<ul style="list-style-type: none"> <li>-Production of tannin</li> <li>-Fuel wood</li> <li>-Poles/posts</li> <li>-Wind breaker</li> <li>-Ornamental</li> <li>-Soil conservation</li> <li>-Gum production</li> <li>-Fibers from the bark</li> <li>-Medicinal (bark and roots)</li> <li>-Fencing</li> <li>-Bee forage</li> </ul>
3	<i>Acacia melanoxylon</i>	Australian Blackwood	<ul style="list-style-type: none"> <li>-The darker brown heartwood is the most decorative timber, mainly used for sliced veneer</li> <li>-Fuel wood</li> <li>-Poles</li> <li>-Ornamental</li> </ul>
4	<i>Acacia xanthophloea</i>	Naivasha thorn	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Fuel wood</li> <li>-Poles/posts</li> <li>-Fodder (foliage and pods)</li> <li>-Medicinal (bark)</li> <li>-Bee forage</li> <li>-Nitrogen fixing</li> <li>-Ornamental</li> <li>-Provides shade to other crops</li> </ul>
5	<i>Adansonia digitata</i>	Baobab	<ul style="list-style-type: none"> <li>-Food (fruit pulp, seeds, leaves)</li> <li>-Medicine (roots and bark)</li> <li>-Fodder (leaves, shoots, fruits)</li> <li>-Bee forage</li> <li>-Fibers (bark)</li> <li>-Gum production and resins</li> </ul>

			-Dyes (bark) -Ornamental -Setting beehives
6	<i>Afzelia quanzensis</i>	Mahogany Bean	-Timber production -Construction purposes -Furniture making -Medicinal
7	<i>Albizia gummifera</i>	Peacock Flower	-Timber -Pole -Fuel wood -Medicine (bark and roots) -Fodder -Bee forage -Nitrogen fixing -Ornamental -Shade
8	<i>Azadirachta indica</i>	Neem Tree	-Fuel wood -Charcoal -Timber -Poles -Medicine (bark and leaves) -Bee forage -Ornamental -Erosion control -Windbreak -Insecticide -Soap manufacture
9	<i>Balanites egyptiaca</i>	Desert Date	-Fuel wood -Charcoal -Timber -Edible fruits -Vegetable -Oil production -Medicine -Fodder -Shade -Mulch -Windbreak -Live fence -Gum and resin production
10	<i>Callistemon citrinus</i>	Bottlebrush Tree	-Ornamental -Windbreak -Bee forage -Fuel wood
11	<i>Casuarina cauisetifolia</i>	Whistling Pine	-Timber -Fuel wood -Pulp -Pole -Fodder and mulch -Green manure

			-Production of dye and tannin
12	<i>Cordia abyssinica</i>		<ul style="list-style-type: none"> <li>-Nitrogen fixing</li> <li>-Fodder</li> <li>-Bee forage</li> <li>-Timber</li> <li>-Shade</li> <li>-Ornamental</li> </ul>
13	<i>Croton macrostachyus</i>	Tebesvet	<ul style="list-style-type: none"> <li>-Fuel wood</li> <li>-Poles</li> <li>-Timber</li> <li>-Medicinal (bark, roots and leaves)</li> <li>-Bee forage</li> <li>-Fodder</li> <li>-Mulch and green manure</li> <li>-Suitable in intercropping (agroforestry)</li> </ul>
14	<i>Croton megalocarpus</i>	Musine	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Fuel wood</li> <li>-Medicine</li> <li>-Bee forage</li> <li>-Green manure</li> </ul>
15	<i>Cupressus lusitanica</i>	Mexican Cypress	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Poles/posts</li> <li>-Fuel wood</li> <li>-Live fence</li> </ul>
16	<i>Dombeya tomentosa</i>	Mukeo	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Mulch</li> <li>-Poles</li> <li>-Green manure</li> <li>-Medicine</li> <li>-Fiber</li> <li>-Bee forage</li> </ul>
17	<i>Dovyalis caffra</i>	Kel Apple	<ul style="list-style-type: none"> <li>-Live fence</li> <li>-Food (fruits and jam making)</li> <li>-Bee forage</li> <li>-Ornamental</li> </ul>
18	<i>Erythrina abyssinica</i>	Flames Tree	<ul style="list-style-type: none"> <li>-Carving</li> <li>-Medicine</li> <li>-Fodder</li> <li>-Bee forage</li> <li>-Ornamental</li> <li>-Mulch</li> <li>-Nitrogen fixing</li> <li>-Soil conservation</li> <li>-Ceremonial purposes</li> </ul>
19	<i>Eucalyptus camaldulensis</i>	River Red Gum	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Poles</li> <li>-Plywood</li> <li>-Veneer</li> </ul>

