Water and Sanitation Baseline Study

of Mahyoro and Nyabbani Sub County,

Kamwege District, Uganda

protos

water maakt vrij
eau un droit naturel
agua por la vida
water powers people

Colophon

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1. Table des matières

Abbreviations

BMU	Beach Management Unit
BH	Borehole
C2C	Child To Child
ECOSAN	Ecological Sanitation
IWRM	Integrated Water Resource Management
JESE	Joint Efforts To Save The Environment
KDLG	Kamwenge District Local Government
LC	Local Council
M&E	Monitoring And Evaluation
SW	Shallow Well
O&M	Operation And Maintenance
PHAST	Participatory Hygiene AndSanitation Transformation
PS	Protected Spring
RWHT	Rain Water Harvesting Tank
UGX	Ugandan Shilling
VHT	Village Health Team
WASH	water sanitation and hygiene
WATSAN	Water And Sanitation
WUA	Water User Association

Tables

Charts

2. Introduction

The following document presents the results of baseline survey carried out in between August to November 2010 in Mahyoro and Nyabani Sub Counties, located in Kamwenge District, Western Uganda. The survey assessed the current situation of water supply and sanitation in the two Sub Counties using data collected through household questionnaires and visits to all schools, water points, health centres and EcoSans in the Sub Counties.
The household data was collected by 20 Village Health Teams. Data on schools, water points, EcoSans and health centres were collected by four JESE volunteers. In addition photography and GPS marking were conducted on water and sanitation facilities.
The baseline survey was carried out to assist in planning a programme of work to improve the situation of water supply and sanitation in the areas concerned. PROTOS, a Belgian based NGO works with JESE (Joint Effort to Save the Environment) as well as the local authorities to increase sustainable access to clean water and sanitation in Mahyoro and Nyabani. The baseline survey will be used within the development of the next programme for WASH activities.
In 2006 JESE carried out a first baseline survey on IWRM in Mahyoro Sub County and comparisons between the two studies are be made. The Uganda Water Atlas 2010, providing an overview of water access at the District level is also now available and can be used as a reference for information and comparisons.

JESE

Joint Effort to Save the Environment (JESE) is an indigenous non-governmental, service-providing base in Fort Portal, Uganda. Since its establishment in 1993, through its work in improved Agriculture Production and Natural Resources Management and long term development, JESE has contributed to improved livelihoods of target beneficiaries and provided opportunities for a better life especially for the rural poor households and communities. JESE is governed by a Board of 9 members with an established structure that is mandated to operate in the district of Kabarole, Kamwenge and Kyenjojo with a focus on key thematic areas: Livelihoods – food security and economic empowerment, Community health - food nutrition, water, hygiene and sanitation, Research, Documentation, Information and knowledge management.
JESE has for the last 6 years implemented programs in water hygiene and sanitation targeting school environment, the community and institutions in the Districts of Kyenjojo, Kyegegwa, Kabarole and Kamwenge. In all these Districts, initial baseline surveys were conducted to guide program designing and planning process. The following are the baselines conducted by JESE in Kamwenge District;
Integrated water resources management on L. George in Mahyoro Sub County
Rain water harvesting in Nkoma and Bwizi.

PROTOS

PROTOS is a non-governmental organization (NGO) working in international development, specialized in water: drinking water, hygiene and sanitation, use of water for agricultural purposes and finally integrated water resources management. With political and ideological neutrality PROTOS advocates equitable, participatory and sustainable water management in the North and the South.
Through a joint IWRM project JESE and PROTOS aim at satisfying the basic domestic water and sanitation needs of the rural communities in a sustainable way in partnership and collaboration of local actors and district/sub county local leadership. The project is implemented in Mahyoro and Nyabani Sub Counties in Kamwenge District targeting to directly benefit approximately 7794 people in water and sanitation technologies. The actions of the projects fall directly with in JESE's strategic objective of improving access to sustainable safe drinking water, hygiene and sanitation through strong collaboration with community beneficiaries, local government and other development actors.

3. Infrastructure

The baseline survey includes a survey of all the water points and EcoSans in Mahyoro and Nyabani sub counties. Below is a description of this water and sanitation infrastructure.

3.1. Water points

Shallow well:This is a hand dug well, 10-20 ft(3-6 m) deep with around 6 ft (1.8m) diameter. It is lined with locally made bricks and sealed with a concrete top slab. A hand pump is installed on the top to pump water.

Photo 1: Shallow well, Mahyoro

Photo 2: A protected spring, Mahyoro

Unprotected source: a natural source which has not been improved to provide safe water drinking i.e. lake, river, swamp and springs where people step in water they are fetching. This is not an official 'water point', but is mentioned here because it is an important source of water for many people.

Photo 3: un protected water source, Mahyoro

Improved spring: Comprises of an effective catchment, consisting of a perforated pipe within a trench or dry walled channel (stone package), a supply pipe leading to an inspection chamber which consists of an entry basin for receiving the spring water and an operation chamber which helps control water quantity and quality. Sometimes it can also serve as a sedimentation basin with a tap for water collection.

Photo 4: Improved spring, Mahyoro

3.2. Sanitation

Ecological Sanitation (EcoSan) is a type of latrine based on the principle of recycling of human waste to reduce the risk of diseases transmission, preventing ground water pollution and using the decomposed human waste to improve soil structure and fertility. EcoSan promotion started as a result of numerous constraints of the high water table and collapsing soils, making conventional pit latrine construction unsustainable. Most people in the sub county practiced open defecation. The prevalence of diarrhea was high at the start of EcoSan promotion. The EcoSan concept was introduced as a good potential alternative that would address the existing environmental, public and pollution constraints.

A 3-5 inch (7.5 – 12.5 cm) slab is casted on which two chambers with separated channels for urine and faecal matter/excreta and the superstructure is built. Dry materials, like wood ash, lime and soil, are added to cover the fresh excreta; the chambers are used alternately to allow decomposition, it takes an average family 6 months to fill one of the vaults. Then the second vault is used. The first vault is emptied following an additional 6 months of sanitization and the material is taken to soil compost. Urine is never mixed in this toilet but continuously diverted into a separate container and later used in diluted form as plant fertilizer. In specific cases urine is diverted to a soak pit.

Photo 5: Outside of ecosan with a urine collection unit

Photo 6: Inside of an ecosan latrine

Photo 7: Back of ecosan showing the two chambers

Photo 8: Different upper constructions

Photo 9: Upper construction in wood

Photo 11: Upper structure in clay and grass thatched

Latrine:

Most households have standard latrines with a pit and some have solid floor/upper structure and a roof. These pit latrines are usually constructed using local materials, mud, reeds, grass for thatching, poles for slab and superstructure.

Photo 12: Ordinary pit latrine in Mahyoro

PROTOS/JESE have constructed public latrines at markets (Kyendangala, Katooma) and in schools at Mahyoro Moslem primary

Photo 13: Public pit latrine at Kyendangala market

Urinals &Washrooms:
These are sanitation facilities constructed in schools to provide a place where pupils urinate to reduce congestion during latrine hours (break time and lunchtime). The washrooms are separate bathing rooms constructed for girls to take showers and use it for sanitary purposes.

Hand washing facilities:
This is a sanitation facility which contains water that is used for washing hands together with soap after using the latrine. There are different types of hand washing facilities i.e. Tippy taps (a small

plastic jerrican with a string tied on pole and stick to step on for tipping a jerrican and pour water) and plastic tanks (100 litres).

4. KAMWENGE district water and sanitation Background

Kamwenge District is located in the central-eastern part of the Western Region of Uganda (see map). The district has two counties with eight sub-counties, one town council and a population of 317,000 people of which 88 % have access to safe water. The functionality rate of water points in urban and rural areas is 93 % and 78 % respectively.

Map of Uganda, Kamwenge District

The annual population growth rate from 1991-2002 stands at 3.3% per annum compared to theNational average of 3.4% p.a. District has 6.4 persons, which is above the National average of 4.7 persons.

According to the Uganda Water Atlas 2010, Kamwenge District has a total of 1,851 domestic water points of which 34 have been non-functional for more than 5 years and are considered abandoned. The main water supply technology is the shallow well. The district has 12 piped water supply systems, mostly located in the Kamwenge Town Council area, serving approximately 25% of the population having access to safe water, while 75% is served by point water sources.[1]

The district covers an area of approximately 2,304 square kilometres. Of this, 64.1 square kilometres (2.6%) is covered by open water. It is predominantly a rural district with some of the worst poverty levels in the country. The Human Development Index (HDI) for Kamwenge District in 2004 was 0.442, the 19th lowest index of all 56 districts. (The HDI ranges between 0 and 1 where 1 indicates better levels of human development and is defined by the United Nations Development Programme, UNDP).The HDI of the capital Kampala is 0.615.[2]

Most of the people in Kamwenge engage in subsistence agriculture. A cross-section of people in the district is engaged in sizeable cultivation of maize crop beyond subsistence level. Other food crops grown are bananas, beans finger millet, cassava, groundnuts, sweet potatoes and Irish potatoes. The cash crops include coffee in Kitagwenda county and parts of Kibale County and cotton in Mahyoro sub-county. There are a lot of cattle rearing in the sub-counties of Nkoma ,Bwizi and Kitagwenda County. The latter also accounts for a large proportion of improved livestock rearing and fish farming.[3]Bee keeping is steadily taking root in the district as an income generating activity.

4.1. Hydrology

Kamwenge district includes parts of Lake George and river Mpanga. The Mpanga River originates from a catchment area in the Rwenzori Mountains (bordering Uganda and Congo) that is currently under high pressure due to deforestation and the mining of sand in Mpanga source area.

The river flows through Fort Portal town where water is abstracted and after treatment used to provide drinking water to the town. The waste water from Fort Portal is, through a small sewer system, together with different point emissions sources, discharged back in to the river after limited treatment. From Fort Portal the Mpanga flows through a rural area and various tea plantations (where large ground water abstraction are put in place) into Kibale Forest. As the river flows through Kamwenge District towards Lake George the area is heavily deforested and river banks are threatened.

The cultivation of crops up to the river bank has led to high erosion and finally silting into the Lake George. In Kamwenge town a new drinking water system has been put in place using treated Mpanga

water.For now there is no waste water discharge from this town (as there is no sewer present but this might be so in the future). In Kamwenge irrigation systems have been planned for.
Finally the Mpanga flows into Lake George over Mpanga falls where since 2010 an 18 MW hydro-power station is operational. Lake George has a mean depth of 2.5 m, maximum depth of 4 m and an area of 250 km^2. The lake has several influent rivers and streams; including the Mpanga, Sebwa, Nsonge, and Mubuku. The single outflow is Kazinga Channel, which empties its waters into Lake Edward. The wetlands surrounding Lake George are a Ramsar site because of their importance as habitat for water birds. The lake faces several serious threats related to the rivers flowing into it and the management of this resource itself i.e. over fishing, degradation of catchment area as a result of human activities (cultivation, sand and stone quarrying along the shores), siltation due to surface runoff water into the lake, pollution resulting from human practices like poor garbage disposal, open defecation, construction of pit latrines on lake shore contaminating underground water.

Nyabani and Mahyoro Sub Counties are found in Kitagwenda County, Kamwenge District in Western Uganda. They are both located within the Lake George basin situated in south western part of Kamwenge district.[4]

4.2. Political Setup

Kamwenge district is divided into counties, town councils, sub counties, parishes, wards and villages. Local council V, local council IV and local council III have legislative, financial and administrative powers within the district local government. The lower local councils I and II are administrative units at parish and village level.

A district is led by an elected local council V (LCV) chairman and executive. There is also an elected LCV council, with representatives from the sub-counties and technical staff in the district. The council debates budgets, decisions and bylaws. On the technical side, the district is led by a chief administrative officer, appointed by central government. The district also has heads of departments such as education, health, environment and planning.

Each county is represented in the national parliament in Kampala by an elected member (an MP). In major towns, the equivalent of a county is a municipality (which is a set of divisions). LCIII executive committee members of all the sub-counties constitute the local council IV (LCIV), who elect an LCIV executive committee from among themselves. These committees have limited powers, except in municipalities, which they run.

The sub-county is run by the sub-county chief on the technical side and by an elected LCIII chairman and executive committee. The sub-county has an LCIII council, a kind of parliament at that level, with a speaker and deputy speaker. The council consists of elected councillors representing the parishes, other government officials involved in health, development and education, and NGO officials in the sub-county. In towns, a sub-county is called a division.

A parish is made up of a number of villages. Each parish has a local council II (LCII) committee, made up of the chairpersons from the village LCIs in the parish. Each LCII will elect, from among themselves, an executive committee. Today, LCIIs are largely involved in settling land distributes and mobilising the community for various activities. The parish is largely run by a parish chief – a government employee who provides technical leadership to the LCII.

A village is the lowest political administrative unit. A village usually consists of between 50 and 70 households (between 250 and 1,000 people). Each village will be run by a local council – local council I (LCI) - and is governed by a chairman (LCI chairman) and nine other executive committee members.

Flow chart showing administrative set up from district to village level:

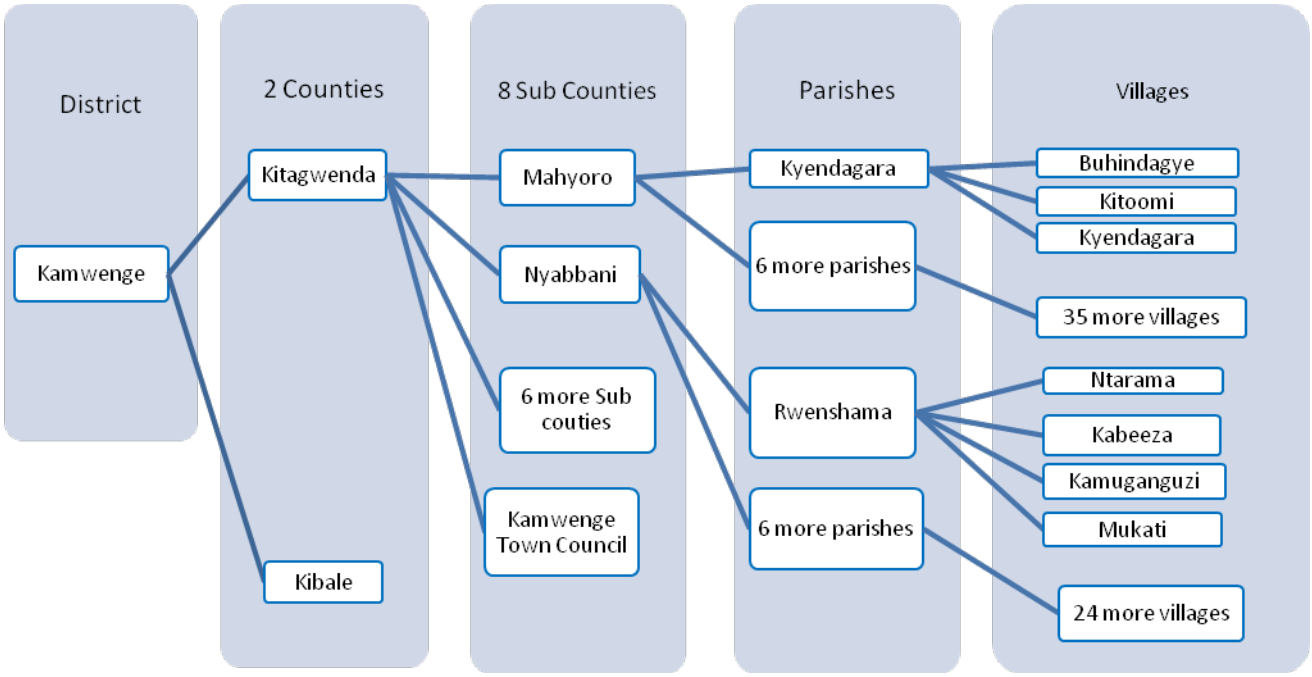
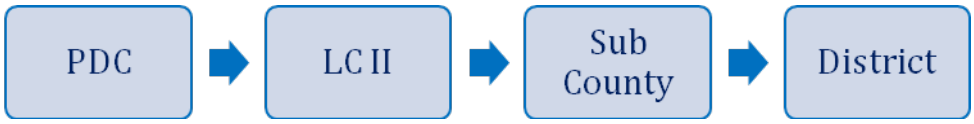


FIGURE 15: SUB COUNTY PLANNING CYCLE

The government planning cycle begins at parish level; the Parish Development Committee (PDC) is responsible for linking the villages to the development cycle of the local government. At parish level, plans are developed with input from the villages and are then input into the sub county development plan. After compilation of the plans the sub county forwards the plans to the district planning department unit for unification into the district development plan.



4.3. Education

Kamwenge district has 140 government aided primary schools and 7 government secondary schools. 11 secondary schools are private.
The teacher pupil ratio for Kamwenge is 1:57 and whereas the classroom pupil ratio is 1:74.

TABLE 1:

	Mahyoro	Nyabani
N°. of primary schools	12	19
N°. of secondary schools	2	2

Distances which pupils have to travel to reach a school can be large e.g. from Buhindagye village to the nearest secondary school (Mahyoro Secondary School) is about 24km, from Iharagatwa village to the nearest primary school (Nyakeera Primary School) is 12km. This has hindered many pupils from attending school regularly.

Many pupils living around the fishing villages miss out on school because they are involved in washing, drying fish nets, cleaning and selling of fish. During the cultivating seasons most pupils do not attend school as they have to take shifts in watching over cereal crops (e.g. working in rice fields especially during flowering period to scare away birds).
Some under aged girls drop out of school as result of early unwanted pregnancies and to get married either out of their own desires, or being forced into early marriages by their parents for money purposes. School fees is not a major factor in stopping pupils to attend school, since most of these schools are government aided under a universal primary and secondary education. Parents are required to contribute a small fee of 1000Ugx per school term every year.
With the above factors most school-attending children are found in villages loitering during school hours. The rate of school completion is at 30% for secondary and 40% for primary school compared to the enrolment at the beginning of the year (data taken from Mahyoro schools). The school completion rate in Mahyoro according to some sources is very low compared to the registered figure of 57% from the Ministry of education and sports.
Some households who are well-off send their children to regional schools as well as to the capital city (Kampala) for studies. There is no university in Kamwenge district but students can attend universities in neighbouring districts like in Kabarole and Mbarara.

4.4. Health

Kamwenge district has a total of 27 health facilities: 19 are government and 8 non-government (NGO) owned. The district does not have a hospital but has 2 referral level IV health centres. The doctor to patient ratio of Kamwenge is 1:158,500 compared to neighbouring district of Kabarole with a ratio of 1:19,179. The recommended national ratio of 1:10,000, but the current ratio for Uganda stands as 1:24,725.
The district has 2 Level 4 Health Centres (see explanation below), only one of which has a functioning theatre. Further to the shortage of health facilities, many centres lack basic equipment, adequate lighting and adequate professional staff to manage deliveries. The whole district has only two doctors, does not have a single anaesthetist, and has inadequate health workers trained in emergency obstetric care. As a result expectant mothers are sometimes referred to facilities outside the district for deliveries.

Health Centre Level 2 (HCL2): According to the Ugandan government's health policy, every parish is supposed to have this level of Health Centre. This facility serves a few thousand people and should be able to treat common diseases like malaria. It is supposed to be led by an enrolled nurse, working with a midwife, two nursing assistants and a health assistant. It runs an out-patient clinic, treating common diseases and offering antenatal care.

Health Centre Level 3 (HCL3): A health centre 3 facility should be found in every sub-county in Uganda. These centres should have about 18 staff, led by a senior clinical officer, who runs a general outpatient clinic and a maternity ward. It should also have a functioning laboratory.

Health Centre Level 4 (HCL4): This health facility serves a county or a parliamentary constituency. A health centre IV is a mini hospital. It should have the kind of services found at health centre 3, with extra wards for men, women, and children and should be able to admit patients. It should have a senior medical officer and another doctor as well as a theatre for carrying out emergency operations.

Hospital: Each district is supposed to have a hospital with all the services offered at a HCL4, plus specialised clinics – such as those for mental health and dentistry, consultant physicians.

In every village there are at least four **Village Health Teams (VHTs)** who are recruited to help in the provision of health services to people in villages. The VHTs are identified by the health assistant at the sub county level and trained by the district health department.
The teams go from door to door in villages, checking residents' health; where they have complaints, the VHT either offers immediate treatment from a kit he/she has been issued with or refers cases to the health centres if needed.
The health centres provide the VHTs with "Homepacks" which contains the anti-malarial Fansidar and Panadol. VHTs are responsible for distributing drugs like deworming, anti-malarial tablets and mosquito nets given free of charge to households and sensitizing people about proper hygiene, sanitation and H.I.V/AIDS.Monthly reports are submitted to the health centres. Local council I monitors the activities of the VHTs. Although the effectiveness of the V.H.Ts is unknown

Health at sub county level

In the two Sub Counties the level 3 health centres provide antenatal care, minor surgeries and have medical assistants whereas level 2 only treat simple health complications. These centres cannot handle most health complications so patients have to be transferred to a regional referral hospital (Buhinga) located in Kabarole district. Due to long distances and costs associated with transporting some patients do not reach the hospital, dying on the journey.The nearest HCL4 is located in Ntara Sub County; the distance covered from Mahyoro Sub County (Buhindagye village) to this health centre is 60km (return trip).

TABLE 2: HEALTH AT SUB COUNTY LEVEL

Sub County	No. of level 2 or 3 health centres
Mahyoro	4
Nyabani	3

JESE collaborates with VHTs in its hygiene and sanitation programme at sub county level. JESE mainly identifies VHTs within a village and provides basic training in data collection, PHAST methodologies, report writing, record keeping, and household monitoring.

In 2008-2009, Mahyoro Sub County was greatly affected by cholera outbreaks during and after rainy seasons. This was mainly due to poor sanitation and hygiene practices around the landing sites, like open defecations and contaminating the lake water. Other diseases such as malaria, typhoid, dysentery, diarrhoea, worms and skin diseases are prone to these areas.

5. Sub-County Mahyoro and Nyabani

5.1. Water Supply and Sanitation

Access to clean water and adequate sanitation varies greatly across the Sub County. The percentage of people with access to potable water varies depending on how this is defined, and will be discussed in Chapter 7 which compares the results of different baseline surveys. Some water sources are non-functional due to natural calamities like earthquakes which shift the water tables, prolonged drought especially on springs and drying up of water sources due to people tampering with the catchment areas which are cleared for farming and settlements. Hard underlying rocks also make it difficult to excavate the required depth 50-80 m for boreholes, 6 m for a shallow well. Mechanical breakdowns like broken hand pumps, dislocation in the pump head due to vandalism. Water quality like turbidity (bad water colour) and taste (salty) makes it impossible for people to use/drink the water, causing the water point to be abandoned.

According to the Ministry of Water guidelines, the walking distance to the nearest water source is 1km. In Mahyoro and Nyabani which are water stressed sub counties, people can walk distances of 10km (return journey) to collect water from safe source. As a result people have resorted to fetching water from unprotected sources like ponds, river, swamps and the lake, because those sources are nearest within 0.2km-0.5km distance to their homes.

