Water for Schools

A YES Alumni Initiative

Project Proposal

The Water for Schools initiative aims to promote improved conditions for education and health through the installation of rain water tanks in 12 schools in Western Kenya. Through the optimisation of natural resource availability, the project will allow learners to spend more time in class instead of collecting water. The project will have a strong educational component and aim to empower the wider community with rain water harvesting techniques.

Executive Summary

School going children in many developing countries are often required to travel long distances during class time to collect water for use at school. As a result, many learners do not benefit adequately from the learning experiences available to them. The installation of rain water tanks, as proposed in this 'Water for Schools' project, aims to provide schools with the water they require onsite and alleviate the need for learners to spend hours retrieving water. The first phase of this project will be to install rain water tanks in 12 schools in Western Kenya. The 'Water for Schools' project has a strong educational focus for the learners and teachers, and will aim to empower the wider community on sustainable water management through a series of awareness and capacity building workshops.

The 'Water for Schools' project was conceived during a YES Alumni special course on Water and Sustainability which was recently held in the dry, rocky, water-scarce desert of Sinai in Egypt. The motivation was to take a practical action from the skills acquired from this course, and make a meaningful impact in the lives of hundreds of school children in impoverished communities in Kenya.

"Anyone who can solve the problems of water will be worthy of two Nobel Prizes; one for Peace and one for Science" *John F. Kennedy*

Table of Contents

Project Fact Sheet

Project Name	**WATER FOR SCHOOLS**		
Team Members	Kizito Masinde Violet Barasa Sevda Alanya Jess Schulschenk	Contact Emails	kizitomasinde@yahoo.com viobarasa@yahoo.com sevda.alanya@villanova.edu Jess.schulschenk@gmail.com
Challenge Addressed	School going children, especially girls, miss class in order to collect water for use at schools.		
Thematic Areas of Impact (Focus)	Health, Water; Education		
Geographic Area of Impact	Districts of Bungoma & Busia in Western Kenya [6 schools from each district = 12 schools in total for Year 1]		
Situation to be Transformed	- Lack of water - Children missing class time - Loss of rainwater - Frequent outbreak of water borne diseases - Ignorance on water and sanitation issues		
Complication	- Poor rural communities disconnected from services, infrastructure and funding - Cultural practices which deny girls educational opportunities by making them perform domestic roles, such as water collection		
Solution Chosen	- Installation of rainwater harvesting tanks at schools - Educational programme for teachers and students on global and local water issues - Education on installation of household rainwater harvesting tanks and general water management skills		
Direct / Indirect Beneficiaries	Direct: Students & Teachers Indirect: Parents, Families & the Wider Community		
Approach / Model	- Rainwater catchment system - Water Education Tool - Water Treatment (where necessary)		
Planned Impact	- Capture of rainwater for use in schools - Over 2400 students to access safe drinking water in 12 school - The students to benefit through increased time spent in class - Improved water management and cultural attitudes to water use through education of the students and surrounding community - Empowering wider community on water use and rain water harvesting		
Estimated Total Financial Resources Needed for Implementation	114,102.37 USD Given 12 tanks @ 4 739 USD each Additional cost of educational materials, transport, logistics and labour	Time Needed for Implementation	Phase 1: 12 months excluding securing funding
Human Resources Requirement	Logistics: Kizito Masinde & Violet Barasa Educational Materials: Jess Schulschenk & Sevda Alanya		

	Stakeholder Analysis / Participation: Violet Barasa Technical Support: Sevda Alanya
Team Management	Project Leader: Kizito Masinde
Benchmark / Existing Initiative	Kwaho (Local NGO) operating similar project but in different region UNEP Environmental Education Unit – existing educational resources
Information Source(s)	Kwaho / UNEP YES Alumni Network

SWOT Analysis	
Strengths (Internal) -Connections & networks -Expertise -Aligns with research and occupational descriptions	**Weaknesses (Internal)** - Time - Geographical distribution - Communication
Opportunities (External) -Community identified need -Local expertise -Affordable & locally available resources	**Threats (External)** - Political context - Accessibility to rural schools (i.e., logistics & transport)

Project Proposal

1. Background: Situation to be transformed

The escalation of poverty levels in many developing countries, including Kenya, has brought the question of resource use, ownership and access to the attention of researchers, academics, policy communities and development partners. Africa's relative abundance of water resources but its scarcity of economic means to harness available water resources has been the continent's major challenge (Vankoppen, 2003). Like in many other parts of Sub-Africa, access to clean water remains a significant challenge in Kenya. It is estimated that more than 60% of the population do not have access to clean water despite the fact that much of the country have reliable water sources and adequate rainfall. One of the main challenges is adequate infrastructure to harvest available rain water (Vankoppen, 2003).