			-Fuel wood
20	<i>Euceuyptus globulus</i>	Tasmanian Blue Gum	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Plywood and veneer</li> <li>-Poles/posts</li> <li>-Bee forage</li> <li>-Pulpwood</li> <li>-Medicine leaves</li> <li>-Fuel wood</li> <li>-Production of essential oils (leaves)</li> </ul>
21	<i>Eucalyptus grandis</i>	Flooded Gum	<ul style="list-style-type: none"> <li>Timber</li> <li>-Poles/posts</li> <li>-Plywood</li> </ul>
22	<i>Grevillea robusta</i>	Silky Oak	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Fodder</li> <li>-Poles/posts</li> <li>-Bee forage</li> <li>-Fuel wood</li> <li>-Soil conservation</li> <li>-Good for intercropping</li> <li>-Windbreak</li> <li>-Ornamental</li> <li>-Mulch</li> </ul>
23	<i>Hagenia abyssinica</i>	Hagenia	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Poles</li> <li>-Fuel wood</li> <li>-Green manure</li> <li>-Soil conservation</li> <li>-Ornamental</li> <li>-Intercropping (good in agroforestry)</li> </ul>
24	<i>Jacaranda mimosifolia</i>	Jacaranda	<ul style="list-style-type: none"> <li>-Poles</li> <li>-Carvings</li> <li>-Bee forage</li> </ul>
25	<i>Juniperus procera</i>	Cedar	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Production of shingles</li> <li>-Flooring</li> <li>-Pencil manufacture</li> <li>-Poles/posts</li> <li>-Medicine</li> <li>-Shade</li> <li>-Ornamental</li> <li>-Ceremonial Purposes</li> </ul>
26	<i>Kigeinia africana</i>	Sausage Tree	<ul style="list-style-type: none"> <li>-Wood is used to make the mortars and pestles</li> <li>-Yoke production</li> <li>-Posts</li> <li>-Fuel wood</li> <li>-Medicine</li> <li>-Fodder</li> </ul>

			<ul style="list-style-type: none"> <li>-Bee forage</li> <li>-Shade</li> <li>-Brewing of traditional beer (fruits used as a catalyst)</li> </ul>
27	<i>Leucaena diversifolia</i>		<ul style="list-style-type: none"> <li>-Green manure</li> <li>-Soil conservation</li> <li>-Dyes and tannin production</li> <li>-Bee forage</li> <li>-Fodder</li> <li>-Mulch</li> <li>-Fuel wood</li> <li>-Poles</li> </ul>
28	<i>Maesopsis eminii</i>	Musizi	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Production of veneer and plywood</li> <li>-Fodder</li> <li>-Shade</li> <li>-Ornamental</li> </ul>
29	<i>Markhamia lutea</i>	Markhamia	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Construction materials</li> <li>-Poles/posts</li> <li>-Medicine</li> <li>-Bee forage</li> <li>-Soil conservation</li> <li>-Shade</li> <li>-Ornamental</li> <li>-Intercropping (agroforestry)</li> </ul>
30	<i>Meija volkensii</i>	Meija	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Fuel wood</li> <li>-Medicine</li> <li>-Bee forage</li> <li>-Mulch and green manure</li> <li>-Fodder</li> </ul>
31	<i>Milicia excelsa</i>	Iyoko(?)	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Paneling</li> <li>-Frames and floor production</li> <li>-Fuel wood</li> <li>-Shade</li> <li>-Windbreak</li> <li>-Mulch</li> </ul>
32	<i>Moringa oleifera</i>	Drumstick Tree	<ul style="list-style-type: none"> <li>-Food (young pods, leaves and flowers)</li> <li>-Edible oil (seeds)</li> <li>-Water purification (pounded seeds)</li> <li>-Medicinal</li> </ul>
33	<i>Ocotea usambarensis</i>	East African Camphorwood	<ul style="list-style-type: none"> <li>-Timber</li> <li>-Paneling</li> <li>-Veneer and plywood</li> <li>-Medicinal (roots and bark)</li> </ul>