5.2. Sub-County Water Management

Sub County water management is decentralised to the Sub County Level, while financial resources remain at the District level.
At the district level the water and sanitation is taken up by the secretary for works and technical services. This office is responsible for representing water needs from the Sub County, Parish and village to the District Executive Committee (DEC). The secretary coordinates the district water and sanitation coordination committee meetings in collaboration with the water department and office of the Chief Administrative Officer (CAO). It is also responsible for representing the water office in the district council.
At the Sub County level the water and sanitation is taken up by the secretary for works and technical services. This office is responsible for representing water needs from the Parish and village to the Sub County Executive Committee (SEC). The secretary coordinates the Sub County water and sanitation coordination committee meetings in collaboration with the Community Development Officer (CDO). It is also responsible for representing the water office in the Sub County council.

Water user committees (WUCs): This is comprised of seven people elected by the water users to manage an existing functional water source. Their role is to collect user fees, mobilizing the water users for O&M and routine maintenance of the water source; they are elected every after two years according to the sector guidelines.

Pump assistants are trained to repair the water pumps. Every water point has a well-trained pump attendant who is responsible for rectifying minor repairs on the pump. For the major repairs the committee refers to the water user association at the Sub County level. This approach works and is evident on all water points in Mahyoro and Nyabani.

Tap stand committees: Each tap stand has one tap committee and is functional. Tap stand committees are elected representatives, to manage the taps stands under gravity flow schemes or rural growth schemes. Their role is to collect user fees, mobilizing the water users for O&M and routine maintenance of the water source.

Water user associations (WUAs): These Sub County associations are an umbrella body for all existing Water User Committees. The associations play a vital role of monitoring, technical support in O&M, lobbying and advocacy. They collect and manage user fees from the Water User Committees and assist the Water User Committees to conduct repairs and maintenance of their water points. The Water User Association committee is comprised of 7 members elected by the general assembly of the Water User Association. There is one WUA for Mahyoro Sub County and one for Nyabani.

Sub county water board: These oversee all tap stand committees, are appointed by the Sub County executive and approved by the water officer, district executive committee and the Sub County council. The water board is responsible for collecting user fees from public tap stands for the maintenance of rural growth and gravity flow schemes. They are also responsible for providing technical support inform of training, extension and monitoring the tap stands committees.

5.3. Previous programmes in the wash sector

Since Mahyoro and Nyabani Sub Counties are water stressed, in terms of water access to protected water for drinking, the Kamwenge local government alone cannot address all the water and sanitation related problems.
Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use. Water stress causes deterioration of fresh water resources in terms of quantity (aquifer overexploitation, dry rivers, etc.) and quality (eutrophication, organic matter pollution, saline intrusion, etc.)[5].

Hence other WASH partners have come in to compliment the efforts of the local government towards increased accessibility to safe water and appropriate sanitation services through construction of facilities like boreholes, shallow wells, institutional tanks, GFS, ordinary springs and sanitation facilities like latrines. These harmonised interventions have increased the access to water supply, contributed to the reduction in the distances covered by community members to fetch water and reduced water related diseases like typhoid, diarrhoea and dysentery resulting from contaminated water from unprotected water sources.
The table below present the interventions implemented by different partners in the WASH sector in the two sub counties these include;

TABLE: INTERVENTIONS IMPLEMENTED BY DIFFERENT PARTNERS IN THE WASH SECTOR

Partner	Technology promoted	Sub county of operation
JESE	Shallow-wells, Water jars, Protected/ordinary springs, Ferro cement Tanks (school and household), Ecosans (households and institutional, V.I.P at markets	Mahyoro & Nyabani
FORUD	Shallow-wells, Protected/ordinary springs, Ferro cement Tanks (institutional and household), Ecosans in institutions and households	Nyabani
HEWASA	Water jars, Boreholes, Gravity flow schemes, Shallow wells and Ecosans in	Nyabani
WATER AID	Shallow wells, Protected springs	Mahyoro
SAMARITAN PURSE	Institutional tanks	Nyabani
District Local Government Kamwenge district	Gravity flow schemes, Shallow wells, Ferro cement tanks, Boreholes and Latrines in schools	Mahyoro & Nyabani
Ministry of Water	Piped water scheme for rural growthCenters	Mahyoro
HIMA cement	Ferro cement tanks and Ecosans in schools	Nyabani

6. Methodology

The baseline survey collected data on the population, safe water coverage and household hygiene and sanitation status, IWRM issues and institutions that relate directly to the communities i.e. schools, health units and landing sites. The survey covered all 14 parishes located in the two Sub Counties.

6.1. Survey Methodology

Open ended questionnaires were used to interview household heads, school patrons, school head teachers, Child to Child members, WATSAN committee members, local chairpersons, EcoSan owners and health centre attendants.
Spot checks were carried out on sanitation facilities like latrines, hand washing facilities and animal shelters. Water points like shallow wells, boreholes and rain water harvesting tanks were spot checked for cleanliness as well as functionality.
Focus group discussions with Child to Child, WATSAN Committee and Beach Management Unit members were conducted.
Digital GPS mapping and photographing was done on sanitation and water facilities.
Four different surveys were carried out from August to November 2010:

1) Household survey

TABLE 6:

	Mahyoro	Surveyed
Households	5.977*	672 (11%)
Population	23.800*	4.543 (19%)

** The number of households per Sub County is a projection for 2010, based on the figures from the 2002 census with a growth rate of 3.2% per year~~6~~. The population figures are instead taken from the Uganda Water Atlas – these are lower figures than those which would result from using the calculation method as described above, which is why the % of the population surveyed is shown to be higher than the % of the households surveyed.*

2) Schools survey
3) Ecosan survey
4) Water point survey
5) Health centre survey

All of the schools, EcoSans, water points and health centres in Mahyoro Sub County were visited and surveyed for the baseline.

TABLE 7:

Schools	EcoSans	Health centres	Landing site (households)	Water points
14	70	4	20	72

Sampling method: Every village in the two sub counties was included in the survey but not every household due to time constraints. 20 households were interviewed per village skipping 3-4 households between an interviewed household.
The household data was collected by 20 Village Health Teams. Schools, water points, EcoSans and health centres were collected by four JESE volunteers. In addition, photography and GPS marking was

conducted on water and sanitation facilities. Water points like boreholes, shallow wells were tested for water quality (bacteriological analysis) during the baseline.

6.2. Population Surveyed

The population surveyed were people living within the intervention area of PROTOS around Lake George basin. Characteristically these local people are peasant farmers who practice subsistence farming at small scale for both domestic consumption and for commercial purposes.

The households interviewed were both very low income earners, middle earners including petty traders like shop owners and civil servants. In most villages, some households were isolated since most of the land is used for cattle crazing which made it almost impossible to access them.

The fishing villages in the parish of Mahyoro and Bukurungo known as landing sites were also surveyed. The landing sites will be explored in more detail in the results section 6.4 as they have distinctive characteristics compared to the other villages.

6.3. Questionnaires and Data Collection

The questionnaires were developed to address the previous indicators that were used during the first baseline. Some new questions were developed to investigate health centres and EcoSan usage. The questionnaires were developed by PROTOS in collaboration with JESE and can be found in Annex 1. They were intended to capture:

1) Behaviour change in WASH at household, school and landing site level.
2) How water is integrated in other sectors like agriculture, production and in health at community level.
3) To access replication rate of the new sustainable sanitation facilities by the beneficiaries.
4) Prevalence of water borne/related diseases in the community.

Respondents answered the survey questions according to what they knew, did and observed in their household, school, water point and health centre. Records were also checked to access data such as school enrolment, health centre admission lists, annual records, water points WATSAN Committee financial and membership documents.

Questions were answered by focal people such as household heads (men and women), school C2C patrons, C2C heads (pupils), head teachers, WATSAN chair persons, treasurers, and village LCI chairpersons, EcoSan owners and Beach management Unit committee chairpersons.

TABLE 8:

Key informant	Place of interview	Survey method	Data collectors
Household heads	Households	Interviews guided with a questionnaires In situ observations	Village Health Teams (V.H.Ts) JESE volunteers
School patrons C2C club heads Head teachers	Schools	Interviews guided with a questionnaires Spot on observations Focus group discussions Secondary data i.e. records checking	JESE volunteers
Ecosan owners	Households Institutions Landing sites	Interviews guided with a questionnaires In situ observations	JESE volunteers
WATSAN Committees Local chairpersons	Water points	Interviews guided with a questionnaires In situ observations Focus group discussion Secondary data i.e. records checking	JESE volunteers
Health centre attendants	Health centres	Interviews guided with a questionnaires Secondary data i.e. records checking	JESE volunteers

6.4. Challenges and Limitations

There were many challenges encountered during the baseline surveying exercise.
These created gaps in the baseline survey which included inaccurate data, loss of data as a result of the following:

1. Language barrier:
There was miss-interpretation of the questionnaires by the V.H.Ts, even when they underwent training for carrying out the survey. Some didn't want to be ashamed that they could not read English ended up miss-interpreting questions filling in wrong answers.

2. Bias information:
Some V.H.Ts did not interview some households just because they knew all about certain families, ending up filing in inadequate data like number of household members.
Some respondents answered what they thought was needed to be known rather than the actual problem/answer.

3. Unreliable data collectors:
Some V.H.Ts never returned all the questionnaires or others brought back half of the required number reducing on the households surveyed. The foreseen total amount for households surveyed was estimated to be 1900 for both Mahyoro and Nyabani.
The actual survey figure is 1552; a total of 348 were never surveyed.

4. Political and social interferences:
During the surveying season, it was campaigning period for local authorities this made people scarce for interviews as they were always in other places campaigning.
This time was also planting season most people were in their farms cultivating, they could not be accessed since their farms were very far in hilly places.

5. Seasonal heavy rains:
Persistent heavy down pours made mobility very hard, data collectors used motor cycles for collecting data but most days they could not interview because the roads were inaccessible.
Also questionnaires got wet and some data was lost, which meant redoing it over again.

6. Inadequate data information:
Some people could not differentiate water borne diseases like malaria and typhoid, or skin diseases.
Health centres had no age grouping or sex separation; all data was recorded as either adult or infants no male or females.

7. Results– Mahyoro Sub County

7.1. Water Points Survey

Introduction to the survey

All of the 72 water points in Mahyoro Sub County were visited for the baseline survey. As detailed in the previous chapter, the data for this survey was collected by JESE volunteers who carried out spot checks at the water points, interviewed WATSAN committees and local chair people, and checked records about the water points for extra information.

Availability of water infrastructure and its functionality

Table 9 shows an overview of the water points in each parish of the Mahyoro Sub County.
All 72 water points were surveyed, but one protected spring in Mahyoro parish was still under construction at the time of the survey visit, so this is not included in the following results.

TABLE 7-1: OVERVIEW OF THE WATER POINTS IN EACH PARISH OF THE MAHYORO SUB COUNTY (Y=FUNCTIONING WATER POINT - N= NON-FUNCTIONING WATER POINT)

	Shallow well		Protected spring		Improved Spring		Borehole		Grand Total
	Y	N	Y	N	Y	N	Y	N	
Parish									
Bukurungo	5	1			1				7
Kanyabikere	1	1							2
Kitonzi	15	3							18
Kyendangara	6								6
Mahyoro	10	2	1					1	15
Nyakasura	15	1	1						17
Nyakeera	3		2	1	1				7
Grand Total	55	8	4	1	2			1	71

In total it was recorded that Mahyoro Sub County has 61 functioning water points and 10 non-functioning water points. The Uganda Water Atlas 2010 for Kamwenge District records 70 functioning and 7 non-functioning water points in Mahyoro. Difference between the results will be discussed in Chapter 8.

In total 55 of the 63 shallow wells in Mahyoro Sub County are functioning, i.e. 87%. Five are not functioning due to mechanical problems and the other three through a lack of water.
The table 10 shows the reasons for which the water points are non-functioning, indicating that the reasons are near evenly spread between mechanical problems and a lack of water.

Two key things can be noted from the table:

- All three non-functioning shallow wells constructed by Water Aid have mechanical problems.
- Both shallow wells and the protected spring constructed by JESE are non-functioning due to a lack of water. These are also the most recently constructed non-functioning water points.

TABLE 7-2: REASONS FOR WHICH THE WATERPOINTS ARE NOT FUNCTIONING
** The one borehole in Mahyoro is not functioning due to a mechanical problem as part of the electric installation need to be repaired.*

Parish	Water point	Problem	Year of construction	Break down repair period	Pump type	Facilitator
Kitonzi	Shallow well	Mechanical	1992	1 year	Niira	Water Aid
Mahyoro	Shallow well	Mechanical	1994	7 years	Niira	Water Aid
Bukurungo	Shallow well	Mechanical	2004	1 year	Niira	Water Aid
Kanyabikere	Shallow well	No water	2007	n/a	Niira	JESE
Mahyoro	Shallow well	No water	2009	n/a	Niira	JESE
Nyakeera	Protected Spring	No water	2009	n/a	NA	JESE
Mahyoro	Borehole	Mechanical	2005	1 month	NA	Water Aid
Kitonzi	Shallow well	No water	1997	n/a	Victoria U3	DDSP
Kitonzi	Shallow well	Mechanical	2006	1 year	Victoria U3	DDSP
Nyakasura	Shallow well	Mechanical	2003	2 years	Victoria U3	KDLG

The table 7-3 presents 'inadequate' water points, defined as:

- Not functioning due to mechanical problems;

or

- Functioning but with a break down repair period of over one month

TABLE 7-3: OVERVIEW OF ADEQUATE WATER POINTS
(THE FIGURES IN BRACKETS SHOW THE TOTAL NUMBER OF WATER POINTS CONSTRUCTED BY THIS FACILITATOR)

Facilitator	before 1995	1995-2005	after 2005	Grand Total
DDSP		(2)	1 (4)	1 (6)
JESE		2 (2)	3 (25)	5 (27)
KDLG		2 (7)	1 (5)	3 (12)
Water Aid	7 (20)	2 (5)		9 (25)
DWSCG			(1)	(1)
Grand Total	**7 (20)**	**6 (16)**	**5 (35)**	**18 (71)**

The table 11 shows that these 'inadequate' water points were constructed throughout all three periods shown. Before 1995 only Water Aid constructed water points in Mahyoro Sub County, and 7 of these now are not functioning/over one month break down repair period. Since 1995 JESE has constructed 25 new water points, 5 of which also meet these criteria. This indicates that problems with the water points do not necessarily results from age, but from attention paid during construction and maintenance to capacitate local authorities to repair and manage the systems. Experience on the ground suggests that problems come from the technology type, its functionality period, O&M by the beneficiaries and repair costs.

The four water points which are not functioning due to lack of water must also be considered. One of these was constructed by DDSP in 1997 and the other 3 by JESE between 2007 and 2009. Declining ground water tables could explain the lack of water for the shallow well constructed in 1997, but this is unlikely to account for why the more recently constructed water points lack water.

Water access in Mahyoro Sub County

Water infrastructure serves water users. In this part this analysis will try to detail the amount of people who have access to water services. It is important to note that the 'number of users' of each water point is defined as the number of users the water point is designed to service, not the actual number of people using the water point. The results from the water point survey can be compared to the household survey which asks people which water point they are using.
Table 12 below shows the % of households which the water points provide water service to, compared to the responses of households themselves for what type of water point they are using (total of 4543 people surveyed; average 5.7 people per household).

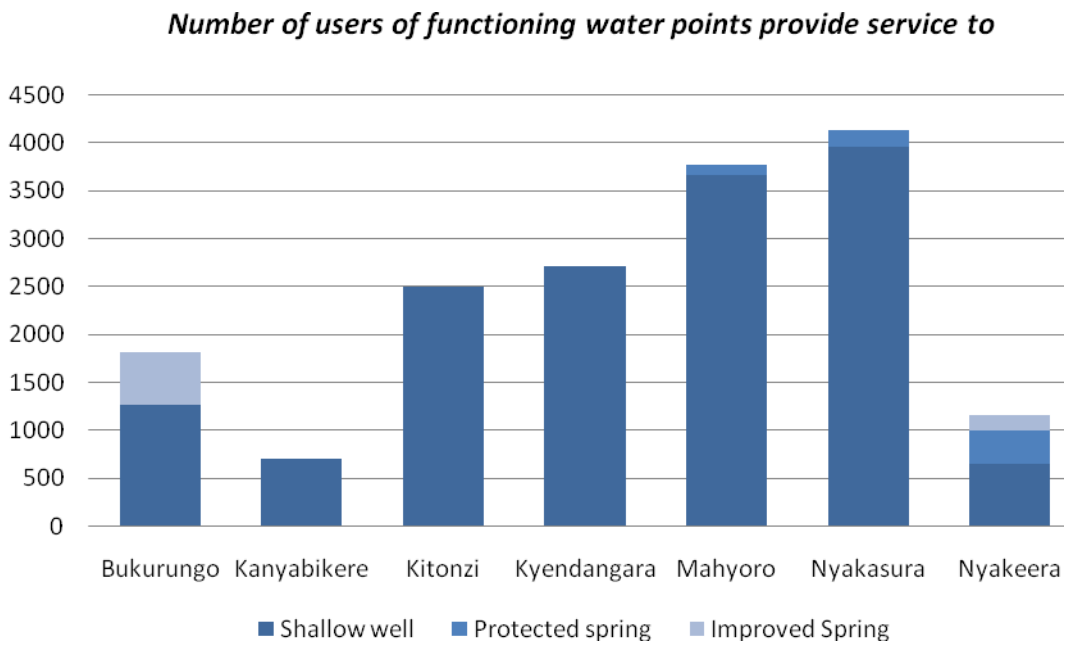
	Shallow well/ Borehole/ Piped water	Improved spring	Protected spring	RWH	Unprotected source
Water point survey	92%	4%	4%	-	-
Household survey	56%	-	5%	<1%	39%

TABLE 7-4: % OF HOUSEHOLDS WHICH THE WATER POINTS PROVIDE WATER SERVICE

Shallow wells (with the borehole and piped water) are clearly the most commonly used water point, but the household survey also demonstrates that nearly 40% of people use an unprotected source for their water, this water is used for all domestic purposes because there are no protected sources within that area. The water point survey shows use of improved springs, which is not shown in the household survey because this distinction was not made.

The chart 7-1 below presents the results from the water point survey, showing the number of water users in each parish the functioning water points provide a service to.

Chart 7-1: Number of users of functioning water points provide service to.



In total, the 61 **functioning** water points can provide water to 83% of the 20,281 possible users in this survey. This can be compared to the Uganda Water Atlas which states that there is a 95% access to water in Mahyoro. If all 71 water points were functioning, they could provide water service to 20,281 people (compared to a population of Mahyoro of 23,800).

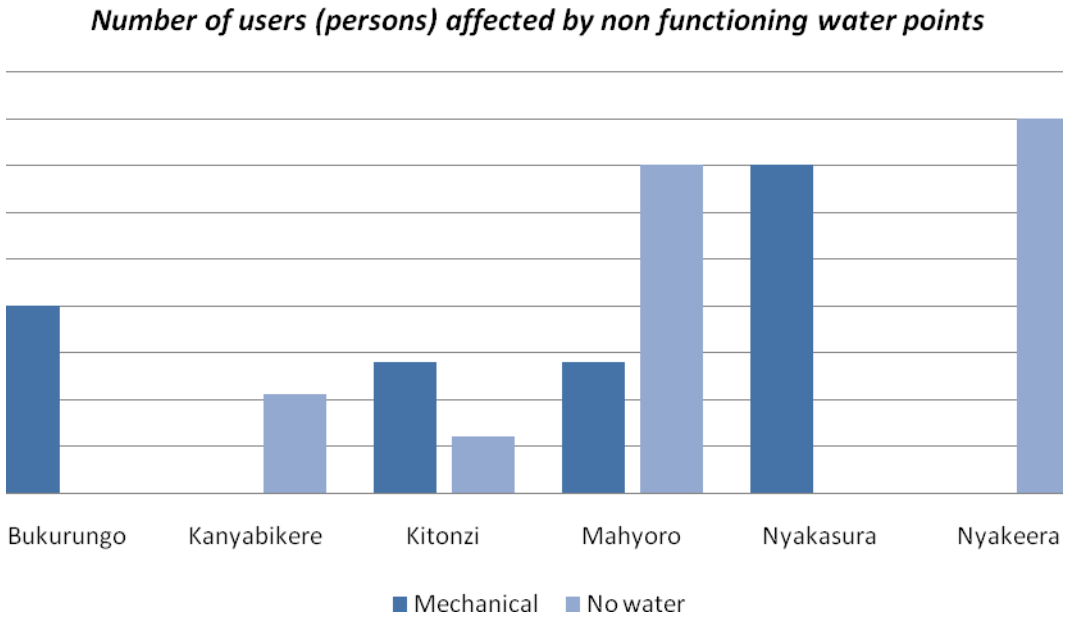


Chart 7-2: people affected by non functioning water points

1.660 more users could have access to water if the water points with mechanical problems are fixed (another 1.830 are affected by water points with water shortage).

Water quality

Spot checks were carried out to assess the water quality at each water point, which was described as: 'clear', 'turbid', 'salty', 'smelly' or 'all'. Only the response 'clear' will be taken to indicate that the water point provides clean water. Turbid water was unclear water with grey (mixed with clay), brown (mixed with soil) and black (common in unprotected sources).
The chart 7-13 and table 13 show that the majority of functioning water points in Mahyoro Sub County has unclean water, with only 36% providing clean water. NA indicates that the water quality was not recorded.

TABLE 7-5: WATER QUALITY

	Water quality						
	Clear	Salty	Smelly	Turbid	Turbid & Smelly	All	NA
% of water points	36%	3%	16%	25%	5%	7%	8%

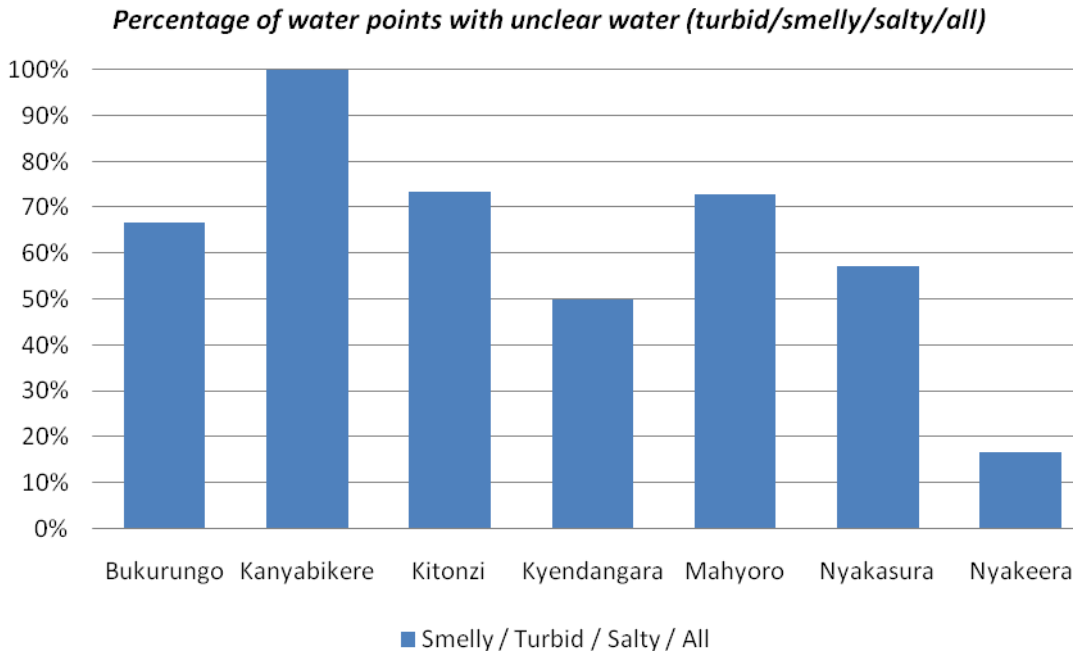


Chart 7-3: Percentage of water points with unclear water

In Kanyabikere parish, both available water points have unclear water and this parish has the highest number of users per water point. There are also major problems with water quality in Kitonzi, Mahyoro and Nyakasura. If all the water points were clean, this would be access to clean water for 9339 more people.
The following table looks at whether the year of construction of the water point is linked to its water quality. In fact, only 39% of water points constructed since 2005 have clear water, similarly 39% of water points constructed before 1995 having clear water.