Insufficient access to safe and adequate drinking water not only has health implications, but also social and economic impacts on communities. This is especially the case for women and girls who are traditionally responsible for domestic tasks such as the collection of water. Furthermore, school going children often bear the brunt of water shortages. They may miss almost hours of lessons taught in school each day as they have to collect water from remote sources, which is needed to clean the classrooms, drinking for teachers and students as well as other uses at school. Sometimes the water is retrieved from contaminated sources which have serious potential health implications. This situation has led to frequent outbreaks of water-borne diseases, which also further impacts performance in school. A research carried out jointly by the University of Nairobi and the Kenya Population Health Environment task force between October 2006 and April 2007 revealed shocking findings. It was discovered that at least one in every 3 children aged between 0-5 died each day due to drinking contaminated water. The research further found out that the larger part of Rift Valley and Central provinces of Kenya as well as some parts of Western contained too much fluoride in the water and this situation causes flourosis (Population Reference Bureau, 2008).

It is against this background that the YES Africa group proposes to address this situation in schools by installing rain water harvest tanks which enable students to stay in class to achieve a real education and also empower wider communities on sustainable water management.

2. Vision, Goals & Objectives

Our vision is to support education in poor rural communities in Kenya by improving access to clean water and empower communities towards sustainable livelihoods through collaborative dialogue and capacity building.

The overall objective of this project is to improve the quality and access to clean water for selected schools in rural communities in Western Kenya, through the installation of affordable and easily constructed rain water harvesting tanks. The goal of the project is to bring together the collective experiences of the YES alumni network to promote a practical solution to water shortages in the communities under focus.

3. Impact Potential

The two main outcomes the project will focus on are:

3.1 Sustainable water supply

The expected outcome from the installation of rain water tanks will be increased time that learners are able to spend in the classroom, with the ultimate outcome of increased learning and improved pass rates for learners.

Furthermore, the water will be stored in clean tanks with simple filtration systems that will ensure a safe supply of drinking water. Where necessary, further treatments may be introduced to ensure the safety of the drinking water. This will have significant impacts on the health of the learners and the wider community.

3.2 Capacity building

The project aims to achieve two capacity building outcomes. Firstly, the training of teachers, parents and other community members on practical skills of installing and operating rain water harvesting tanks in the local school as well as in the their homes. Secondly, gaining knowledge in water use management and sanitation in a broader context.

Expertise and skills will be gained in the project and a network of experts on the issues of rainwater harvesting will be developed in the project, providing real prospects of expanding to other parts of the country, and the region at large. The network will bring together researchers, civil society activists, the YES alumni community, NGOs and donors interested in the issue of water and sanitation.

The primary strength of this project is the additional educational component that is designed to supplement the aim of offering an alternative, safe and secure water supply. Several organisations including the Kenya Water for Health Organisation (KWAHO) and the Austrian Development Agency have in the past implemented similar programmes with limited success in terms of project continuity. The lack of continuity is attributed to the limited understanding of all of the stakeholders of the ideas and goals of the project. This project therefore goes beyond the building of rain water harvesting tanks and seeks to empower individuals with core knowledge on global and local water issues, along with transferable skills. The programme seeks to inform both the pupils and their parents on the importance and advantages of using simple technologies and readily available resources to solve problems in the community. It will also increase the awareness of the community on global issues such as environment, water management and sustainability as well as rain water harvesting, safe water storage, sanitation, water and health, and environmental conservation techniques. This ensures sustainability after completion of the first phase which is supported.

In addition to the educational component, the project will ensure the ready availability of clean drinking water to over 1, 500 pupils in the 12 targeted schools. It will also contribute to improved awareness on domestic water management and sanitation issues. The overall results to the community will be:

- reduced child mortality and medical expenditure due to water diseases;
- improved grades for children due to increased concentration time in class;

- enhanced sanitation in the community.