34	<i>Olea capensis</i>	East African Olive or Elgon Olive	-Timber -Veneer -Fuel wood -Medicine -Gum is edible
35	<i>Olea europaea</i>	Wild Olive or Brown Olive	-Timber -Fuel wood -Carving -Poles/posts -Medicine -Food -Bee forage
36	<i>Pinus patula</i>	Mexican Weeping Pine	-Timber -Pulpwood -Fuel wood -Posts
37	<i>Podocarpus falcatus</i>	Podo or East African Yellow Wood	-Timber -Poles -Fuel wood -Medicinal purposes (bark)
38	<i>Podocarpus latifolius</i>	Podo or East African Yellowwood	-Timber -Poles -Plywood -Fuel wood -Medicine (bark)
39	<i>Polyscias kikuyensis</i>	Parasol Tree or Muraki	-Timber -Production of food containers and tea chests -Veneer -Plywood -Beehives -Medicine -Green manure and mulch
40	<i>Prosopis juliflora</i>	Mesquite	-Timber -Carvings -Bee forage -Fuel wood -Food (pods) -Medicine -Poles/posts -Fodder
41	<i>Pronus africana</i>	Red Stinkwood	-Fuel wood -Food (fruits) -Fodder -Medicinal -Toothbrushes for tooth decay prevention
42	<i>Schinus molle</i>	Pepper Tree	-Fuel wood -Bee forage -Medicine

			-Shade -Ornamental
43	<i>Sesbania sesban</i>	River Bean	-Fuel wood -Fodder -Fiber -Nitrogen fixing -Erosion control -Intercropping (agroforestry)
44	<i>Spathodea campanulata</i>	Nandi Fiame	-Charcoal -Carvings -Medicine -Bee forage -Fuel wood
45	<i>Syzygium guineense</i>	Waterberry or Water Pear	-Timber -Fuel wood -Poles/posts -Food (fruits) -Medicine -Bee forage -Dyes and tannin production
46	<i>Tamarindus indica</i>	Tamarind	-Timber -Fuel wood -Posters making -Mokars(?) making -Poles/posts -Food (pulp) -Medicine -Mulch
47	<i>Vangueria madagascariensis</i>	Olgumi (Maasai)	-Fire wood -Charcoal -Timber -Food (fruits) -Medicine (roots and bark) -Shade -Tool handies stirrers
48	<i>Vitex keniensis</i>	Meru Oak	-Timber -Poles -Fuel wood -Food (edible fruits) -Medicine -Fodder -Bee forage -Mulch -Shade
49	<i>Warburgia ugandensis</i>	East African Green Heart	-Timber -Medicine (leaves and bark) -Fuel wood
50	<i>Ziziphus mucronata</i>	Buffalo Thorn	-Firewood -Live fence -Medicine

			-Ornamental -Fodder -Food
51	Olea Weicitchi	Ggon Tick	-Timber -Medicinal -Poles/posts -Fodder -Soil conservation
52	Parsia americana	Avocado	-Fruits -Timber -Fuel wood -Fodder -Agroforestry