TABLE 7-6

Construction period	Clear	Smelly / Turbid / Salty / All	NA
before 1995	39%	44%	17%
1995-2005	25%	75%	0%
after 2005	39%	55%	6%

The table below shows the water quality of the water points constructed by different facilitators. All of the facilitators (apart from DWSCG who have only constructed one point) have constructed water points which now have poor water quality.

TABLE 7-7

Facilitator	Clear water	Smelly / Turbidity / Salty / All	NA	Total
DDSP	1	3	0	4
DWSCG	1	0	0	1
JESE	11	10	2	23
KDLG	2	9	0	10
Water Aid	7	12	3	22
Total	22 (36%)	34 (56%)	5 (8%)	61 (100%)

Finally the next table looks at whether the type of water point is related to its water quality. Although there are few results for the improved and protected springs, it is clear that there are major problems of water quality with the shallow wells, where 60% of all functioning shallow wells are not providing clean water.

TABLE 7-8

Water point	Clear water	Smelly / Turbid / Salty / All	NA	Total
Improved Spring		1	1	2
Protected spring	3		1	4
Shallow well	19 (35%)	33 (60%)	3 (5%)	55 (100%)
Total	22 (36%)	34 (56%)	5 (8%)	61 (100%)

Bacteriological water quality

In the survey, a limited assessment was made of the water quality at selected water points, from which the result was quantified and related to the amount of total and faecal coliforms. In the graph below the results are shown related to the different technologies that were examined. Note that as the sites selected were infrastructures constructed by PROTOS, the evaluation solely relates to shallow wells and protected springs. Next to the protected water sources, samples were taken from river Mpanga.

THE TABLE 7-9 BELOW SHOWS THE NUMBER OF WATER POINTS TESTED

Water point	Number tested
Shallow well	43
Protected/improved spring	18
Borehole	2
Piped water (tap stand)	2

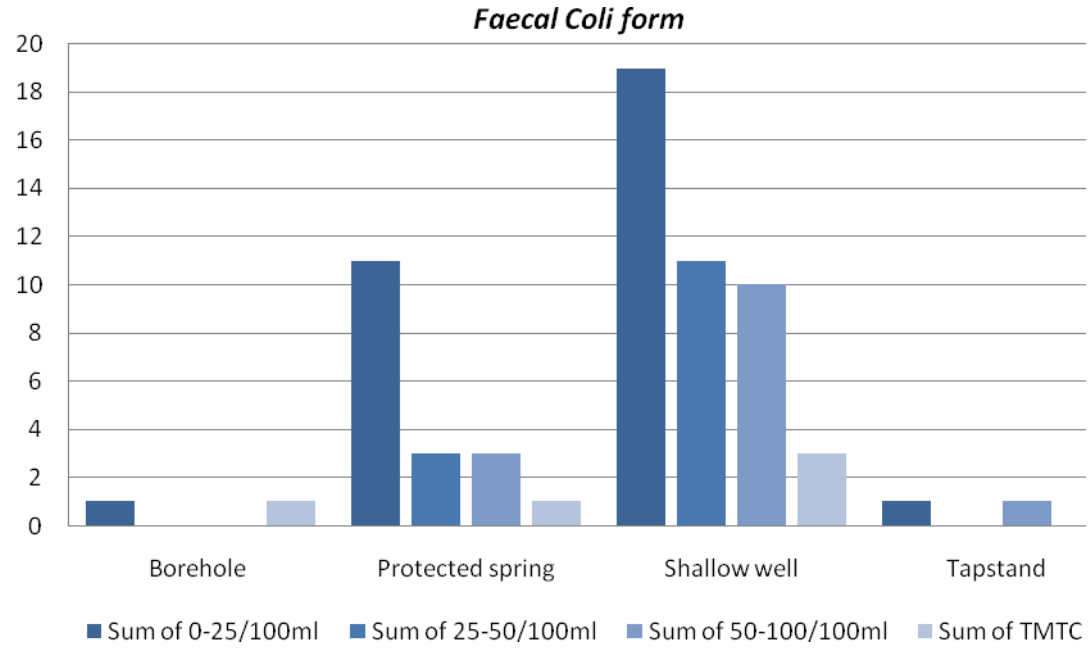


Chart 7-4: Fa ecal Coli form

From the table above it indicates none of shallow wells and protected springs tested are within the required national standard of 0/100ml. 19 of the shallow wells and 11 of protected springs are in the Maximum Acceptable Concentration (MAC) of 50/100ml.

The water testing results indicate that shallow wells were the most contaminated water sources, with Faecal coli form Too Many To Count (TMTC) per 100ml due to some factors:
The testing was carried out during the rainy season and the water was contaminated (flooding around the well).
Shallow wells don't have the necessary clay seal to stop the well from getting contamination.
Protected springs were with the least Faecal coli form TMTC per 100ml, this is a result of protecting and well management of the catchment area. This minimizes on the high rates of water contamination.

Water Management

As described in Chapter 5, the water management at the Sub County level is comprised of:
Water User Committees elected by the users to collect fees and organise O&M for a water point.
The Water User Associations (WUA) which are umbrellas for the Water User Committees.
This section takes a closer look at the management of the water points, how their O&M is conducted, the presence of WUAs, the collection of fees and the effects these factors have on access to water.
One indicator of the quality of the management of a water point is how quickly the water point is repaired if there is a break down.

Protected and improved springs do not use a water pump so are treated separately from shallow wells. The table below present the break down repair period of the functioning water points in Mahyoro Sub County:

TABLE 7-10

For two of the springs it is noted that the spare part frequently needed is a tap. The table below presents the spare parts frequently needed for the shallow wells.

TABLE 7-11

Part needed	Number of shallow wells
Bolts	6
Bolts & Pipe	1
Bolts & Shafts	1
Pipes	1
Pump	2
Pump Stand	1
NA	43
Total	55

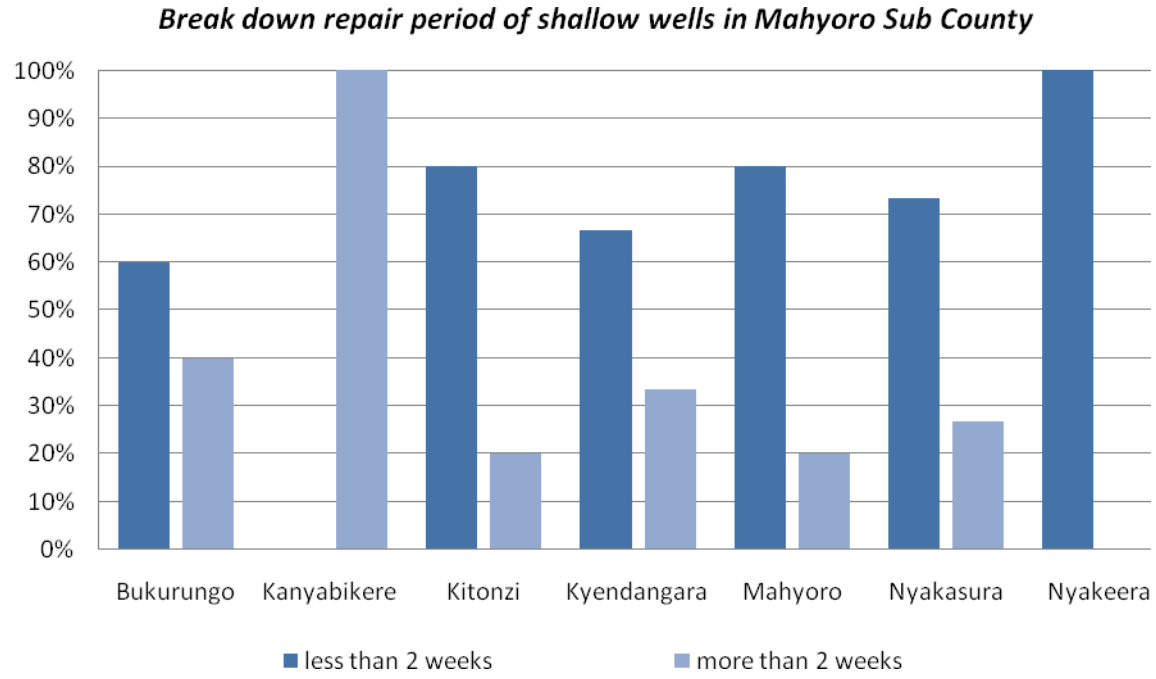


Chart 7-12

The chart below shows that most water point with a break down repair period of less than a week have their pump attendant located at the Sub County level.

Break down repair period	0	1-2 weeks	2-4 weeks	Over 1 month	Over 1 year	Total
Springs	3	0	1	1	1	6
Shallow wells	35	6	4	8	2	55

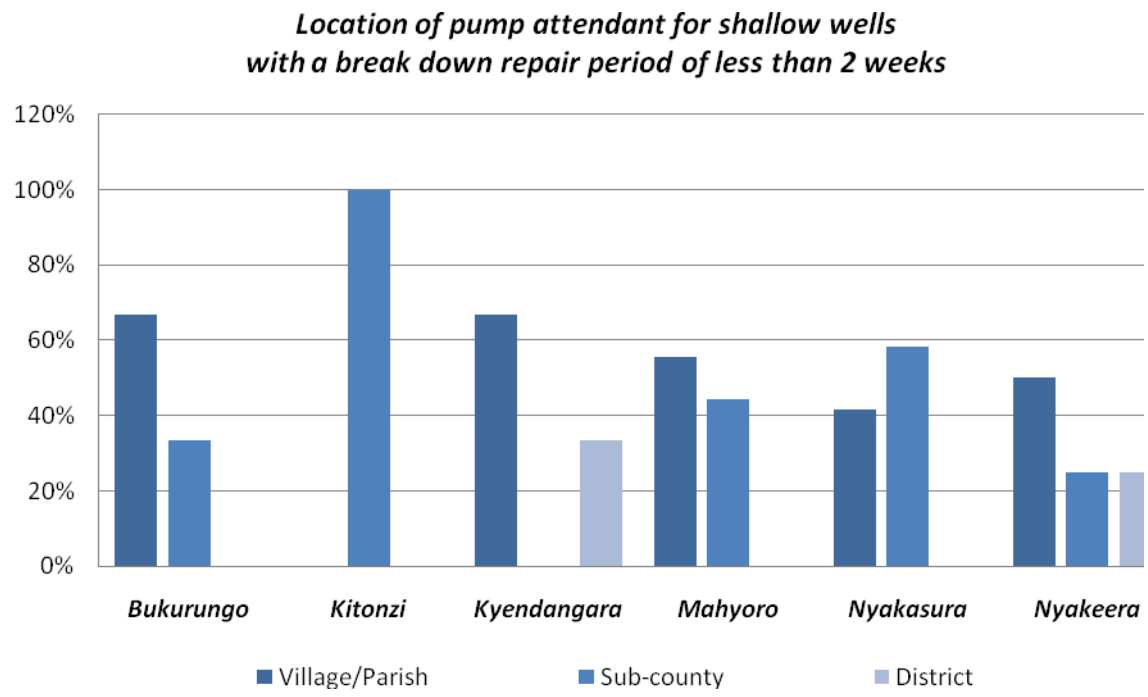


Chart 7-5: Location of pump attendant for shallow wells

The chart 7-6 gives a picture of the the local management of the water points in each parish. Four parameters are used:

1) WATSAN in place
2) Water User Committee (WUC) member of a Water User Association (WUA)
3) User participation in Operation and Maintenance (O&M)
4) User fee collected.

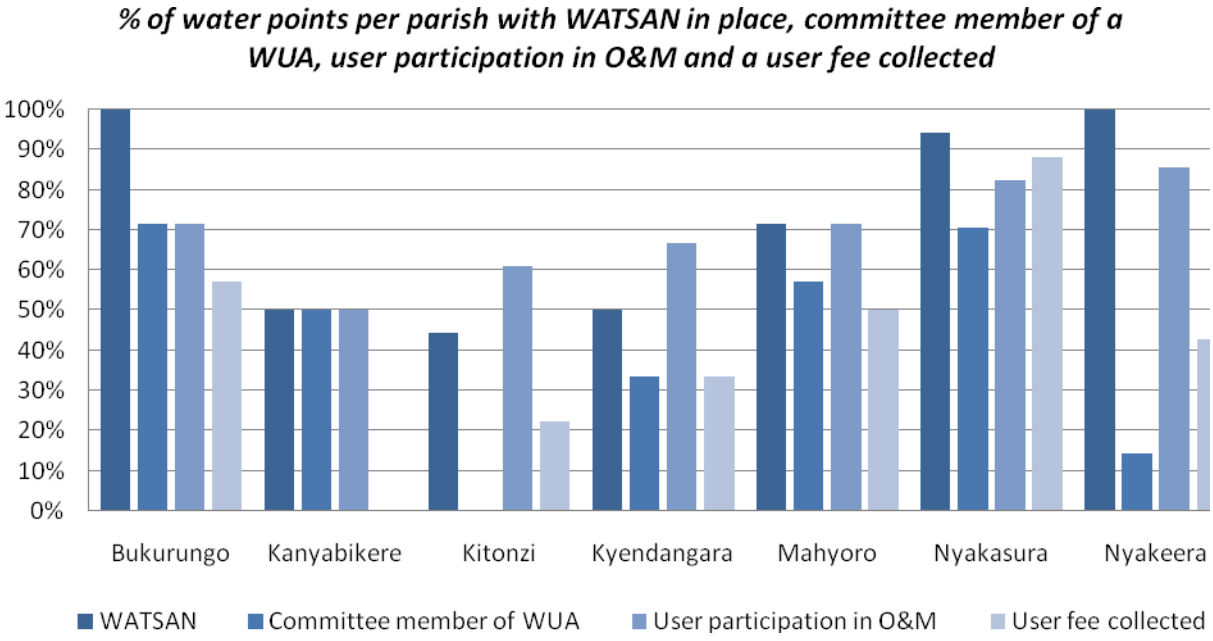


Chart 7-6: % of water points per parish with ATSAN in place, committee member of a WUA, user participation in O&M and a user fee collected

It can be seen that for example in Kitonzi, a low percentage of water points have this water management in place, whereas in Nyakasura over 70% of the water points fulfil all of the above criteria. The chart below compares which have both 'adequate' water points (functioning, have a break down period of less than one month and provide clear water) and 'adequate water management' in place.
The table below shows the reasons given for water points with no Water User Association.

TABLE 7-13

	Never heard of WUA	No funds	Total
No. of water points	10	13	23

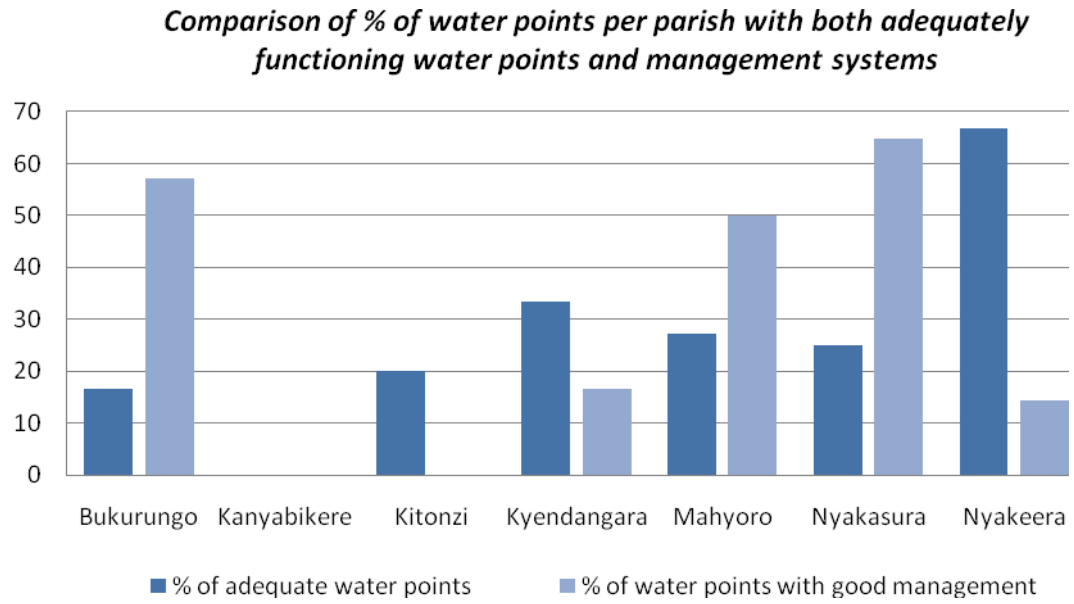


Chart 7-7: Comparison of % of water points per parish with both adequately functioning water points and management systems

TABLE 7-14: USER FEES ARE COLLECTED AT 35 OF THE WATER POINTS, WITH AN AVERAGE FEE OF 611UGX.

	Water fees held by	
	Water User Association	Water User Committee Treasurer
Number of water points	11	25

The chart below shows the variation of amounts of fees paid to use the water points – people most commonly pay 500UGX.

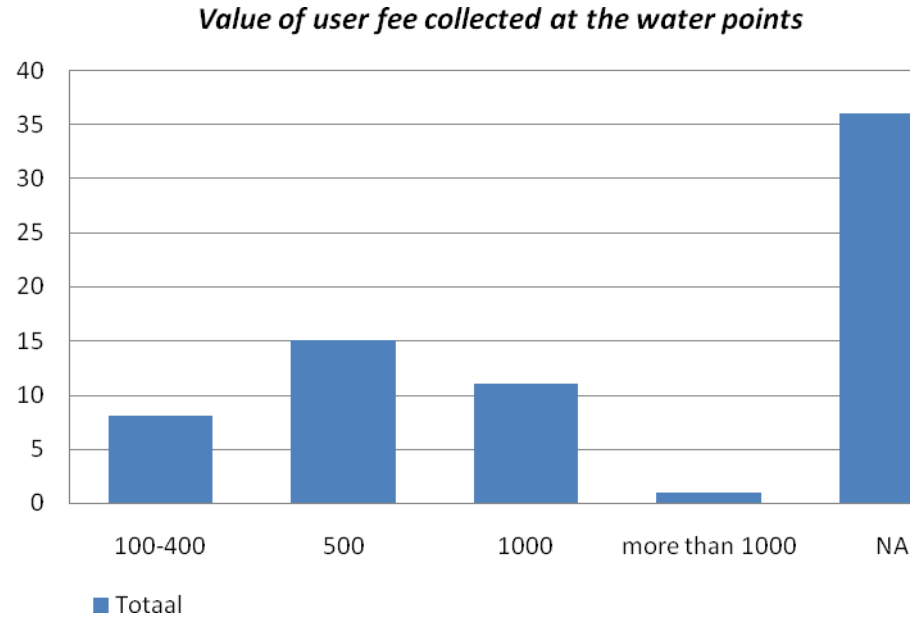


Chart 7-8 NA indicates the number of water points which are non functioning so WATSAN committees stopped charging water user fee

	Period of user fee collection	
	Monthly	**Yearly**
No. of water points	12	23

Ideally a water point is:

1) Functional
2) Water quality 'clear'
3) Break repair period less than 2 weeks
4) WATSAN committee in place
5) User participation in O&M
6) User fee paid
7) Drainage channel
8) Run-off water used
9) Animals not drinking from the source

The table below shows the number of water points fulfilling all of these criteria, and the number of user of these water points.

Parish	No. water points	No. fulfilling all criteria	No. of users accessing ideal water points
Bukurungo	7	0	0
Kanyabikere	2	0	0
Kitonzi	18	0	0
Kyendangara	6	1	400
Mahyoro	15	2	500
Nyakasura	17	3	470
Nyakeera	7	1	150
Grand Total	72	7	1520

The chart below looks instead at water points which are:

1) Functional
2) Water quality 'clear'
3) Break repair period less than 2 weeks
4) Animals not drinking from source

Parish	No. water points	Number fullfilling criteria	% of well managed water points	No of people accessing these water points
Bukurungo	7	1	14	150
Kanyabikere	2	0	0	0
Kitonzi	18	2	11	337
Kyendangara	6	2	33	1200
Mahyoro	15	3	20	1200
Nyakasura	17	4	24	857
Nyakeera	7	4	57	799
Grand Total	72	16	22	4543

Summary and conclusions

10 of the 71 water points surveyed in Mahyoro are non-functioning; 6 of these are due to mechanical problems and 4 as a result of lack of water. Fixing the mechanical problems would provide water to 1660 users.

Shallow wells are overwhelmingly the most common water point found in Mahyoro Sub County – 63 of the 71 water points are shallow wells.

17 of the 61 functioning water points have a break down period of over 2 weeks, 12 over one month and 3 over one year.

Only 39% of the water points have clear water; this clearly demonstrates that water quality is a major problem. 60% of shallows wells provide unclean water. This is assumed to be of contractors not following the right procedures and guidelines during shallow well construction i.e. providing a clay seal (most times soil is used for sealing), chlorination during the pump installation (this is not done and poor quality also relates to the technology in itself (the less deeper, the higher potential for contamination) with some few noted factors above lead to contamination of shallow wells.

Only 22% of the possible water users have access to water points which are functioning, can be repaired in less than one month and have clear water.

There are many different factors influencing the functionality and quality of the water points, with no particular factor standing out as the overriding cause of poor service. The age of the water point does not appear to dictate its current quality, rather the facilitator of the water point.

Mahyoro, Nyakasura and Nyakeera are parishes with the highest possible impact to give access to more water users.

Kitonzi parish shows the poorest water management structures and also has the highest number of non-functioning points and poor water quality.