4. Solution / Model

The approach to the defined problem is to take advantage of rainfall as fresh water supply. The featured solution is to install rooftop rainwater harvesting systems in order to capture rainwater and supply water for children at schools. This system is an effective sustainable approach in terms of water management but in addition a very sound approach to water problems for communities with intermittent water supplies. The conditions in the rural areas (especially in relative to health and education) will be indirectly improved through the installation of these simple rain water tanks. Increased security will also be achieved through the storage of water for the dry seasons.

The system is practical and applicable, taking advantage of the existing construction in the schools decreasing the requirement of additional costs given that the roofs are used as catchment area. The system is easy to maintain and operate - one of the most important parameters since the maintenance of the system will be done by the local people.

Rainwater harvesting tanks in the dry regions has been the subject of several studies which are successful in terms of water supply to communities in need. For example, in a project performed by UNICEF, Rooftop Rainwater Harvesting tanks installed in the states of Kerala, Maharashtra and Uttar Pradesh, India (UNICEF, 2004). Another study was in Kajiado District of Kenya where Rainwater Harvesting tanks installed to 100 households (Sang J. and Wambui C., 2006).

Technical Design

Rooftop rainwater harvesting systems contain two main elements which are the storage tank and water transfer system. Roof is used as the catchment area in these systems. Corrugated iron is used as roof material at the schools in the area which is an advantage since it is commonly used as material for rooftop rainwater systems.

To transport and collect the rainwater rooftop gutters are used, with which the water collected is transported into a pipe which directs the flow into the storage tank where generally PVC or plastic is used as material.

The storage tank can be made of reinforced concrete, ferro-cement, plastic or metal sheet. The size of the storage tank depends on various factors such as the amount of precipitation, the frequency of the rainy days, demand, space availability and etc. Depending on the dry periods in the area larger sized tanks are needed for storage purposes.

One of the main concerns of the system is the quality of water collected. Therefore, first flush systems are used in order to eliminate the unwanted material collected on the roof such as dust, dirt, droppings and other kind of pollutants. By including the first flush system the runoff occurring at the first period of the rain is diverted to another container, sized depending on the surface area of the roof, just before entering the storage tank preventing the reduction in the water quality. The outlet, tap of the storage tank should be above the tank bottom in order to let the suspended

material in the tank settle to not to reduce the quality of water. Depending on the quality of the water collecting low cost household treatment methods can be included to eliminate the potential adverse health effects of the water supply provided

The monthly rainfall data for the area is provided for the last three and four years in Figure 1, 2 and 3 (Climate Kenya, 2008). Since the local precipitation data is not available for the target region closest representative data is used around the area which are Kakamega, Kisumu and Kitale.

Kakamega is the district closest to target districts, Bungoma and Busia. As represented in Figure 1 precipitation is relatively low when compared to the data available for other districts. Except the high rainfall event occurred in 2003, the rainfall received is considerably low during the whole year.