7.2. EcoSan Survey

All the 70 EcoSans in Mahyoro Sub County were visited as part of this survey; 30 of the EcoSans are found at the two landing sites in Mahyoro Sub County. The high number of EcoSans at the landing sites is due to the fact that people living at the landing sites were facing problem of collapsing soils and a high water table which means that using simple pits or latrines contaminates the water.It is important to note that successful functioning of an EcoSan depends on the users' understanding and proper use of the EcoSan – communicating how to use an EcoSan is more difficult at the landing sites

as there is a high turnover of people living there and newcomers do not necessary know how to properly use the EcoSans.
The table below shows where theEcoSans are located and whether they are privately owned (used by one household) or public EcoSans (used at schools, markets and landing site)

TABLE E1:

Parish	Household	Public	Total
Bukurungo	23		23
Kanyabikere	1	1	2
Kitonzi	2		2
Kyendangara	2		2
Mahyoro	23	2	25
Nyakasura	11		11
Nyakeera	5		5
Grand Total	**67**	**3**	**70**

60 of the 70 EcoSans are **demonstration**EcoSans, built with 80% facilitation from JESE and the owner is left to contribute 20%. This is done to demonstrate to the neighbouring households how an EcoSan operates; those interested can then replicate and construct an EcoSan in their homes without requiring facilitation from JESE. The following table shows when and where the EcoSans were constructed.
The figures in brackets show the number of EcoSans which were constructed by the household and without a facilitator. It can be seen that very few EcoSans are independently constructed by the households.

TABLE E2:

Parish	2006	2007	2008	2009	2010	Total
Bukurungo		3 (1)	1	17 (4)	2 (1)	23
Kanyabikere				2		2
Kitonzi	2					2
Kyendangara			2 (1)			2
Mahyoro	1 (1)	3	2 (1)	8 (1)	11	25
Nyakasura	2		2	4	3	11
Nyakeera		1		3	1	5
Grand Total	**5**	**7**	**7**	**34**	**17**	**70**

Functionality

The table presents the functionality of the demonstration EcoSans constructed by the two facilitators.

TABLE E3:

	Functionality			
Facilitator	**Y**	**N**	**Unfinished / newly built**	**Total**
JESE	41	4	7	52
Kombi.T.S	8			8
Grand Total	49	11		60

All of the privately constructed, non demonstrationEcoSans are functioning.

Three of the four non-functioning EcoSans were constructed between 2009/2010; the other was constructed in 2006.
Only the public EcoSan in Bubale collects a user fee: 500UGX per month, which is used for O&M. For public EcoSans to have proper O&M users are supposed to pay a fee for maintenance, but in most cases O&M is done voluntary basis.

Sanitation

The table below shows sanitation data for the 59 functioning EcoSans (49 functioning demos and 10 non demos).

TABLE E4:

	EcoSan clean	Cleaned by women/girls EcoSan	Ash used	Hand washing facility	Soap
Number of EcoSans	56	43	58	49	42
% of EcoSans	95%	73%	98%	83%	71%

The table below show the recorded time period it takes to fill one toilet chamber of the EcoSan.

TABLE E5:

Period to fill one chamber	2006	2007	2008	2009	2010	Total
1yr-2yrs		3	1	2		6
6mth-1yr	2	2	4	7	1	16
Not yet filled	2	1	2	20	2	27
Newly constructed		1		4	5	10
Unfinished					7	7
Total	4	7	7	34	15	66

It can be seen that most EcoSans have not yet filled the toilet chamber. It should be noted that 5 EcoSans constructed between 2006 and 2008 are 'not yet filled'. This indicates that the EcoSans are not being used properly; there are a number of factors leading to this: some people constructed EcoSans but did not regularly use them, some households left the children to use them while the adults used their ordinary pit latrines and some just wanted the new technology to be part of their household without actually putting it to use.
Of the 22 EcoSans which have filled toilet chambers, half or 11 of these have used the manure in their garden. All of those apply the manure to their crops said that they recorded an increase in yield as a result of the manure use – this shows the positive impact a properly used EcoSan can have.

The table below show shows which crops the manure has been applied to.

TABLE E6

	Bananas	Cabbages	Coffee	Pineapples	Rice
Crop manure applied to	6	1	1	1	1

All of the EcoSan surveys reported that there was community interest to build further EcoSans.
On average 12 people had expressed interest to each EcoSan owner - a total of 871 people showing interest.

TABLE E7:

	Limitations to building an EcoSan			
	Prices	Local materials	Other	Total
NoEcoSan owners questioned	66	2	2	70

Conclusions

A great deal of effort is still needed in:
Sensitization:
Development of visual aids for social marketing, to enable users to effectively use the EcoSans properly for example those who were not trained such as children or visitors in a home.
Regular refresher trainings in villages to remind the users about proper O&M and usage of the EcoSan bi-products (conduct exchange visits to other households/schools already implementing Hu-manure in their gardens).
Provision of vegetables seeds, to be planted in the demonstration gardens in schools to promote the use of EcoSan bi-products.
Adaptability rate:
The replicate rate is still greatly affected by the cost of an EcoSan totalling to 220,000Ugx (which is a low cost EcoSan). More efforts to reduce the cost to 100,000Ugx isstill vital for people to be able replicate the technology.

7.3. Household Survey

In total 775 households comprising of 4543 people were included in this survey. This is 19% of the total population of Mahyoro Sub County (23,800 people). 34 of the 41 villages in the Sub County were questioned including the four landing sites.

Overview of population

The table and charts below present the population surveyed – for each house, the head of household was asked to fill out the questionnaire.

TABLE HH1

Parish	Households	Men	Women	Girls	Boys	Total Children	Total People
Bukurungo	152	131	147	120	112	511	892
Kanyabikere	51	50	51	41	40	224	338
Kitonzi	114	98	113	98	78	382	635
Kyendangara	93	86	89	64	66	321	620
Mahyoro	131	109	125	95	100	398	696
Nyakasura	151	129	145	117	117	511	854
Nyakeera	83	80	82	64	67	298	508
Grand Total	775	683	752	599	580	2645	4543

Occupation of head of household

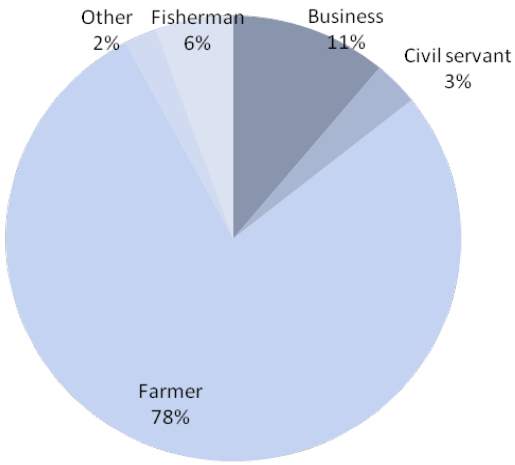


Chart 7-8: level of education of head of householdChart

7-9: occupation of head of household

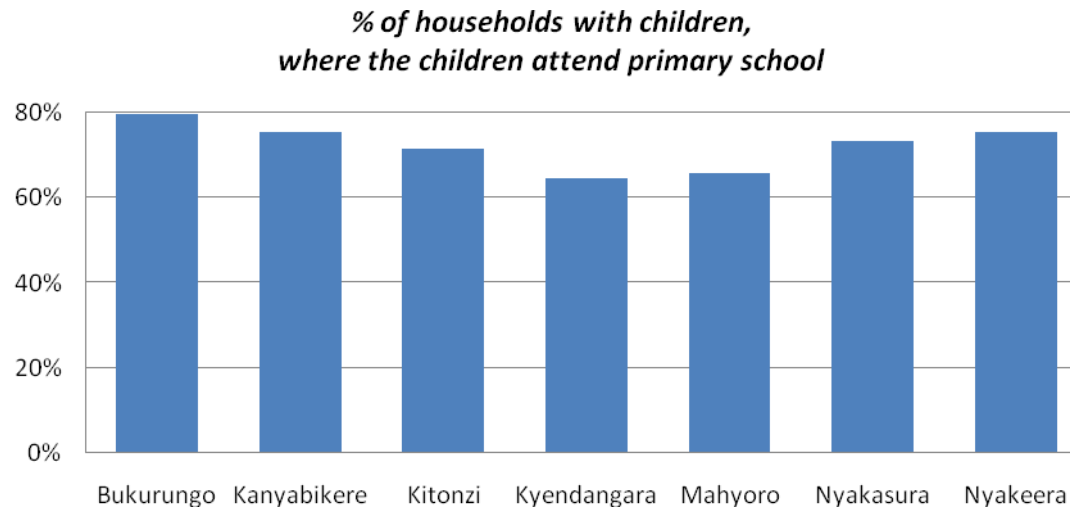


Chart 7-10: % of households with children, where the children attend primary school

Water Supply

This section presents the results from the household survey relating to the households' access to water. The table below shows the type of water source each surveyed household uses for their water. 48% of all households use shallow wells as their water point; 39% only use an 'unprotected' source – a natural source with no infrastructure.

TABLE HH2

Row Labels	No. of households	% of households
Shallow well	371	48%
Borehole	53	7%
Piped water	14	2%
Protected spring	34	4%
Unprotected source	302	39%
Grand Total	774*	100%

The table below presents the different water points being used by households in each parish in Mahyoro Sub County.

TABLE HH3

	Type of water point					
Parish	Shallow well	Borehole	Piped water	Protected spring	Unprotected	Total
Bukurungo	63			8	81	152
Kanyabikere	1	16			34	51
Kitonzi	80	12			22	114
Kyendangara	54	1		1	37	93
Mahyoro	37	16	14	4	60	131
Nyakasura	116	8		10	16	150
Nyakeera	20			11	52	83
Total	371	53	14	34	302	774

Availability of water

The table and chart below show that both shallow wells and unprotected sources, the most commonly used water sources, frequently dry up in the dry season.

TABLE HH4

	Does the water source dry up in the dry season?		
Water source	Never	Sometimes	Always
Shallow well	65%	23%	12%
Borehole	70%	9%	21%
Piped water	7%	86%	7%
Protected spring	88%	3%	9%
Unprotected	78%	17%	5%
Total	70%	20%	10%

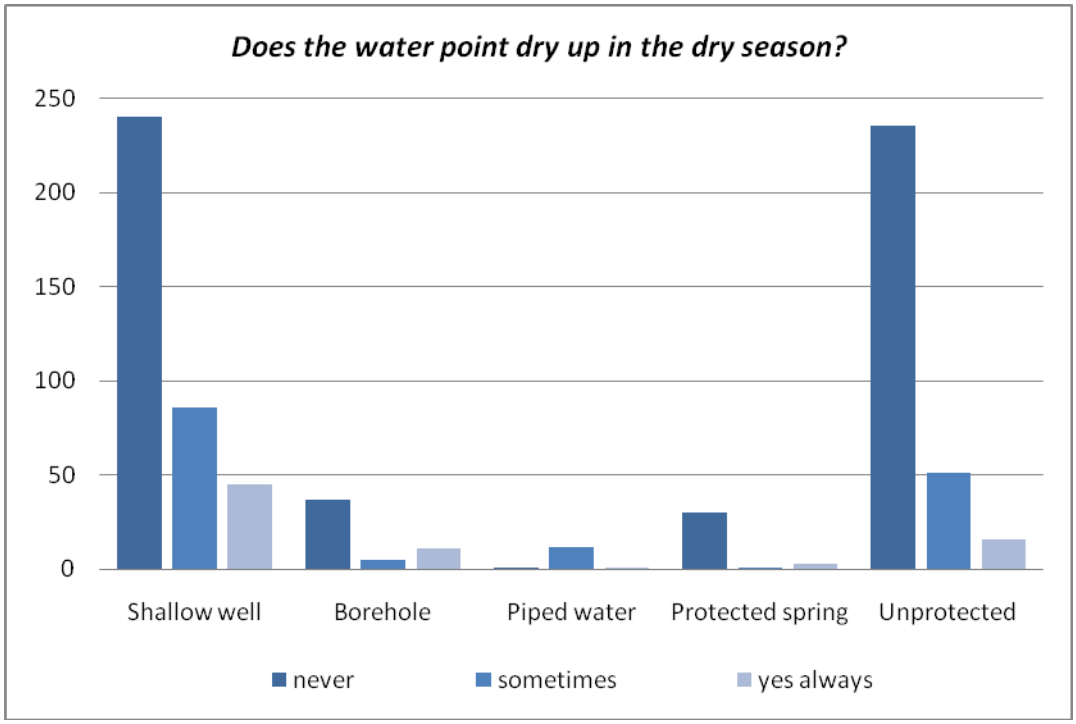


Chart 7-11: does the water point dry up in the dry season?

It can also be seen that all parishes are affected by water points which dry up.

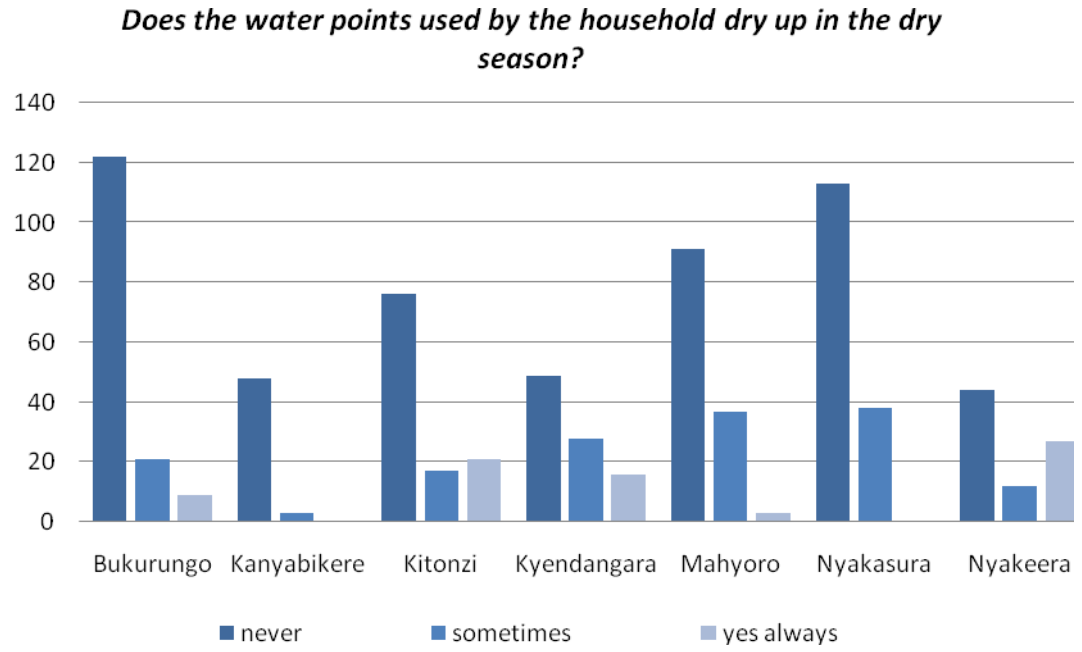


Chart 7-12: does the water points used by the household dry up in the dry season?

Of the 232 households whose water source dries up, the following alternative sources are used:

TABLE HH5

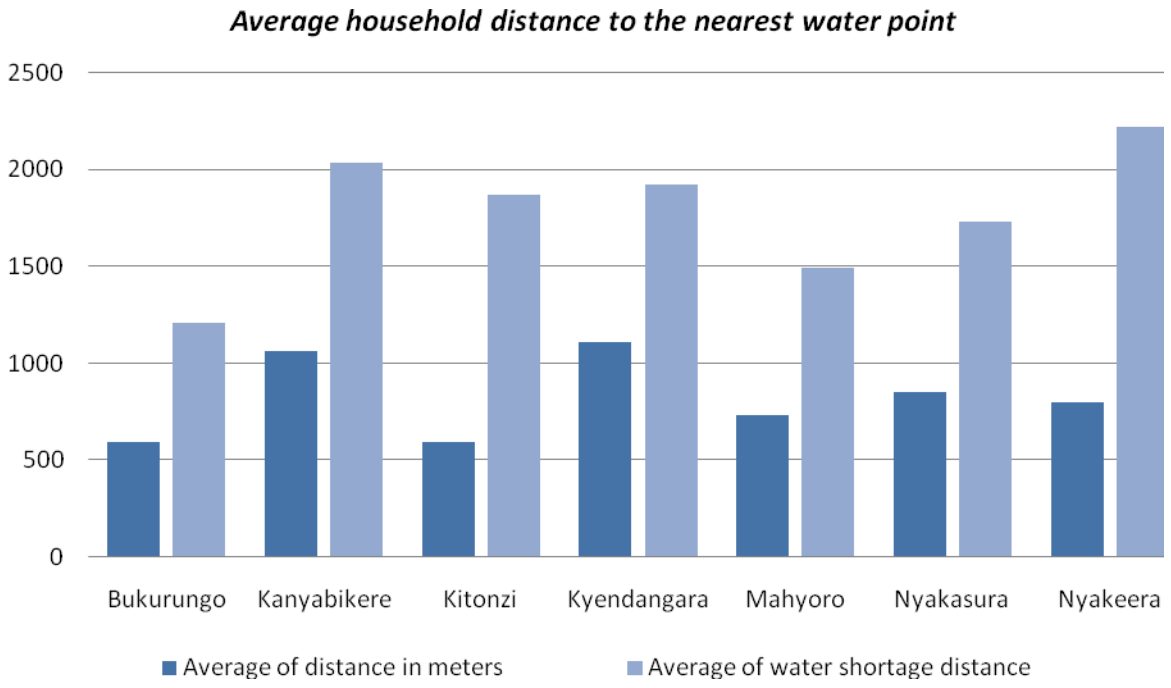
	Alternative source			
	Protected spring	Shallow well	Unprotected	No answer
% of households	3%	10%	81%	6%

It can be seen than the percentage of people using and unprotected source is now very high, at 81% which means that the drying up of water points in the dry season results in more people turning to untreated, natural water sources which are more likely to provide unclean water.

Distance to water sources

Households were asked to estimate the distance to their nearest water source. These results are only estimates of distances and should only be taken as an approximation.
The average distance for households to the nearest water point is 780m.
The minimum average distance, in Bukurungo and Kitonzi parishes, is 590m.
In Kanyabikere and Kyendangara the average distance is over 1km.
The average distance to a water source when the original source has dried up becomes 1740m.

Chart 7-13



The charts below show the number and percentage of households with a separate container to store drinking water and whether this is clean.
Overall 68% of households have separate drinking water storage (524 households).
10% of these or 78 households describe the water storage container as 'dirty'.
251 households have no drinking water storage.
Only 13 of the 775 households surveyed have rain water storage.

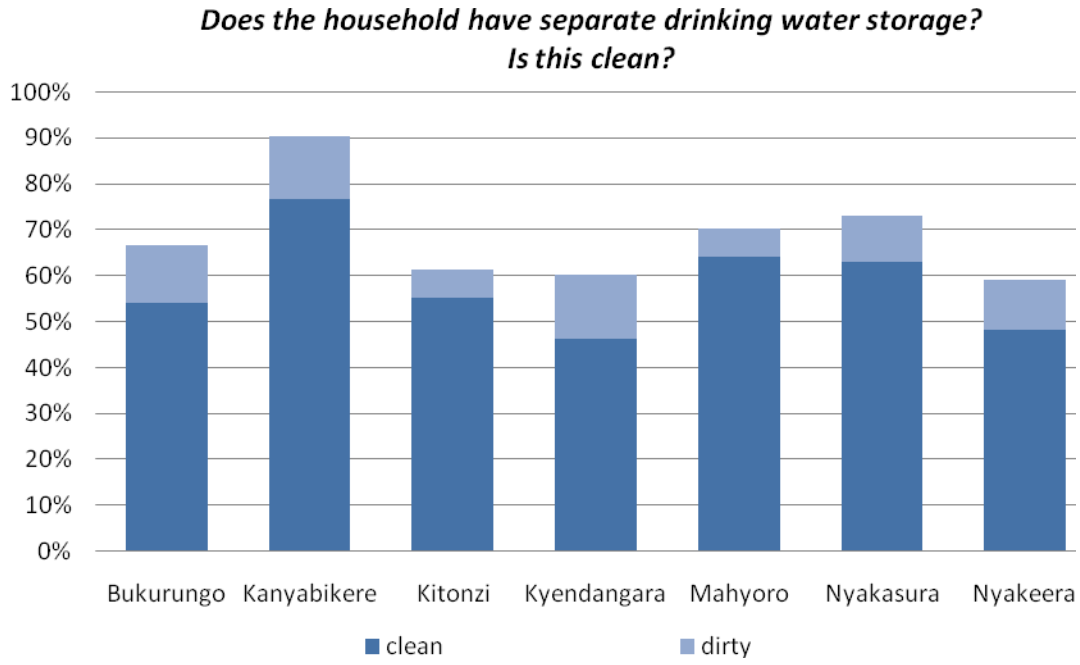


Chart 7-14: does the household have separate drinking water storage? Is it clean?

Sanitation

This section looks at the type and conditions of the latrines of the households surveyed.

Latrine type	No. of households	% of households
No Latrine	17	2%
Pit only	44	6%
Pit + Upper structure	59	8%
Pit + Upper structure + roof	655	85%

Latrine floor	No. of households	% of households
Floor not firm	178	23%
Floor firm - no sanplat	568	75%
Concrete floor	12	2%

75% of households with a latrine recorded the latrine maintenance as 'clean'.
The following chart shows the % of households with no latrine or only a pit and no structure. 61 households (8%) have no latrine or only a pit.

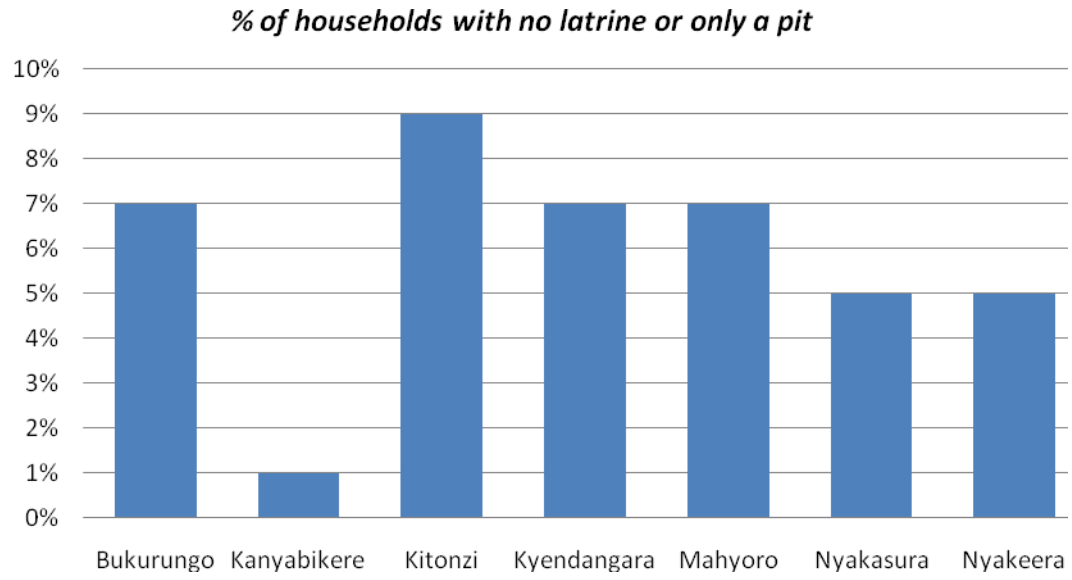


Chart 7-15: % of households with no latrine or only a pit

The chart below shows the number of households with a separate hand washing facility for the latrine.
Only 21% of households have a functioning hand wash facility.
75% of those with a separate device use soap.
7% have a non-functioning device
71% have no separate device.