Figure 1 Monthly Precipitation data for Kakamega

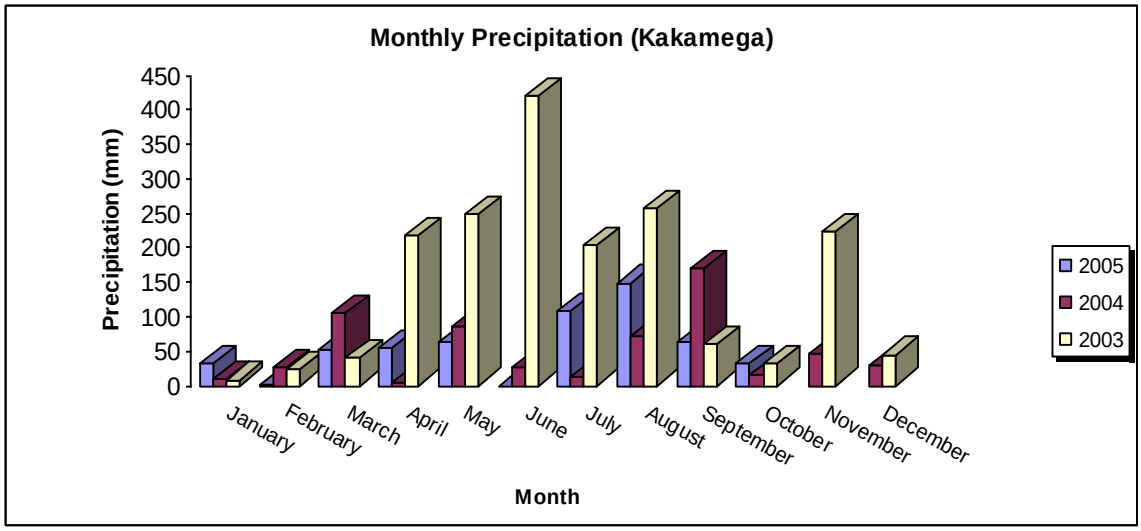
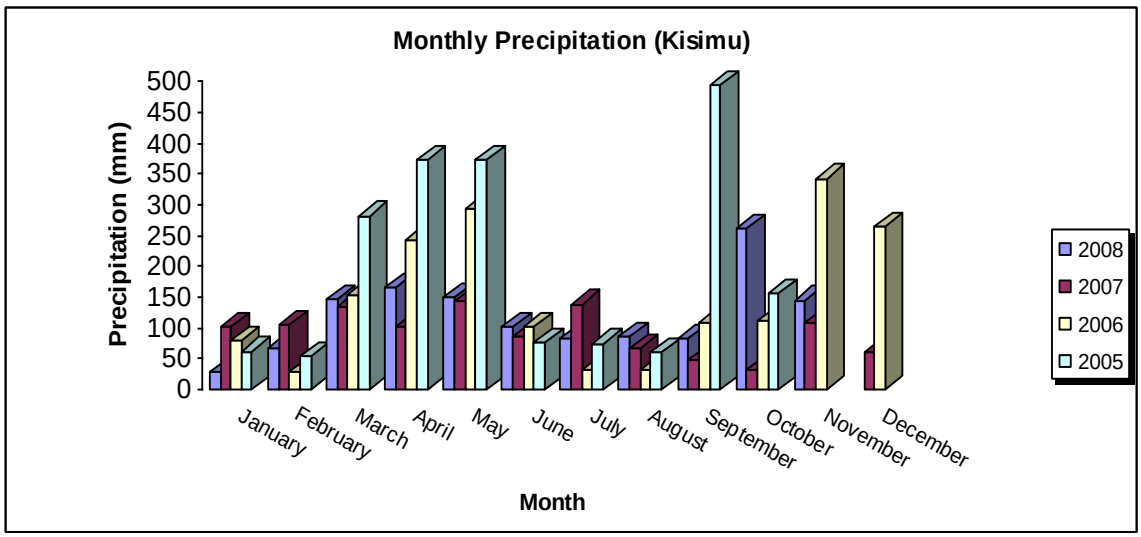


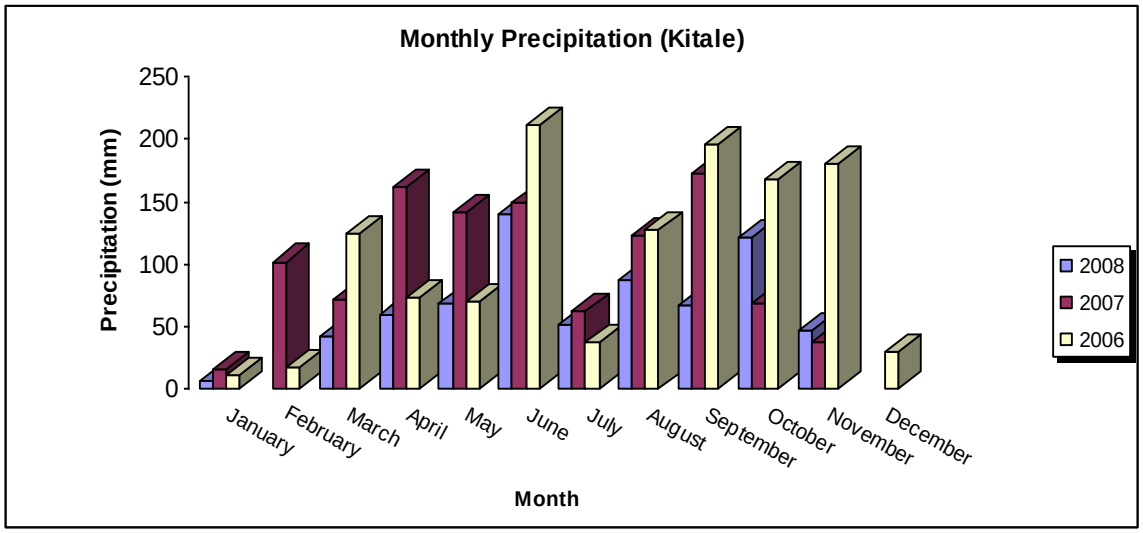
Figure 2 Monthly Precipitation data for Kisumu