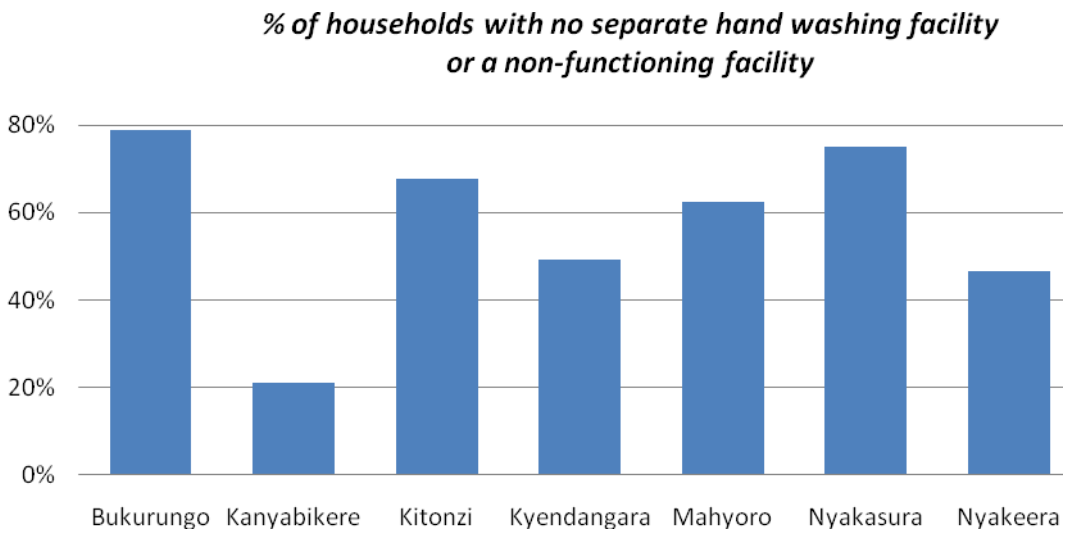


Chart 7-16: % of households with no separate hand washing facility or a non functioning facility

The table below shows the % of households with the infrastructure listed.

	% of households
Drying rack	66%
Garbage pit	45%
Bathing shelter	65%
Separate kitchen	85%
Animal shelter*	48%

**% of households with animals who have a separate animal shelter.*

The chart below presents the % of households in each parish which have all of the above infrastructure within the household.
On overage 13% households have all of these infrastructure.
20% of households in Nyakeera have all of these things, compared to 8% in Kyendangara.

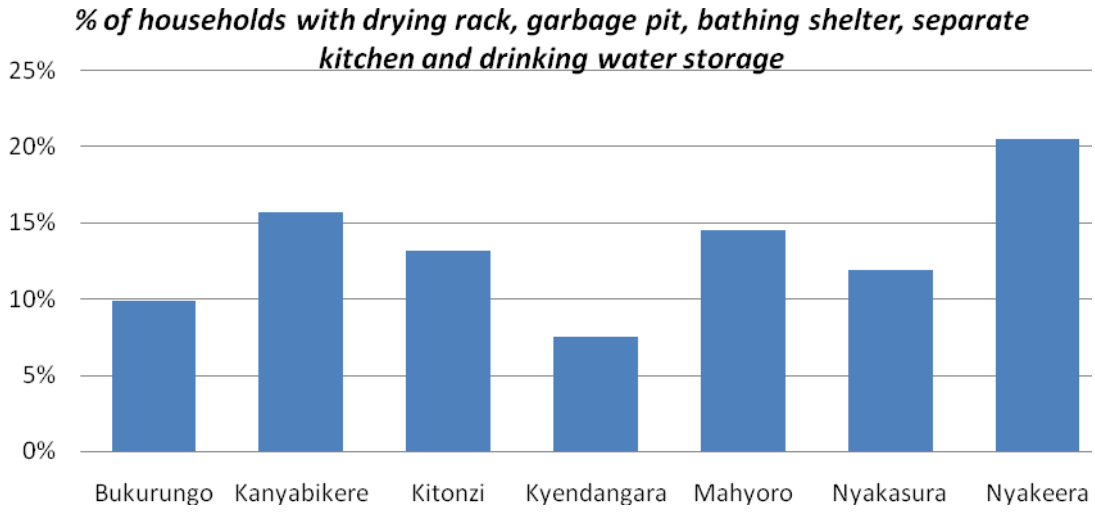


Chart 7-17: % of households with drying rack, garbage pit, bathing shelter, separate kitchen and drinking water storage

Conclusions

Sensitization in better hygiene and sanitation practices is still required at household level i.e. for hand washing with soap, animal shelters, separate kitchens and bathing shelters. To reduce the poor school performance for pupils due to water borne diseases, households should have separate safe storage for drinking water and pack it in clean water containers to take to school.
Provision of guttering materials to encourage people to harvest rain water hence reducing on WBD from unprotected sources and distances covered by women and children , this will help to minimize on absenteeism from school due to long distances covered in search for water, women to have time for other income generating activities i.e. gardening, selling fish.
Establishment of kitchen gardens to utilise manure from the EcoSan latrines, for improving on the diet and income generation.
Establishment of tree nurseries with indigenous and agro forestry trees. To reduce pressure on the existing trees, income generation, fuel wood and fodder for livestock. Women need to play a leading role because it's women who travel long distance looking for firewood.
Inter villages at household levels in hygiene & sanitation and awarding of best performance this will improve on hygiene and sanitation and adaptability of best practices.

7.4. Landing sites

Four of the villages surveyed are landing sites on the shore of Lake George where 24% of households' primary occupation is fishing. The data from the household survey above includes the results from all of the villages and the landing sites; in the following section the landing site data is separated and looked at in more detail.
People living and working at landing sites are faced with challenges of lack of sanitation facilities and clean safe drinking water; most people access contaminated water from the lake which is consumed untreated. These areas have experienced high prevalence of water borne diseases such as cholera, diarrhoea and typhoid fever which have caused many deaths and poor performances in school.
The table below presents the differences in illnesses recorded by landing sites and villages during the previous 6 months from when the survey was carried out. It can be seen that diarrhoea, typhoid, intestinal worms and skin disease are more prevalent at the landing sites than the villages, which is an indicator of the poorer hygiene practices at the landing sites.

TABLE L1

	Landing site	Village
Diarrhoea	44%	27%
Cholera	1%	1%
Typhoid	59%	44%
Dysentery	2%	1%
Malaria	75%	74%
Intestinal worms	61%	46%
Skin disease	37%	21%

The table below shows whether a household considers themselves as permanently or temporarily living at the landing site and the length of their stay. 73% of the household have been at the landing site for over five years and 16% less than a year. This is significant because if households at the landing site move frequently, sensitisation work related to water supply and sanitation needs to be repeated accordingly.

TABLE L2:NUMBER OF HOUSEHOLDS

		Type of stay		Length of stay		
Parish / Village	Total households	Permanent	Temporary	< 12 months	1 - 5 years	> 5 years
Mahyoro / Bubale	32	16	16	7	2	23
Mahyoro / Kyamubinga	24	17	7	5	6	13
Bukurungo / Kabale 1	31	22	9	3	3	25
Bukurungo / Nyamizo 1	16	13	3	1	1	14
	103	68 (66%)	35 (34%)	16 (16%)	12 (12%)	75 (73%)

The table below shows that at the landing sites, 77% of households use an unprotected water source, whereas overall in Mahyoro Sub County 39% of households use an unprotected source for water. This shows that people living at landing sites are more exposed to untreated water and thus water related health problems.

TABLE L3

	Water source				
Village	Unprotected	Protected spring	Shallow well	Piped water	Total
Bubale	23			9	32
Kabale 1	29	1	1		24
Kyamubinga	12	1	6	5	31
Nyamizo 1	15	1			16
Grand Total	79 (77%)	3 (3%)	7 (7%)	14 (14%)	103

It is also noted that of the 34 households with animals, 29 of the households let their animals drink from the lake and the other 5 have a trough.
The tables below present the information on sanitation at the landing sites where:
13% of households at landing sites have an EcoSan
93% of households have a latrine with a pit, upper structure and roof whereas 83% of non landing site villages have a la latrine with pit, upper structure and roof. There were a number of factors that determined the concentration of sanitation programmes at the landing sites compared to other places i.e. collapsing soils, high water tables, epidemic outbreaks like cholera. As a result, JESE/PROTOS began hygiene and sanitation projects to improve hygiene and sanitation status, hence a high number ofEcoSan latrines concentration.
20% of households have a latrine without a firm floor.

TABLE L4

	Own an EcoSan?	
Village	Y	N
Bubale		32
Kabale 1	5	26
Kyamubinga	2	22
Nyamizo 1	6	10
Total	13 (13%)	90 (87%)

TABLE L5

	Latrine type

Village	No Latrine	Pit + Upper structure	Pit + Upper structure + Roof
Bubale	1		31
Kabale 1	1	1	29
Kyamubinga		3	21
Nyamizo 1	1		15
Total	3 (3%)	4 (4%)	96 (93%)

TABLE L6

	Floor type		
Village	Concrete floor	Floor firm - no sanplat	Floor not firm
Bubale		25	7
Kabale 1	2	22	7
Kyamubinga	1	17	6
Nyamizo 1	6	9	1
Total	9 (9%)	73 (71%)	21 (20%)

The survey also shows that 67 of the households (65%) have a garbage pit and 35 burn their waste (34%). This shows that the 65% have adopted the proper hygiene and sanitation practices that they have been sensitized to JESE/PROTOS. The other 34% indicates that people do not have enough land where they can re-use the waste as manure or land to prepare garbage pits or composite pits.

Conclusions

At the landing sites people have high adaptability rate because these areas are prone to water and sanitation diseases. Therefore people embrace any technology or trainings focusing on hygiene and sanitation improvement. Though people at the landing sites have a high adaptability rate to hygiene and sanitation improvement, more refresher trainings are required because of social immobility (seasonal migration of fishermen and their families).

Water supply
Providing water filters and safe drinking water storage containers; because people drink un-boiled water from the lake that is highly contaminated with faecal materials.
Provision of rain water harvesting tanks, to avoid people using lake water for domestic purposes.

Sanitation
Scaling up of EcoSan usage as a way of discontinuing the excavation of pit latrines at the landing sites to reduce on the underground water pollution.
Continued sensitization on better hygiene and sanitation practices like hand washing with soap after visiting latrines, before and after eating food, proper disposal of faecal and garbage , safe water chain.

IWRM
Tree planting around lake shores and cultivating within the required distance from the lake shores.
Construction of low cost diversion channels to stop storm water from directly flowing into the Lake George, to reduce siltation of the lake.
Conservation of the indigenous vegetation around Lake George, in order to prevent the lowering of water levels and eco system imbalance. The indigenous vegetation also acts as breeding zones for fish.

Sensitization of people to stop bad practices like car washing, defecating and urinating, watering livestock from the lake.

7.5. Health Centre Survey

There are four health centres located in Mahyoro Sub County, the following table presents a overview of each. None of the centres have doctors as staff, but there medical drugs available at all of the health centres as well as medical equipment.

TABLE HC1

***Water Born Disease**

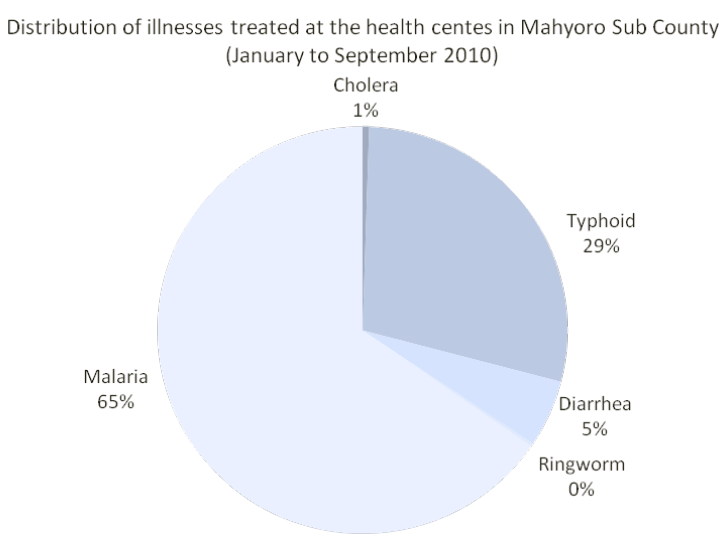
Health Centre	Parish	Village	Category	Health centre Level	Nurses	Other staff	Population served	Villages served	Patients of WBDs* per day (year)
Mahyoro Health Centre	Mahyoro	Kyamubinga	Government	3	5	6	18922	25	120 (3812)
Bukurungo Health Centre	Bukurungo	Kabale 11	Government	2	2	2	4956	11	40 (3000)
St Peters health Centre	Mahyoro	Kyendangara	Private	2	3	3	1200	5	6 (1100)
Good Hope Health Unit	Mahyoro	Rugando	Private	2	3	2	3336	12	10 (216)

In the private health centres people have to pay for service delivery whereas at public centres services are free with some occasional small fees charged. Which health centre people use depends on their income and distance to the health centre. The quality between public and private health centres is different because at times private health centres offer better services because people pay for it.
The table below presents the illnesses treated at the health centre over the 8 months: January-September 2010 when the data was collected.

TABLE HC2

Health Centre	Cholera*	Diarrhoea	Malaria	Ringworm	Typhoid
Mahyoro Health Centre	114	537	10013	0	3465
Bukurungo Health Centre	0	501	3511	2	2634
St Peters Health Centre	0	77	700	1	250
Good Hope health Unit		72	384	52	27
Total	114	1187	14608	55	6376

***Cholera epidemic:** In 2008, after heavy rains there was a cholera outbreak at the Mahyoro landing site due to poor sanitation like open defecation and poor hygienic practices like drinking contaminated water. There were emergency interventions from the government and non-government organisations like UNICEF. For the Mahyoro Health centre Mahyoro there was one record book combining like three years and it was difficult to separate the figures. In fact cholera outbreaks in 2010 were very minimal.
The two charts show firstly the % of different illnesses treated at the health centres and secondly the % of illnesses reported by the households. Both charts



show malaria and typhoid as highly reported diseases. The household survey shows that diarrhoea, intestinal worms and skin disease are also common complaints so it can be concluded that people to not travel to the health centres to have these illnesses treated.

Distribution of recorded illnesses from households (February to November 2010)

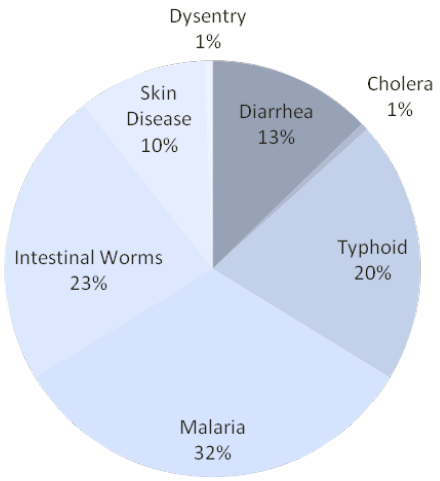


Chart 7-18

Chart7-19

Diarrhoea and intestinal worms are both illnesses related to water but are not recorded at the health centres. This means that to measure the impact of a water programme on people's health, the data from the health centres cannot currently be used as a good indicator because the relevant data is not available. Increasing access to the health centres where such illnesses are treated would itself be a good indicator in combating these health problems.

Water Supply:

The table below presents the water service used by the health centres.

TABLE HC3

Health Centre	Villages served	Water source	Time to fetch water	Share with community	Does source dry up	Distance covered during dry season	Manage ment of drinking water	RWHT (capacity)	Length during dry season
Mahyoro Health Centre	25	tap	10 Min	N	Y	1km	treating	3 (1x5000l 2x1000l)	2 months
Bukurungo Health Centre	11	shallow well	1hr	Y	N		treating	0	
St Peters Health Centre	5	shallow well	1hr	Y	Y	3km	treating	1 (5000l)	2 weeks
Good Hope Health Unit	12	tap	5min	N	N		treating	1 (10000l)	6 months

Sanitation:

The table below presents an overview of the hygiene and sanitation situation of the health centres.

TABLE HC4

Health Centre	Type of latrine	No. of stances	Separation between stances	Cleanliness	Hand washing facility	Soap used	Soak pit	Garbage skip	No. of skips	HC contribution*
Mahyoro Health Centre	VIP latrine	4	Y	dirty	N	n/a	n/a	Y	1	Sand
Bukurungo Health Centre	VIP latrine	3	N	clean	N	n/a	n/a	N		
St Peters Health Centre	VIP latrine	4	N	clean	N	n/a	n/a	Y	3	Feeding masons
Good Hope Health Unit	EcoSan	3	Y	clean	Y	Y	Y	Y	1	Labour

**Health Centre contribution during the construction of water and sanitation facilities*

From the above two tables, some key points can be noted:
Two of the centres are located at an hour's walking distance to a shallow well which is shared with the community.
Two health centres use sources which dry up in the dry season, one of which is the largest centre – Mahyoro Health Centre.
The largest health centres do not have more latrines than the smaller health centres so the density of people per latrine is very high at Mahyoro and Bukurungo Health Centres.
Only one of the Good Hope Health Unit has a hand washing facility.
The latrine at Mahyoro Health Centre has been categorised as 'dirty'.
The Bukurungo Health Centre has no garbage skip.
It was recorded that all of the Health Centres sensitise the patients to Water Borne Diseases. This sensitisation is done during immunisation, pre natal visits and when patients come for treatment. They are told the dangers of poor hygiene and sanitation and how they can minimise WBD occurrences in their households. There is no coordination between the sensitisation work of schools and the hospitals, each work independently.

Conclusions

From the health centre result analysis it indicates the need for initial sensitization in hygiene and sanitation by JESE/PROTOS, these health centres are within the intervention areas. This is evidenced by poor sanitation practices i.e. facilities are dirty, no hand washing facilities and garbage skips. Interventions in the health centres would be in form of water and sanitation facilities like water tanks, bio sand filters, hand washing facilities, provision of latrines like EcoSans and garbage skips.

7.6. Schools survey

The following schools were surveyed in Mahyoro Sub County:

TABLE S1:

Name of school	Parish	Village	No. of Pupils	No. of teachers
Kanyabikere Primary	Kanyabikere	Kanyabikere	348	7
Mahyoro Moslem Primary	Mahyoro	Bubale	233	6
Kitonzi Primary	Kitonzi	Kitonzi	1883	20
Nyanga Primary	Kitonzi	Nyanga 1	300	5
Busanza Primary	Mahyoro	Nkurungo	425	5
St Thereza Vocation	Mahyoro	Rugando	216	14

Ihunga Primary	Nyakasura	Ihunga	490	9
Nyakeera Primary	Nyakeera	Nyakeera B	181	6
Rift Valley Junior	Bukurungo	Nyamizo 11	268	9
Mahyoro Primary	Mahyoro	Lyengoma 11	746	11
Karambi Primary	Mahyoro	Kyamubinga	552	10
Mahyoro Secondary	Mahyoro	Nyakasura 11	291	11
Bukurungo Primary	Bukurungo	Kabale 2	541	10
Kabaye Primary	Kanyabikere	Karokarungi	382	7

School sanitation:

All of the schools have separate latrines for boys and girls, with an average of 59 pupils per latrine. The table below shows that types of latrines in each school.
A *mobilet* is a latrine where the upper structure and slab are made of plastic.
An *ordinary latrine* is a pit latrine with no ventilation and the upper structure is made from reeds, wattle and mud.
A *VIP latrine* is an improved pit latrine with proper ventilation and supper upper structure made from bricks, cement and concrete slab.

TABLE S2:

Latrine type	No. of schools
EcoSan	1
EcoSan, Mobilet &Ordinary	1
Mobilet	1
Ordinary	3
Ordinary &Mobilets	1
VIP	4
VIP &Mobilets	2
VIP & Ordinary	1
Total	14

TABLE S3
* Of the 8 schools without a garbage skip, two have a garbage pit and the other six burn their waste.

	Yes	%
Separate stance for teachers?	9	64%
Latrine clean	9	64%
Hand washing facility	8	57%
Facility used	7	50%
Soap	4	50%
Soak away pit	5	63%
Garbage skip*	6	43%

School water supply

One of the schools (St Thereza Vocation, Rugando) has a tap stand which is used solely by the school. All of the other schools share their water source with the community. The table below shows the water sources used by the schools. It is the community who is responsible for the O&M of the water points, apart from where schools are using unprotected sources.

Water source	No. of schools

Unprotected source	7
Shallow well	5
Protected spring	1
Tap stand	1

	Yes	%
Does the source dry up?[1]	5	36%
Does the school provide safe drinking water?[2]	2	14%
Is the water storage container clean?	2	100%
Rain water harvesting tank (RWHT)? [3]	11	79%
Is the tank functional?	8	73%
Challenges faced with the RWHT? [4]	11	100%

[1]Average distance to next nearest source is 1200m.
[2]Is the school providing un contaminated water i.e. boiled, filtered or treated with consumable solutions like chlorine etc.
[3]RWHT capacity 5,000-1000 litres.
[4]9 schools report vandalism, one lack of spare part and one cleaning.
It is concerning to note that 7 or half of the surveyed schools are using an unprotected source for the school water. This means that the children and teachers are drinking untreated water.
Only 2 of the 14 schools record that they 'provide safe drinking water'; 706 children attend these 2 schools.
The 6150 children attending the other 12 schools, 90% of the school children in the survey, are drinking unsafe water at school.
This can be compared to the water points survey, where 60% of households had access to water described as 'clear'.

The schools were also asked about their preferred technology for RWHTs.

RWHT technology preferred	No. of schools	Reasons given
Plastic	7	Easy to clean and durable More capacity
Ferro cement	7	Not prone to vandalism Durable

Child to child clubs

Child to child clubs (C2Cs) are an approach that involves capacity building of pupils and teachers in appropriate hygiene and sanitation practices as well as promotional methodologies with an aim of causing transformation amongst the pupils and teachers while at school with anticipation that children will act as agents of change by passing on messages learnt at school to their parents and adoption of the ideal practices at home.
In Mahyoro and Nyabani Sub counties school hygiene and sanitation education has taken participatory approach which has seen the involvement of pupils, teachers, and members of school management committee, Parents Teacher Association and local authorities in identification of water, hygiene and sanitation problems, planning and monitoring change using Participatory hygiene and sanitation transformation methodology. The problems identified range from Poor water, hygiene and sanitation situation undesirable personal, food and environmental hygiene and drinking water handling practices by children, inadequate and lack of water and sanitation facilities, Lack of appropriate structures for routine hygiene and sanitation promotion, poor operation and maintenance of water and sanitation facilities and vandalism of school facilities by the neighbouring communities and Existing tools/visual aids were not depicting the situation in the schools.

Beneficiary schools are facilitated to compose songs, poems and plays that have messages on relevant desirable school environment as well as child hygiene and sanitation transformation while bringing out the magnitude of gender on hygiene and sanitation. All the health club members have songs, plays and poems on thematic areas that reflect the bad behaviours that need to be eradicated, and the good ones that need to be promoted in homes and schools. Patrons are facilitating the rehearsals and club members sensitize fellow pupils using music and drama during school health parades. The music and drama entails messages on such issues as hand washing, food hygiene and operation and maintenance of sanitation facilities, safe water handling as well as waste or garbage management.
Of the 14 schools surveyed, half or 7 of them have functioning C2C clubs – this means 65% of the school children covered in this survey attend a school with a C2C club. If all the schools had a C2C club, this would affect the remaining 2369 pupils.

THE TABLE BELOW GIVES MORE DETAILS ABOUT THE C2C CLUBS.

School	Members	% of total pupils	Boys	Girls	Year of formation	Club members and patrons trained	Responsible for training?	Involved in H&S activities outside school?	Responsible for activities outside school
Kanyabikere Primary	35	10	10	25	2007	Y	NGO	N	Na
Mahyoro Moslem Primary	44	19	27	17	2001	Y	District health officer	Y	Club members
Kitonzi Primary	40	2	20	20	2009	N	Na	N	Na
Nyanga Primary	34	11	13	21	2008	N	Na	Y	Club members and Patrons
Busanza Primary	13	3	8	5	2008	Y	District health officer	N	Na
Mahyoro Primary	47	6	18	29	2007	Y	Teachers&NGO	N	Na
Karambi Primary	150	27	63	87	2008	Y	Teachers&NGO	N	Na

On average around 10% of the pupils are members of a C2C club.
In two of the school there has been no training of C2C members.
Only two of the schools carry out H&S activities outside of the school.

When C2C clubs are trained they receive core knowledge and skills regarding hygiene and sanitation as well environmental protection. This involves sensitizing pupils and staff on the desirable water handling and sanitation and hygiene practices using PHAST methodology as well as popularizing the water and sanitation facility operation and maintenance plans. Since pupils are agents of change, they transfer their knowledge got from C2C clubs and introduce it in their homes. For this reason it is important to conduct hygiene and sanitation activities in their communities.
To try and measure whether a C2C club has an impact on the level of hygiene awareness at the school, the following table shows which schools have both C2C clubs and clean latrines.

	Latrine cleanliness		
	Clean	**Dirty**	**Total**
C2C club?			
Y	6	1	7

N	3	4	7
Total	**9**	**5**	**14**

It can be seen that where there is a C2C club, 6 of the 7 schools record their latrines as clean. Where there is no C2C club, 4 of the 7 schools have 'dirty' latrines. This may indicate that children have better behaviour in schools with a C2C club.

Conclusions

***Infrastructure*:**
Some schools lack the necessary infrastructure such as a clean water source which does not dry up in the dry season, or hand washing facilities with the latrines – in fact half of all schools use an unprotected water source and again half have no hand washing facilities. This in the first instance is a barrier to ensuring safe, sustainable water and sanitation at the school.

***Behaviour*:**
Good hygiene and sanitation practice in schools includes hand washing with soap after latrine use, before and after eating packed food and fruits, drinking boiled or filtered water, cleaning latrines, sweeping classrooms and the compound, proper garbage disposal and the establishment of demonstration gardens for application of EcoSan bi- products.
Home hygiene and sanitation practices include boiling and filtering drinking water, washing hands after using latrine and before and after eating food, proper faecal disposal, washing laundry, cleaning sanitation facilities, proper garbage disposal, cleaning of compounds, houses, usage of drying racks, animal shelters, separate kitchen and application of EcoSan bi-product in their gardens.
Most practices at school and homes are similar; however the hygiene and sanitation best practices taught at school are usually transferred to the pupils' homes through the Child to Child clubs' activities.

Recommended activities:
Scaling-up of Child to Child clubs, hygiene and sanitation activities and EcoSan usage after identifying the H&S needs in schools.
Development of visual aids materials to promote proper O&M of sanitation facilities especially the new technologies i.e. Tippy taps, bio sand filters and EcoSans, to provide consistency usage even for new pupils, teachers and visitors.
Regular follow-ups and refresher trainings, because each year new pupils are admitted to the schools and others tend to relax or forget about the usage and maintenance.
Exchange visits and inter-school competition in terms of drama and music on hygiene and sanitation, to encourage and increase adoption of the new technologies.
Tree planting to combat climate change like establishment of tree nurseries i.e. fruit and indigenous species

7.7. Overall recommendations for Mahyoro Sub County

Water supply:
Construction of household rain water harvesting tanks, in villages without potential water sources, like in Rugando, Karubuguma, Nyakeera A-B and Iharagtwa villages.
Rehabilitation of the already existing water sources but are not functioning due to mechanical problems.
Establishment of mini gravity flow schemes to serve villages especially Mukarere village.
Water quality testing and treatment of contaminated water sources.
Provision of more bio sand filters and safe storage containers to communities around the *unprotected sources like lake, river, swamps and ponds.*

Sanitation:
Scaling –up EcoSan usage at institutional and household level in areas with very high water tables and collapsing soils, with more training and sensitization.
Refresher trainings and continued follow up on the hygiene and sanitation practices in schools, health centre, landing sites and households.
Development and distribution of promotional materials/visual aids i.e. on hand washing, EcoSan usage.
Conducting inter villages programmes with household competitions and exchange visits to households with best practices in hygiene and sanitation.
Empowering of the village health teams in executing hygiene and sanitation activities i.e. bicycles, T-shirts and caps for identification and easy mobility.

IWRM:
Protection of catchment areas, through planting indigenous tree species along river banks and lake shores. This will control on erosion and siltation of the lake, lowering of water tables.
Promotion of water and conservation methods i.e. terracing and agro forestry.
Utilisation of run-off water from water points, through establishment of kitchen garden, water troughs.

8. Nyabani sub county

RESULTSNyabani subcounty

WATER POINTS SURVEY

Introduction to the survey

69 water points in Nyabani Sub County were visited for the baseline survey at the end of 2010. As detailed in the Methodology in the chapter 5, the data for this survey was collected by JESE volunteers who carried out spot checks at the water points, interviewed WATSAN committees and local chair people, and checked records about the water points for extra information. The questionnaire used for the interview can be found in the at the end of this publication.

Availability of water infrastructure and its functionality

The following table shows an overview of the water points in each Parish of the Nyabani Sub County. 69 water points were surveyed and the results were;

Y – Functioning water point N- non-functioning water point

	Borehole		GFS (Gravity Flow Shemes)		Improved spring		Protected spring	Shallow well		Grand Total
Parish	N	Y	N	Y	N	Y	Y	N	Y	
Kanara		1				2	2	1	17	23
Nganiko			1	1		1	2	1	3	9
Nyarurambi		1							2	3
Rwenjaza	1	1			1	1			6	10
Rwenkubebe	1	1				1	2		3	8
Rwenshama	1				1	3	2	1	8	16
Grand Total	3	4	1	1	2	8	8	3	39	69

In total it was recorded that Nyabani Sub County has 60 functioning water points and 9non-functioning water points. The Uganda Water Atlas 2010 for Kamwenge District records 87 functioning and 25 non-functioning water points in Nyabani. This difference shows a big difference between the both baseline studies.

In total 39 of the 42 shallow wells in Nyabani Sub County are functioning, i.e. 92%. Three are not functioning due to mechanical problems and lack of water.

The table below shows the reasons for which the water points are non-functioning, indicating that the reasons are near evenly spread between mechanical problems and a lack of water.

Parish	Water point	Problem	year of construction	Pump Type	Facilitator
Kanara	Shallow well	Mechanical	2004	Victoria U3	HEWASA
Rwenjaza	Borehole	Mechanical	1990	Victoria U3	K.D.L.G
Rwenkubebe	Borehole	Mechanical	1997	Victoria U2	K.D.L.G
Rwenshama	Borehole	Mechanical	1999	Victoria U2	K.D.L.G
	Shallow well	No water	2010	Niira	FORUD

Two key things can be noted from the above table:

All three non-functioning boreholes constructed by K.D.L.G have mechanical problems.

Both shallow wells constructed by HEWASA and FORUD are non-functioning due to a lack of water and mechanical problems. FORUD's shallow well is the most recently constructed non-functioning water point.
The following table presents all 'inadequate' water points, defined as:
Not functioning; or
Functioning but with a break down repair period of over one month

	Piped water	Borehole	Shallow well	Protected spring	Improved spring	RWH	GFS	Unprotected source
Water point survey	-	10%	61%	12%	14%	-	3%	-
Household survey	5%	6%	22%	15%	-	-	-	52%

The table shows the number of non-functioning water points per year of construction and who constructed these water points. The figures in brackets show the total number of water points constructed by this facilitator.)

The table shows that these 'inadequate' water points were constructed evenly throughout all three periods shown. Before 1995 only KDLG constructed 6 water points in Nyabani Sub County and 1 of these now is not functioning/over one year break down repair period. Since 1995 JESE/FORUD have constructed 24 new water points, 1 of which is non-functioning due to lack of water. This indicates that problems with the water points do not necessarily results from age nor pump type, but from attention paid during construction and maintenance to capacitate local authorities to repair and manage the systems. Experience on the ground suggests that problems come from the technology type, its functionality period, O&M by the beneficiaries and repair costs.

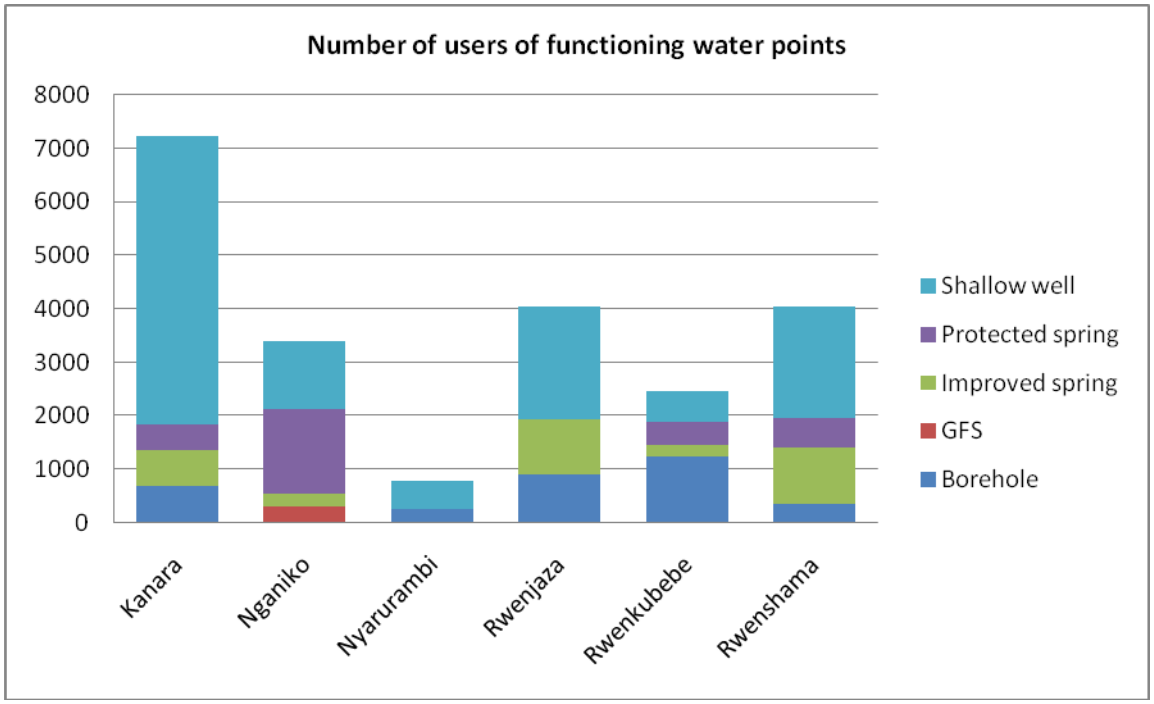
Water access in Nyabani Sub County
Water infrastructure serves water users. In this part the analysis will try to detail the amount of people who have access to water services. It is important to note that the 'number of users' of each water point is defined as the number of users the water point is designed to serve, not the actual number of people using the water point. The results from the water point survey can be compared to the household survey which asks people which water point they are using.
The table below shows the % of households which the water points provide water service compared to the responses of households themselves for what type of water point they are using (total of 4543 people surveyed). On average there are 5.7 people per household.

Shallow wells are the most commonly used source, but the household survey also demonstrates that 52% of people use an unprotected source for their water. The water point survey shows use of improved springs, which is not shown in the household survey because this distinction was not made. Finally the household survey shows that 6% of people us a borehole compared to the 10% water points surveyed.

Sum of Water point	Period of construction			
Facilitator	1995-2005	After 2005	Before 1995	Grand Total
DWSCG		(4)		4
FORUD		1(24)		24
HEWASA	3 (24)	(2)		26
JESE		1(1)		1
K.D.L.G	2 (5)	(2)	1(3)	10
Private		(1)		1
UNICEF	1(1)	(1)		2
WES	(1)			1
Grand Total	31	35	3	69

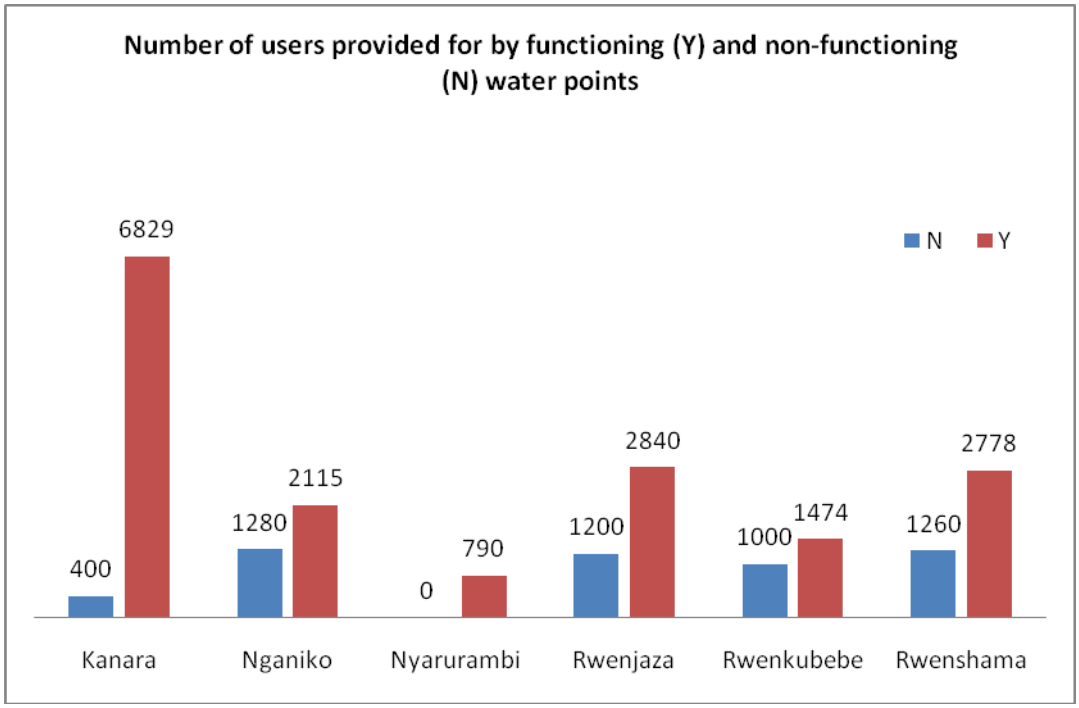
The chart below presents the results from the water point survey, showing the number of water users of functioning water points in each parish.

WP Chart 1:



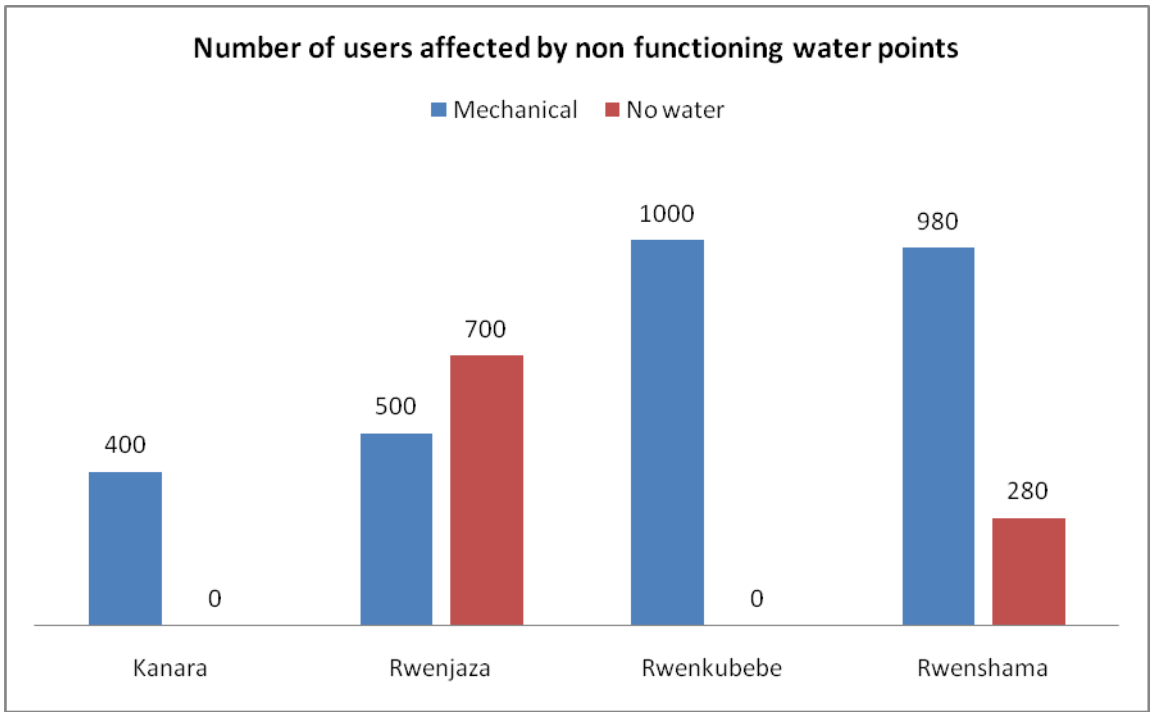
What is the population/parish, can we put it also in % to know how far we are from a 100% coverage?

The 69 water points in this survey, if being used by the number of users they were designed for, could provide water service to 21.966 people (compared to a population of Nyabani of 34.700). In total, the 60 functioning water points can provide water to 17.046 people or 77.6% of the 21.966 possible users; 49.1% of the total population of Nyabani. This can be compared to the Uganda Water Atlas which states that there is 89% access to water in Nyabani. The 6 non-functioning water points due to mechanical problems could provide a service to 2880 people if repaired.
The chart below shows the number of users of the functioning and non-functioning water points in each parish should serve with water. This shows that there is potential to increase access for the greatest number of water users in Kanara, Rwenjaza and Rwenshama parishes.
WP Chart 2:



Make differentation between mecanical/ reparable problems and no water availability!
The chart below shows how many more people can have access to water by solving the problems of non-functioning water points in each parish. In total 2880 potential users could have access to water if only the mechanical problems are fixed (another 980 are affected by water points with water shortage). It can be seen that Nganiko and Rwenshamaparishes have the highest number of users affected by non-functioning water points.

WP Chart 3:



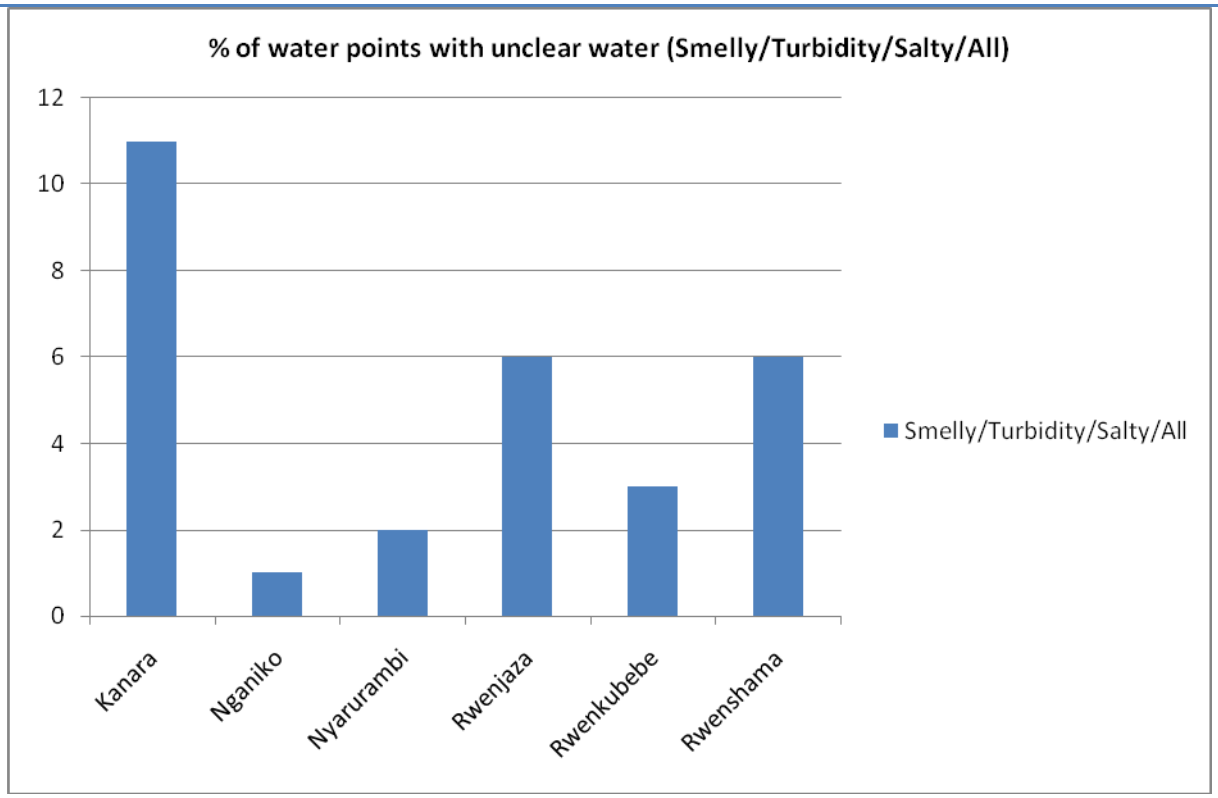
5. Water quality

In the survey, a subjective assessment was made of the water quality at each water point, which was described as: 'clear', 'turbidity' (water colour), 'salty', 'smelly' or 'all'. For the purpose of these results, only the response 'clear' will be taken to indicate that the water point provides clean water.

The following chart shows that the majority of all of the water points in Nyabani Sub County have unclean water. Only 27.5% is considered as "clear". The main problems are 20.3% turbidity, 4.3% smelly, turbidity & smelly 4.3% and 7.2% all.