It can be seen in the figures that there is an uneven distribution in the rainfall precipitation during the year where there is excessive rainfall in some seasons and very low precipitation during some

seasons. After considering the uneven distribution of the rainfall, water scarcity resulting from the limited fresh water supplies and the existing situation in the area which is high demand for water supply, the design is based on supply point of view rather than considering demand.

Figure 3 Monthly Precipitation data for Kitale



The average annual precipitation for the Busia district around 1000 mm (Sustainable Global Gardens, 2008), and changes from 1250 mm to 1800 mm for Bungoma district (Investment Opportunities in Bungoma, 2008). According to the rainfall data provided above when the mean annual rainfall for all three regions considered the average annual precipitation is calculated as 1012 mm. Therefore, the average annual rainfall is assumed as 1100 mm.

The daily average rainfall and water consumption can be calculated as represented below. Runoff coefficient range is 0.7-0.9 depending on the material where it is assumed as 0.9 for new corrugated iron roof also the water consumption per capita is 3 liters, only for drinking, depending on the similar studies performed in the area at schools (Levicki, 2005). Since the maximum storage requirement is assumed to be the optimum storage tank volume the supply and demand calculations are performed.

Runoff coefficient for corrugated iron roof material: 0.9

Average Annual Precipitation: 1100 mm

Roof area: 250 m^2

Then the daily available water can be calculated as;

Rainfall Volume= (1100 * 0.9 * 250)/ 365 days= 678 liters/ day

Assuming the number of people in the school including the students attending the school and the staff total number is 250 and the water consumption is 3 liters per capita per day, we can calculate the average demand as;

Water Consumption= 250 * 3 = 750 liters/ day

According to the available monthly rainfall data supply and monthly demand is calculated and compared for three different districts to represent the area studied. The precipitation is calculated by taking the arithmetic mean of the available rainfall data of the last three year. The results of the calculations are provided in Table 1, 2 and 3.

Table 1 Supply-Demand Relationship for Kisumu

Month	Precipitation (mm)	Kisumu Supply Volume (m3)	Demand Volume (m3)	Cumulative Supply	Cumulative Demand
March	145,13	32,65	22,5	32,65	22,50
April	169,77	38,20	22,5	70,85	45,00
May	195,42	43,97	22,5	114,82	67,50
June	96,18	21,64	22,5	136,46	90,00
July	83,99	18,90	22,5	155,36	112,50
August	61,15	13,76	22,5	169,12	135,00
September	79,59	17,91	22,5	187,03	157,50
October	133,69	30,08	22,5	217,11	180,00
November	198,21	44,60	22,5	261,70	202,50
December	NA	NA	NA	NA	NA
January	69,01	15,53	22,5	277,23	225,00
February	67,57	15,20	22,5	292,43	247,50

Table 2 Supply-Demand Relationship for Kakamega

Month	Precipitation (mm)	Kakamega Supply Volume (m3)	Demand Volume (m3)	Cumulative Supply	Cumulative Demand
March	65,95	14,84	22,5	14,84	22,50
April	91,95	20,69	22,5	35,53	45,00
May	132,76	29,87	22,5	65,40	67,50
June	148,84	33,49	22,5	98,89	90,00
July	108,45	24,40	22,5	123,29	112,50
August	159,09	35,79	22,5	159,08	135,00
September	97,63	21,97	22,5	181,05	157,50
October	27,27	6,14	22,5	187,19	180,00
November	90,00	20,25	22,5	207,44	202,50
December	37,60	8,46	22,5	215,90	225,00
January	16,93	3,81	22,5	3,81	22,50
February	17,19	3,87	22,5	7,68	45,00