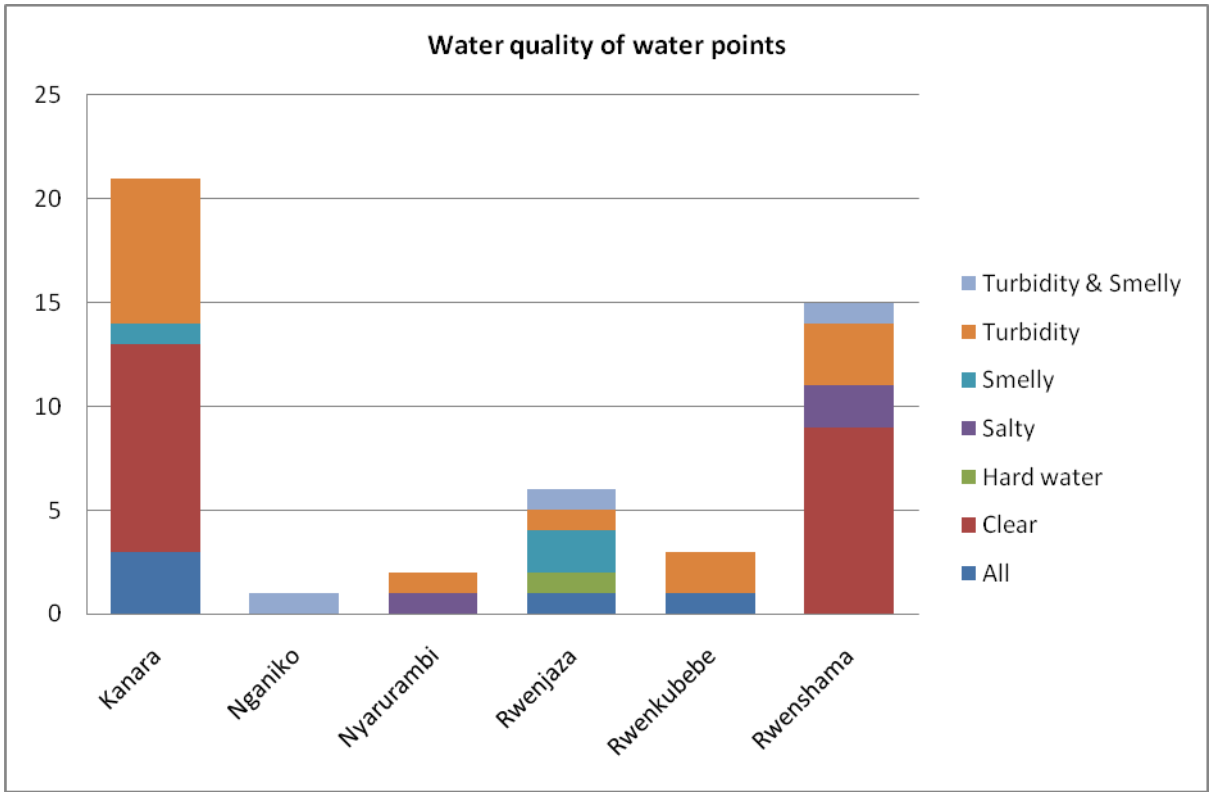
WP Chart 16:

	Water Quality								
	All	Clear	Hard water	NA	Salty	Smelly	Turbidity	Turbidity & Smelly	Grand Total
% of water points	7.2%	27.5%	1.4%	30.4%	4.3%	4.3%	20.3%	4.3%	100.0%



In Rwenjaza parish, both available water points have unclear water, and this parish has the highest number of users per water point. There are also major problems with water quality in Rwenshama, Kanara and Rwenkubebe. It can also be noted that if all the water points were clean, this would be access to clean water for 4.472 more people.

WP Chart 4:



The following table looks at whether the year of construction of the water point is linked to its water quality. In fact, only 18% of water points constructed since 2005 have clear water, compared to a similar result of 0% of water points constructed before 1995 having clear water.

Period of construction	Clear water	Smelly / Turbidity / Salty / All	NA
before 1995	0%	3%	1.5%
1995-2005	10.3%	22.3%	13.4%
after 2005	17.8%	13.5%	16.5%

Facilitator/ number of water points	Clear water	Smelly / Turbidity / Salty / All	NA	Grand Total
FORUD	9	7	8	24
DWSCG	1	3	0	4
JESE	0	0	1	1
KDLG	1	6	3	10
HEWASA	7	11	8	26
PRIVATE	0	0	1	1
UNICEF	1	1	0	2
WES	0	1	0	1
Total	19	29	21	69

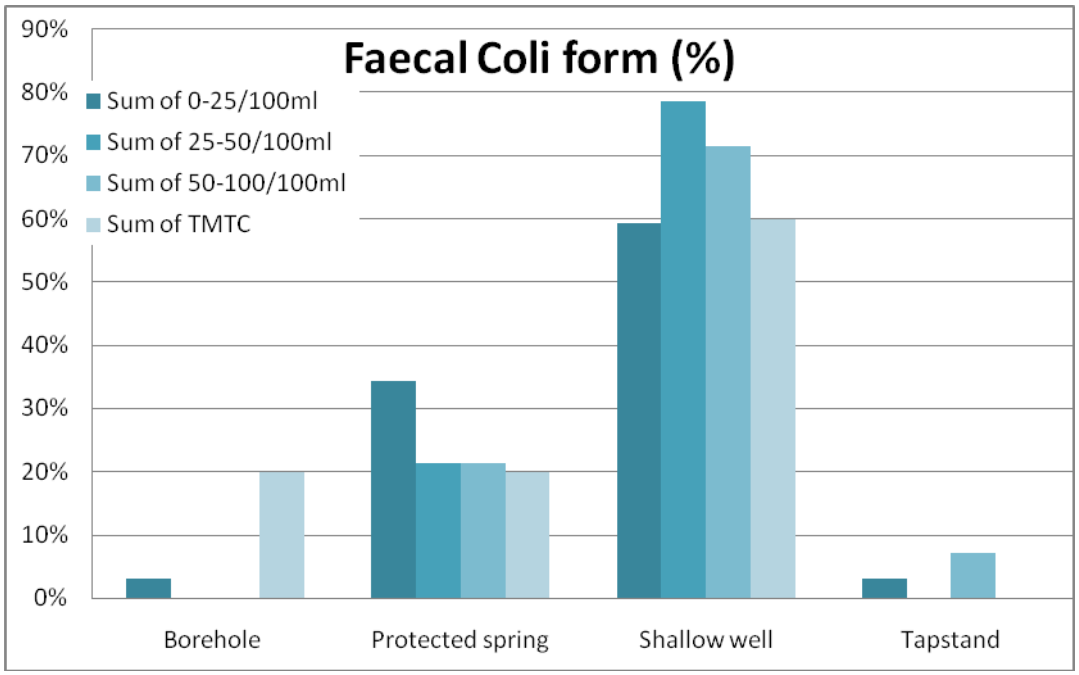
BACTERIOLOGICAL WATER QUALITY

In the survey, a limited assessment was made of the water quality at selected water points, on which the result was quantified, related to the amount of total and faecal coliforms. In the graphic below the results are shown related to the different technologies that were examined. Note that as the sites selected were infrastructures constructed by PROTOS, the evaluation solely relates to Shallow wells and protected springs. Next to the protected water sources, samples were taken from river Mpanga.

The table below shows the number of water points tested

Water point	Number tested
Shallow well	43
Protected/improved spring	18
Borehole	2
Piped water (tap stand)	2

WP Chart 15:



From the table above it indicates none of shallow wells and protected springs tested are within the required national standard of 0/100ml. 19 of the shallow wells and 11 of protected springs are in the Maximum Acceptable Concentration (MAC) of 50/100ml.
The water testing results indicated that shallow wells were the most contaminated water sources, with Faecal coliform to many to count (TMTC) per 100ml due to some factors:
The testing was carried out during the rainy season and the water was contaminated (flooding around the well).
Shallow wells don't have the necessary clay seal to stop the well from getting contamination.
Protected springs were with the least Faecal coliform to many to count (TMTC) per 100ml, this is a result of protecting and well management of the catchment area. This minimizes on the high rates of water contamination.

Water Management

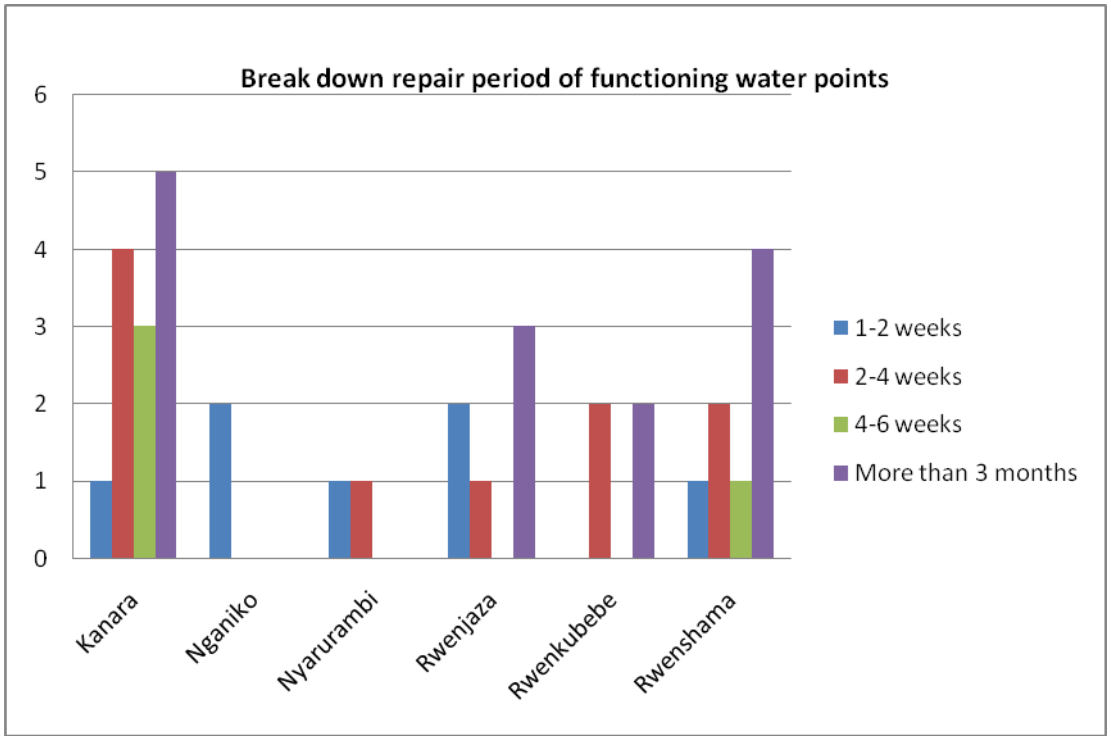
As described in Chapter 5, the water management at the Sub County level is comprised of Water User Committees elected by the users to collect fees and organise O&M for a water point. Water User Associations which are an umbrella for the Water User Committees....

This section takes a closer look at the management of the water points, how their O&M is conducted, the presence of WUAs, the collection of fees and the effects these factors have on access to water. One indicator of the quality of the management of the water point is how quickly the water point is repaired is repaired if there is a breakdown.
Protected and improved springs do not use a water pump so are treated separately from shallow wells. The table below present the break down repair period of the functioning water points in Nyabani Sub County:

For the four springs it is noted that the spare part frequently needed is a tap. The table below presents the spare parts frequently needed for the shallow wells.

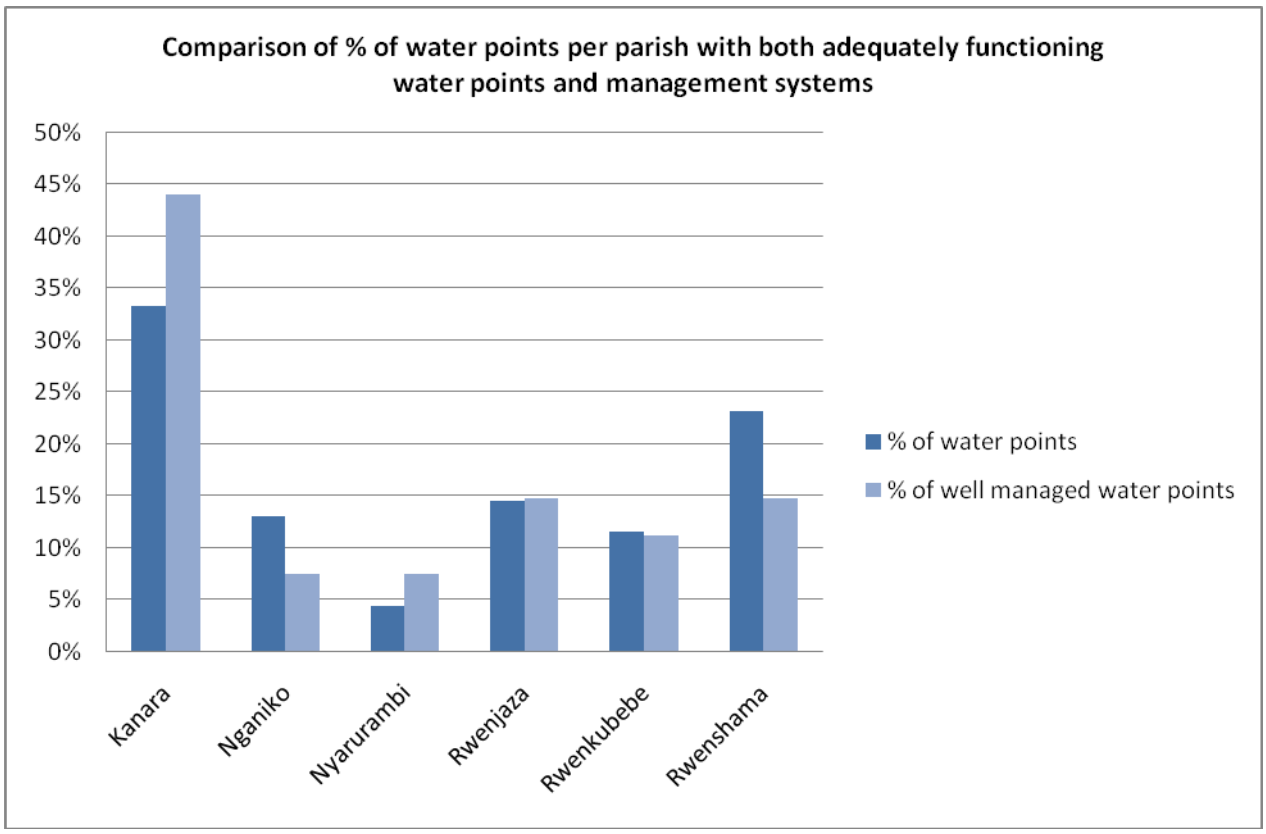
Count of Water point Spare parts needed frequently	Type of Water point Shallow well (Number)
Chains	1
Handles	3
Handles & Handles	1
Handles & Chain	1
Never need of spare parts	25
Pipe & handle	1
Pipes	5
Pump	4
Taps	1
Grand Total	42

WP Chart 5:



The chart above shows that most water point with a break down repair period of less than a week have their pump attendant located at the Sub County level.

WP Chart: 17

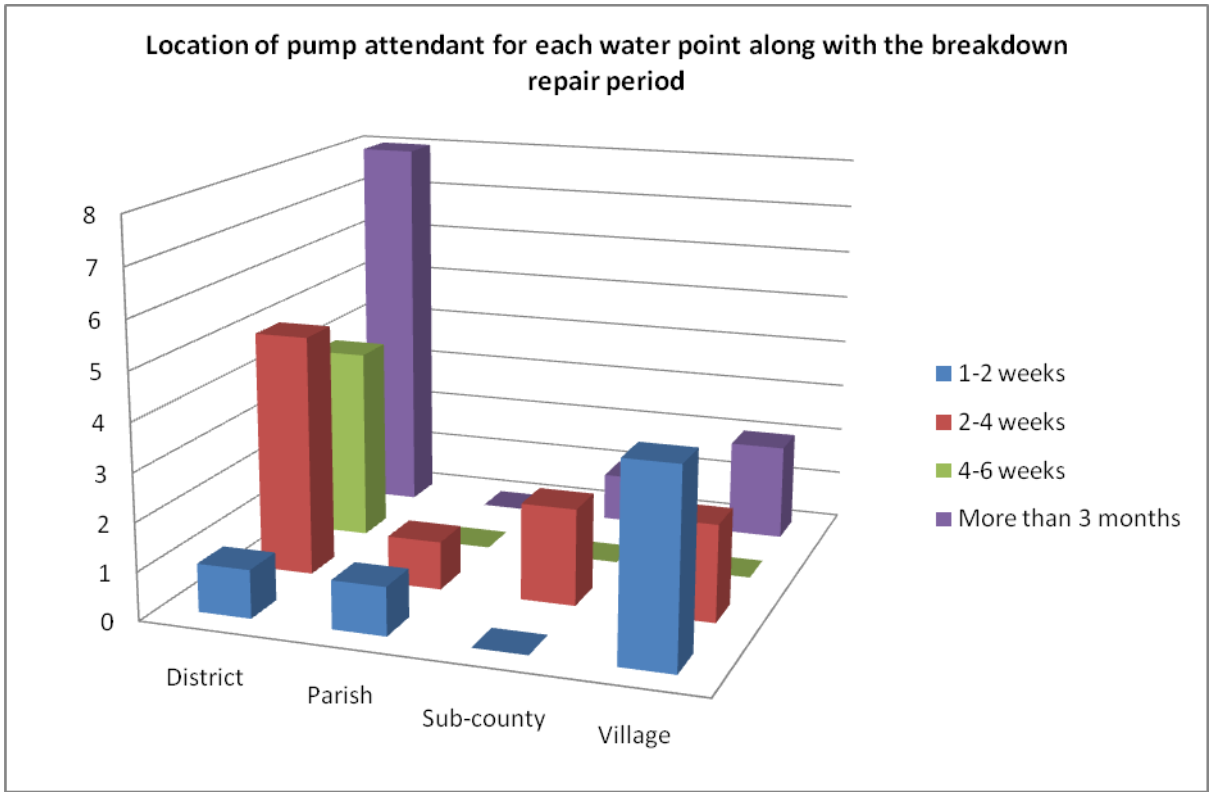


The chart above gives a picture of the local management of the water points in each parish. Four parameters are used:
Water point is functional
WATSAN in place
Water user committee (WUC) member of a water user association (WUA)
User participation in operation and maintanence (O&M)
User fee collected

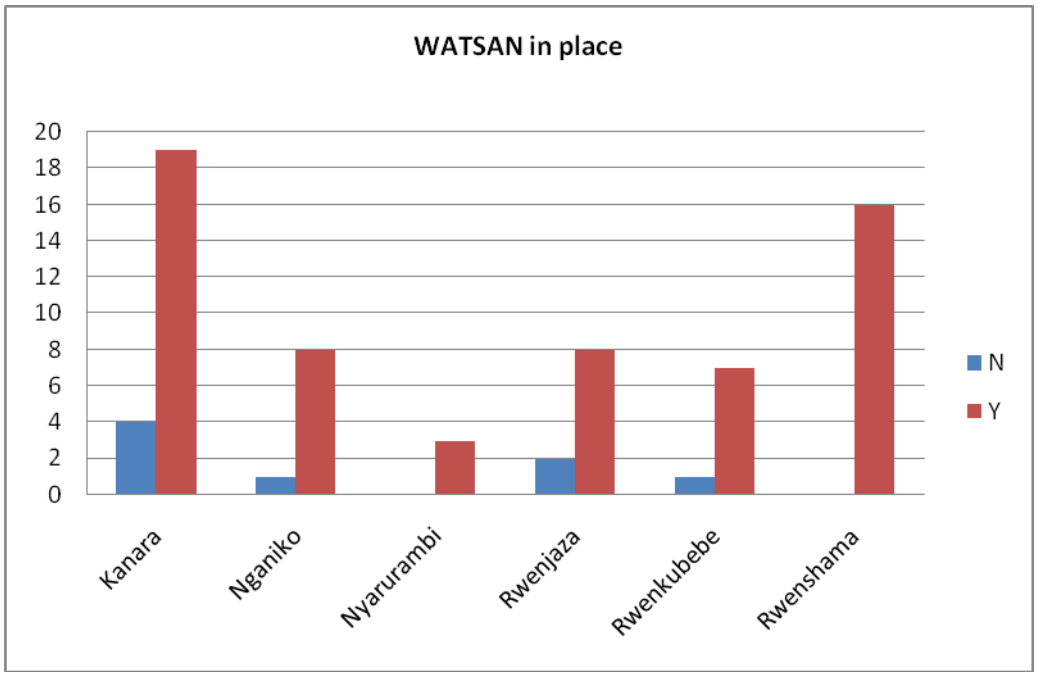
Break down repair period	1-2 weeks	2-4 weeks	4-6 weeks	More than 3 months	Grand Total
Improved spring		2	1	4	7
Protected spring				2	2
Shallow well	6	6	2	4	18
Grand Total	6	8	3	10	27

	Never heard of WUA	No funds	Non functional	Grand Total
No. of water points	32	4	1	37

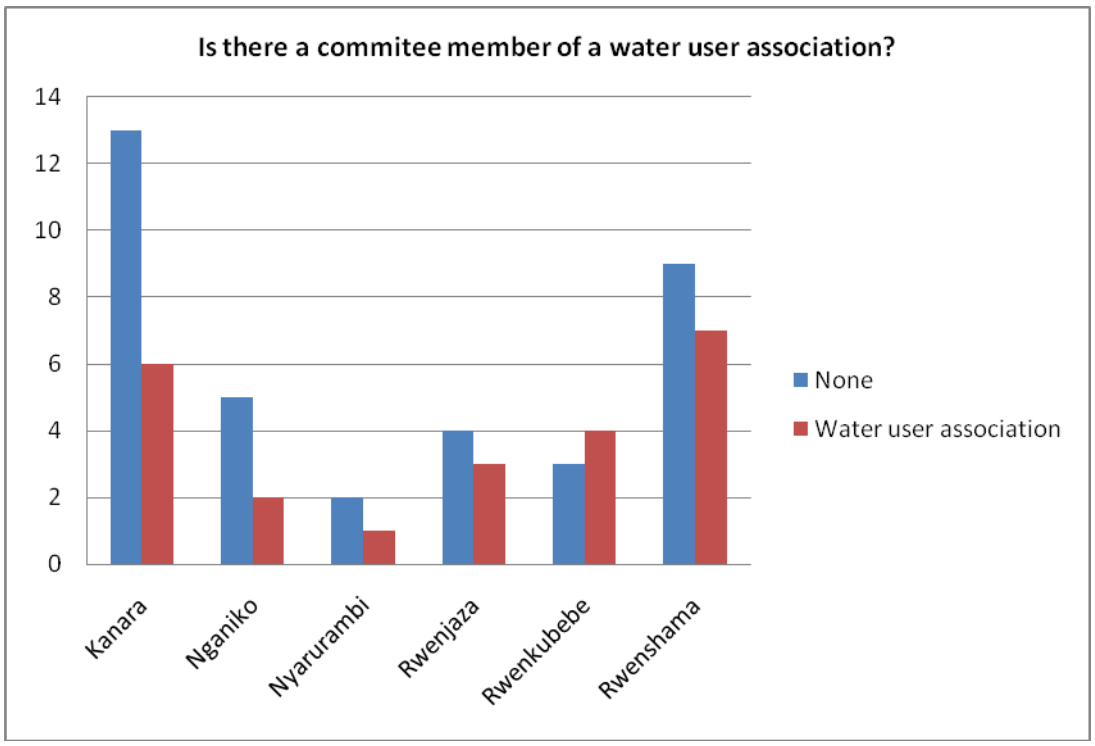
WP Chart 6:



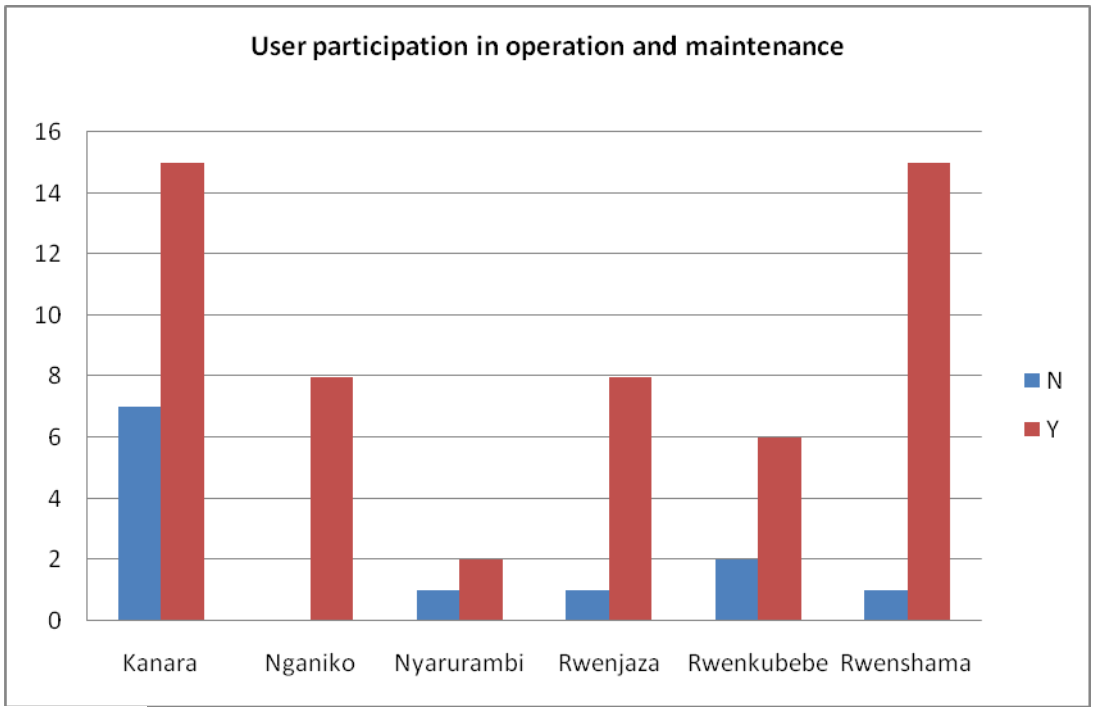
This chart shows that when the district is responsible to repair the water infrastructure, it takes more than 2 weeks to fix the problem.
the diagnostic shows also that the location of both pump attendant and available tools for the water points are strongly related and where the pump attendand is located at the Sub County level, the tools are most likely located at the Sub County level as well. Is it possible to put a % of waterpoints with WATSAN in place? Or put the total number of waterpoints.