Table 3 Supply-Demand Relationship for Kitale

Month	Precipitation (mm)	Kitale Supply Volume (m3)	Demand Volume (m3)	Cumulative Supply	Cumulative Demand
March	79,42	17,86	22,5	17,87	22,50
April	98,05	22,06	22,5	39,93	45,00
May	93,46	21,02	22,5	60,96	67,50
June	166,70	37,50	22,5	98,47	90,00
July	50,20	11,29	22,5	109,76	112,50
August	112,18	25,24	22,5	135,00	135,00
September	145,29	32,69	22,5	167,69	157,50
October	119,05	26,78	22,5	194,48	180,00
November	87,80	19,75	22,5	214,24	202,50
December	29,98	6,74	22,5	220,98	225,00
February	59,56	13,40	22,5	234,38	247,50
January	10,76	2,42	22,5	236,80	270,00

According to the data provided, considering the cumulative difference between supply and demand, the maximum storage capacity is estimated for three districts as 15 m^3 for Kakamega, Kitale 25 m^3 and Kisumu as 60 m^3.

The detailed engineering design calculations will be performed after detailed information gathered during the site visits.

5. Implementation Plan

In order to achieve the objectives outlined above, this project has four central stages. The first is a high level of consultative workshops with parents-teachers associations in the communities worst hit by water shortages, to launch the project and to define the methodological approach.

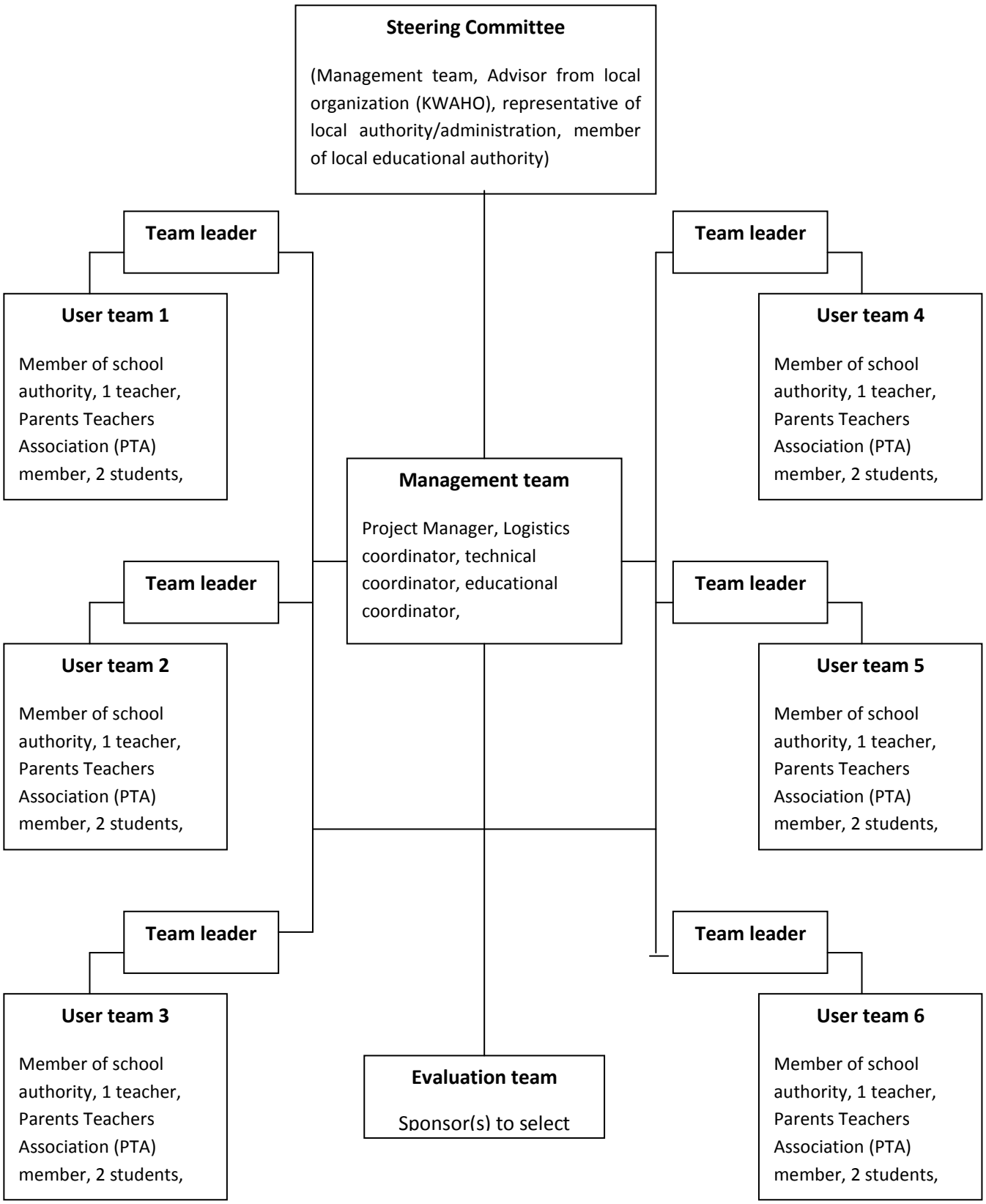
The second is an extensive field research in the identified schools and communities to ascertain the extent and impact of water inaccessibility to students' health and academic performance. This stage covers school and area specific data collection for technical design studies.

The third is a publication and dissemination of educational materials on water and sustainable development, to be used as teaching aid for teachers and community leaders to educate the communities on rain water harvesting, safe water storage, sanitation and environmental conservation techniques.

The final stage is project capacity building by practically training teachers, students, parents and other community members and equipping them with skills and techniques of building rain water harvesting tanks, use and maintenance, for the project sustainability. In addition to this, the final stage will cover the monitoring of the project outcomes. The effectiveness of the education tools, like how the local community manage the water supply provided, or if they use the system as required and apply the maintenance required.

6. Resource Management

Organisational Structure:



Project Management

The steering committee: will be responsible for providing advice and setting the agenda and milestones of the project in consideration of local conditions. There will be two steering committees composed of members relevant to the 2 pilot areas of the project (Busia and Bungoma Districts, Kenya).

The management team: will be responsible for the design and the execution of the project in close collaboration with the User teams. The link person between the on goings on the ground and the management team will be the logistics coordinator, who will be a member of the management team, and an individual well versed with the local conditions.

The user team: Every school will have a User team, with an appointed team leader. The user team will ensure the actual execution of the project on the ground in close collaboration with the logistics coordinator.

The evaluation team: This will be appointed by the sponsor(s). Its role will be to evaluate the different milestones of the project as set by the steering committee and provide advice to the sponsors and the management team on the execution of the next phases of the project.

Before the commencement of the actual project, water tank building, meetings will be held by members of the management committee to identify and bring on board potential donors and other members of the steering committee[*]. After members of the steering committees have been brought on board, the steering committees will meet to decide on the selection of the schools under the guidance of the management committee.

The logistics coordinator will then coordinate the assembly of user teams in the selected schools. The user teams in close collaboration with the logistics coordinator will then commence with the building of the rain water tanks in view of the local conditions.

The management team will ensure a monthly meeting to review and monitor progress of the construction projects in the respective school.

Management Team

- Kizito Masinde - Busia District, Kenya
- Violet Barasa - Bungoma District, Kenya
- Jess Schulschenk - South Africa
- Sevda Alanya - Turkey

[*] This phase is already in progress.

7. Strategy

Fundraising

Several different organisations and institutions will be approached to assist with sponsorship of this project. UNEP Environmental Education Unit has expressed interest in assisting with the publication of educational materials. Local NGOs experienced with rain water harvesting in other Kenyan districts will be able to assist with expertise and local knowledge. A primary sponsor will be approached to provide the capital necessary for purchasing building materials and covering basic logistics.

Marketing & Communication

Given the focus of the project, a large scale marketing strategy is not necessarily appropriate. We would rather like to focus on ensuring that the support we receive from our funders is acknowledged through different methods (such as branding on educational materials, local media and the project website) and that the learning achieved through the project is shared (appropriate reporting, replication and use of local media for dissemination).

Furthermore, communication will be carried out between the management team on an ongoing basis, and regular reporting will be ensured to the funders. A project website will be established to track progress at the schools, and for the students to share online their learning experiences as a result of the project.

Stakeholder Engagement & Communication

Stakeholder engagement is a critical part of this project, and an important step on the paths towards community ownership of the project at a local level. The project would therefore undertake to set up a series of community workshops with students, teachers and interested parents to identify schools with a need for such a project, the main challenges for the school regarding water and environmental education, key stakeholders to take responsibility for the project and the best way forward that is appropriate for the local community. Communication will be carried out between the local key stakeholders and the core project team on a continuous basis throughout the project implementation, as well as through follow-ups post-implementation. As two of our core project team have their homes in the districts that we will be working in, we already have good contacts with the local schools and communities in place.

Addendum I

Budget

	Tank Material and Guttering	Total (KSH)	US$
1	Tank Material	195,075	2,787
2	Guttering	35,660	509
3	Labour	66,920	956
4	Transport	34,100	487
	Total Cost of 1 Tank	331,755	4,739
	TOTAL cost of 12 tanks	**3,981,060**	**56,872.29**

	Educational Component	Total (KSH)	US$
5	Educational component for schools	770,000.00	11,000
6	Total coast for 2 district workshop (@ 80 pax) (cost includes tea break, lunch and conference fees)	270,000.00	3,857.14
7	Training of Trainers Workshop (1 joint).	240,000.00	3,428.57
	Total For the Educational Component	**1,280,000.00**	**18,286**

	Project Administration	Units	Cost per Unit (KSH)	total (KSH)	US$
8	visits by logistics coordinators	22	35,000	770,000.00	11,000.00
9	communication for core team	48	3500	168,000.00	2,400.00
10	1 visit by YES rep from Switzerland + 2 management team members	3	280,000	840,000.00	12,000.00
11	Facilitation for team leaders	72	3000	216,000.00	3,085.71
12	Bank charges	12	500	6,000.00	85.71
Total for project administration				**2,000,000.00**	**28,571.43**

Overall Project Costs	total (KSH)	US$
Overall Total	7,261,060	103,729.43
Contingency (10%)	726,106.00	10,372.94
Grand Total	**7,987,166**	**114,102.37**

Short budget account

Item 8. *Visits by Logistics Coordinators*

Given the nature of the proposed activities a significant amount of planning is required. This therefore requires the local coordinators to visit the project areas on a monthly basis during the project period. Each visit is expected to last a total of 7 days to ensure coordination and supervision of construction, and planning and execution of the educational component. The ineffective public transport service in the rural areas increases the costs of the visits.

Item 9. *Communication for Core Team*

Phone Communication costs are high in the rural areas. Coordinators have to rely on phone communication especially while working with team leaders in the project area as internet is unreliable, expensive and not yet fully embraced. The costs indicated cover all the communication by the core team during the entire project including planning and coordination of the workshops and seminar at the close of the project.

Item 10. *1 visit by YES rep from Switzerland + 2 management team members*

The costs of the visit cover all the transport and subsistence costs of a YES official from Switzerland and two core team members. The core team members are not based in Kenya so it will be a chance for them to see the project and attend and contribute to the planned workshops and seminar. The YES official will also act as a representative of the donor(s) to validate the implementation of the project and also contribute at the two workshops and seminar.

References and Information Sources

Climate Kenya. Webpage: http://www.tutiempo.net/en/Climate/Kenya/KE.html. visited 12 January, 2009.

Investment Opportunities in Bungoma. Webpage: http://bungoma.org/business-insert.htm. Visited 12 January 2009.

Levicki, K. 2005. A CATCHMENT TO CONSUMER APPROACH TO RURAL WATER RESOURCE ASSESSMENT- Baseline Study and Safe Drinking Supply Strategy for Orongo Village, Lake Victoria Basin, Kenya, Royal Institute of Technology (KTH), Sweden.

Population Reference Bureau (PRB). Website: www.prb.org. Visited 12 January, 2009.

Sustainable Global Gardens. Webpage:

http://www.sustainableglobalgardens.org/category/projects/kenya/ . Visited 12 January, 2009.

Sang J. and Wambui C. 2006.Rainwater harvesting project among the Maasai community in Olepolos, Kajiado district in Kenya, UNEP and RELMA-in-ICRAF.

UNICEF. 2004. Evaluation of the Rooftop Rainwater Harvesting Project, Water, Environment and Sanitation Section, UNICEF, New Delhi, India.

Vankoppen, B. 2003. *Water reform in Sub-Saharan Africa: what is the difference?* Physics and Chemistry of the Earth, Parts A/B/C, vol. 28, issue 20-27, pp. 1047-1053