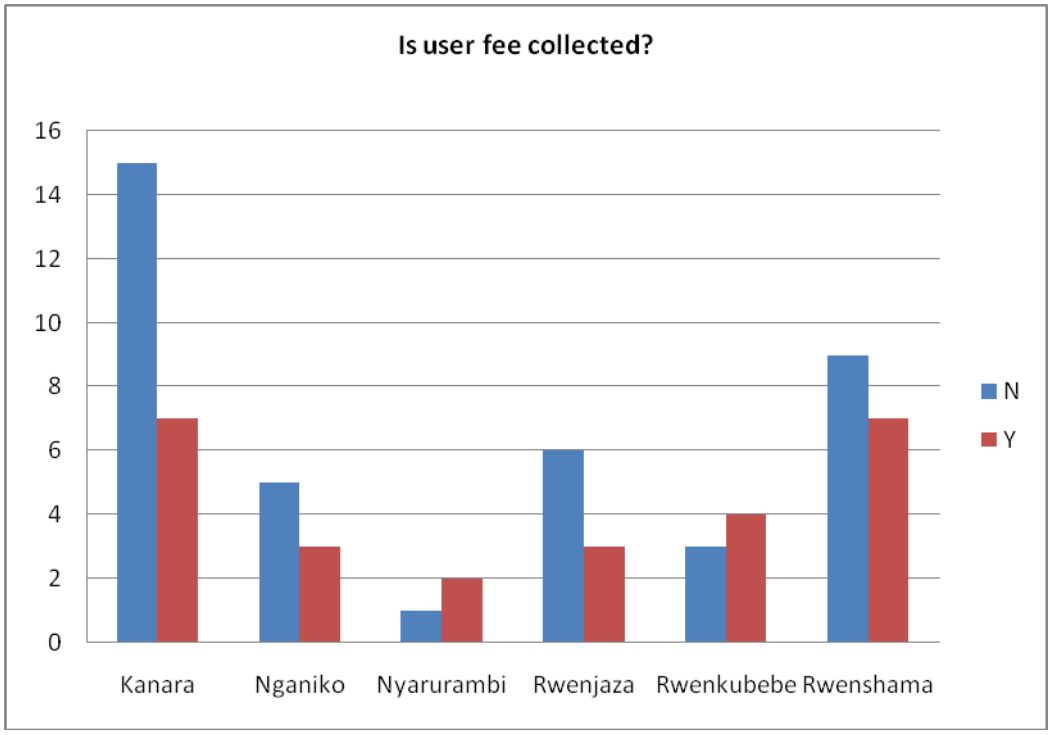
WP Chart 9:



WP Chart 10:



WP Chart 11:



	Never heard of WUA	No funds	Non functional	Grand Total
No of water points	32	4	1	37

Name of water point	Never heard of WUA	No funds	Non functional	Grand Total
Bavukahe	1			1
Buhumurro	1			1
Busungu	1			1
Church	1			1
Gerevaziyo	1			1
Habomugisha	1			1
Hakayembe	1			1
Innocent	1			1
Jafari	1			1
Kabeza	1			1
Kabingo	1			1
Kamutogoro	1			1
Kanara 11	1			1
Kanara T/C	1			1
Karokarungi	1			1
Karokarungi S/W	1			1
Kashaki TC	1			1
Kaswa	1			1
Katukundane	1			1
Kinyagiro S/W		1		1
Kitooma	1			1

Lyamanuma	1			1
Mubungura		1		1
Murambi	1			1
Nabikunda	1			1
Ndazigaruye	1			1
Nganiko T/C	1			1
Nsanzu B/H		1		1
Nyamabale	1		1	2
Nyarurambi	1			1
Philmon	1			1
Rutooma	1			1
Rwenshama	1			1
Simusiga		1		1
Twebaze	1			1
Zanzibar	1			1
Grand Total	32	4	1	37

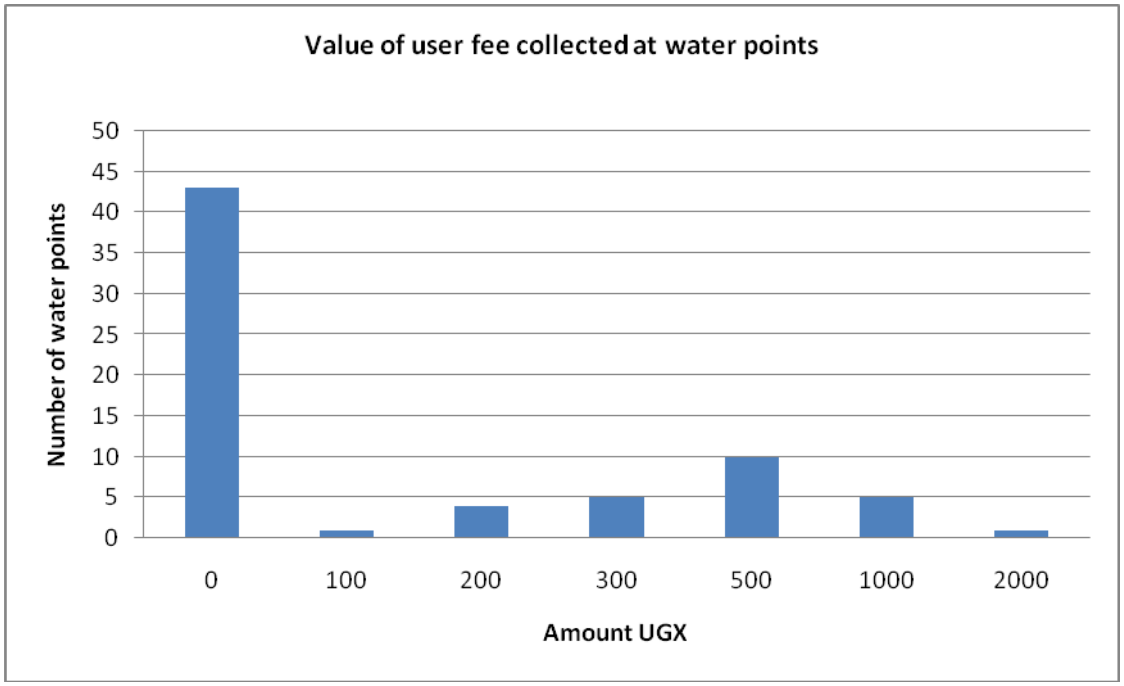
User fees are collected at 26 of the water points (total 69?), with an average amount of 1000UGX. Of these 26 water points, in 1 case the fees collected are kept with the Water User Association and 25 with the Water User Committee Treasurer.

	Water fees held by	
	Water User Association	Water User Committee treasurer
Number of water points	1	25

The chart below shows the variation of amounts of fees paid to use the water points – people most commonly pay 500UGX.

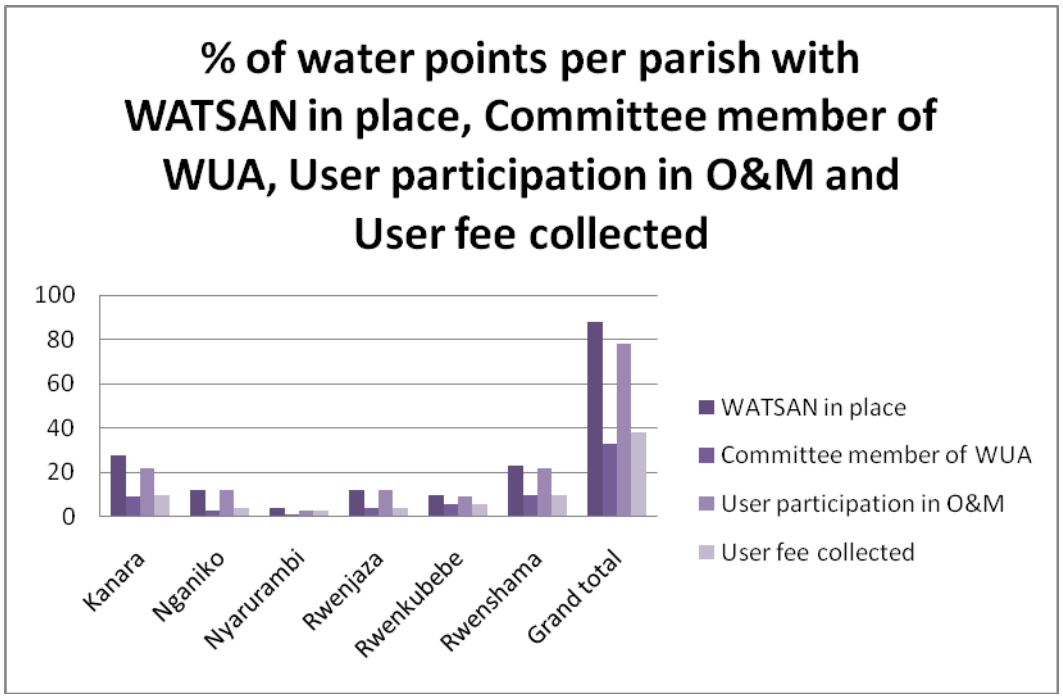
	Period of collection		
	Monthly	Yearly	Grand Total
No of water points	22	4	26

WP Chart 12:



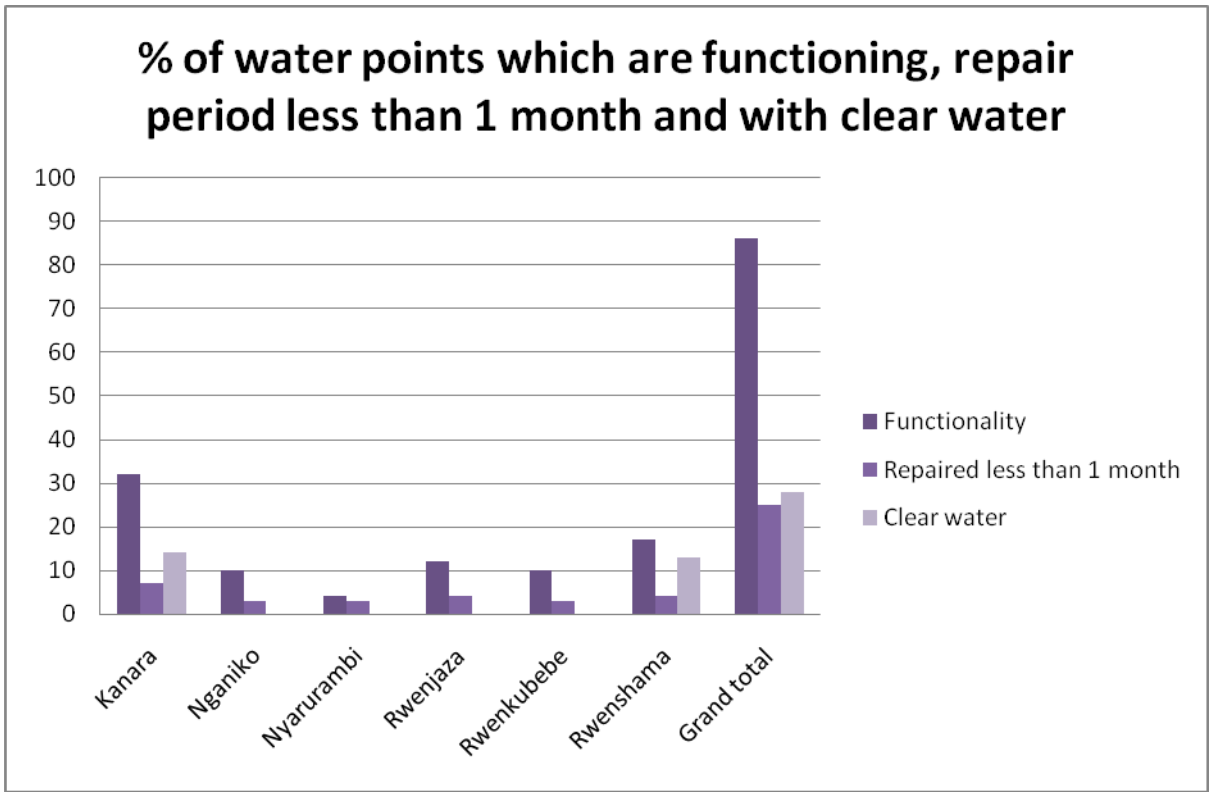
The chart below shows that there is a great variation in the number of water points in each parish which have proper water management systems in place. This demonstrates that there are problems of water management in Kanara parish, where it can also be noted that there are three non-functioning shallow wells, and otherwise poor water quality of its water points.

WP Chart 13:



To give a finally summary of the water access per parish, the following chart shows how many people are using water points which are functioning, have a break down period of less than one month and whose water quality is clear. In total only 25% of the total possible water users can access such water points. The chart shows that Nganiko and Rwenshama parishes have the highest number of people without access to sustainable water points.

WP Chart 14:



A well-managed water point can be defined as:
Functional
Water quality 'clear'
Break repair period less than 2 weeks
WATSAN committee in place
User participation in O&M
User fee paid
Drainage channel
Run-off water used
Animals not drinking from the source
The table below shows the number of water points fulfilling all of these criteria, and the number of people recorded as using these water points.

Parish	No. water points	No. fulfilling good WM criteria	No of people accessing these water points
Kanara	23	3	700
Nganiko	9	2	145
Nyarurambi	3	1	380
Rwenjaza	10	2	430
Rwenkubebe	8	3	644
Rwenshama	16	2	800
Grand Total	69	13	3099

The chart below looks instead at access to clean, sustainable water, i.e.

Functional
Water quality 'clear'
Break repair period less than 2 weeks
Animals not drinking from source

Parish	No. water points	Number fulfilling criteria	% of well managed water points	No of people accessing these water points
Kanara	23	8	35	2240
Nganiko	9	6	67	2095
Nyarurambi	3	1	33	380
Rwenjaza	10	4	40	1180
Rwenkubebe	8	4	50	894
Rwenshama	16	5	31	1253
Grand Total	69	28	41	8042

Summary and conclusions

Shallow wells are overwhelmingly the most common water point found in Nyabani Sub County – 42 of the 69 water points are shallow wells.
9 of the 69 water points surveyed in Nyabani are non-functioning; five of these are due to mechanical problems and three as a result of lack of water. Fixing the mechanical problems would provide water to 2660 users.
12 of the 60 functioning water points have a break down period of over one month.
Only 30% of the water points have clear water; this clearly demonstrates that water quality is a major problem.
Only 20.4% of the possible water users have access to water points which are functioning, can be repaired in less than one month and have clear water.

There are many different factors influencing the functionality and quality of the water points, with no particular factor standing out as the overriding cause of poorservice. The age of the water point does not appear to dictate its current quality, rather the facilitator of the water point.
Kanara and Rwenshama are parishes with the highest possible impact to give access to more water users.
Rwenjaza parish shows the poorest water management structures and also has the highest number of non-functioning points and poor water quality.

Ecosan survey

All the 38 Ecosans in Nyabani Sub County were visited for the survey. The table below shows their location and whether they are private at household level or public.

Parish	Household	Public	Grand Total
Kanara	6	1	7
Nganiko	14	2	16
Rwenjaza	3	4	7
Rwenkubebe	1	1	2
Rwenshama	6		6
Grand Total	30	8	38

37 of the 38 Ecosans are demonstration Ecosans, Ecosans built with 80% facilitation from FORUD/JESE and the owner is left to contribute 20%. This is done to demonstrate to the

neighbouring households how an Ecosan operates; those interested can then replicate and construct an Ecosan in their homes without requiring facilitation from FORUD/JESE.
The following table shows when and where the Ecosans were constructed. It can be seen that one (1) Ecosans are 100% funded by other NGOs (HIMA cement).

The following table shows when and where the Ecosans were constructed.

Parish	2007	2008	2009	2010	Grand Total
Kanara			5	2	7
Nganiko	2	1	3	10	16
Rwenjaza		4	3		7
Rwenkubebe	1	1			2
Rwenshama			2	4	6
Grand Total	3	6	13	16	38

The table presents the functionality of the Ecosans constructed by the four facilitators.

	Functionality		
Facilitator	N	Y	Grand Total
FORUD	8	13	21
Hima Cement	1		1
JESE	13	2	15
SIMAVI	1		1
Grand Total	23	14	38

37 of the total 38 Ecosans are demonstration Ecosans.
2 of the 23 non-functioning Ecosans were constructed in 2008, seven in 2009 and 14 in 2010.
15 out of 38 Ecosans are being used with ash while the remaining 23 are not yet in operation.
None of the public Ecosans collects a user fee per month for O&M

Sanitation

11 of the 38 Ecosans are being cleaned by women or girls. The remaining 23 Ecosans are not yet functional.
13 out of 15 Ecosans have a hand washing facility while 2 do not have.
6 of these 15 have soap while 9 do not.

Number of Ecosans	15	11	15	13	6
% of Ecosans	100%	73%	100%	87%	40%

The chart below shows the recorded time period it takes to fill one toilet chamber of the Ecosan. It can be seen that most Ecosan users have not yet filled the toilet chamber. It should be noted that seven Ecosans constructed between 2008 and 2010 are 'not yet filled' and one is listed as 'newly constructed. This indicates that either the Ecosans are not being used properly, there are a number of factors leading to this: some people constructed Ecosans but did not regularly use them, some households left the children to use them while the adults used their ordinary pit latrines and some just wanted the new technology to be part of their household without actually putting it to use.

Sum of Ecosans	yr of construction				
Period to fill 1 toilet chamber	2007	2008	2009	2010	Grand Total
6mth-1yr	3	3	2		8
newly constructed				1	1
Not yet filled		1	4	2	7
Not yet in use		2	3		5
unfinished			4	13	17
Grand Total	3	6	13	16	38

Of the 8 Ecosans which have filled toilet chambers, 7 of these have used the manure in their garden. All of those apply the manure to their crops said that they recorded an increase in yield as a result of the manure use – this shows the positive impact a properly used Ecosan can have. The table below shows which crops the manure has been applied to.

Sum of Ecosans	crops manure applied to		
	Banana	Coffee& Banana	Grand Total
Total	6	1	7

All of the Ecosan surveys reported that there was community interest to build further Ecosans. A total of 377 people showed interests in owning Ecosans. 33 households reported prices as being the biggest limitation.

	Limitations to building an Ecosan			
	Prices	Local materials	Other	Total
No Ecosan owners questioned	33	3	1	37

Conclusions

A great deal of effort is still needed in:

Sensitization:

Development of visual aids for social marketing to enable users to use them properly like those who were not trained like children, visitors in a home.

Regular refresher trainings in villages to remind the users on proper O&M and usage of the Ecosan bi-products (conduct exchange visits to other households/schools already implementing Hu-manure in their gardens).

Provision of vegetables seeds, to be planted in the demonstration gardens in schools to promote the use of Ecosan bi-products.

Adaptability rate:

The replicate rate is still greatly affected by the cost of an Ecosan totalling to 220,000Ugx (which is a low cost Ecosan). More efforts to reduce the cost to 100,000Ugx is vital for people to replicate.

Household survey

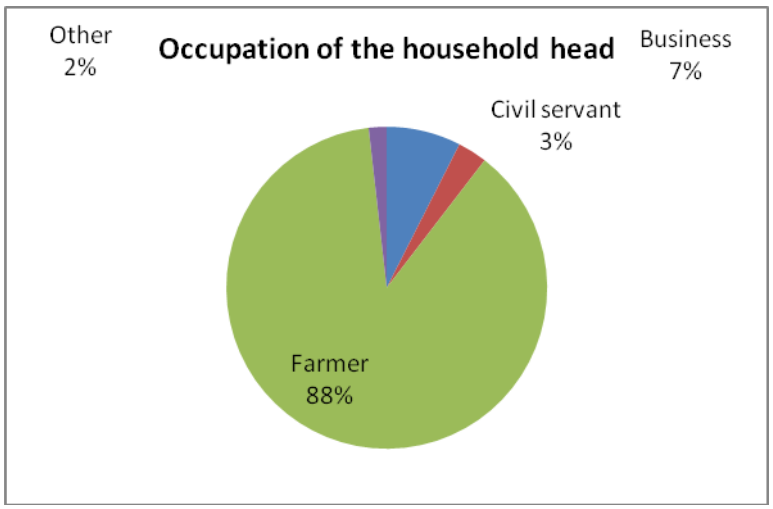
In total 777 households comprising of 4766 people were included in this survey. This is 14% of the total population of Nyabani Sub County (34700 people). 26 of the 42 villages in the Sub County were questioned. For a list of the parish and villages, see the annex XX.

Overview of population

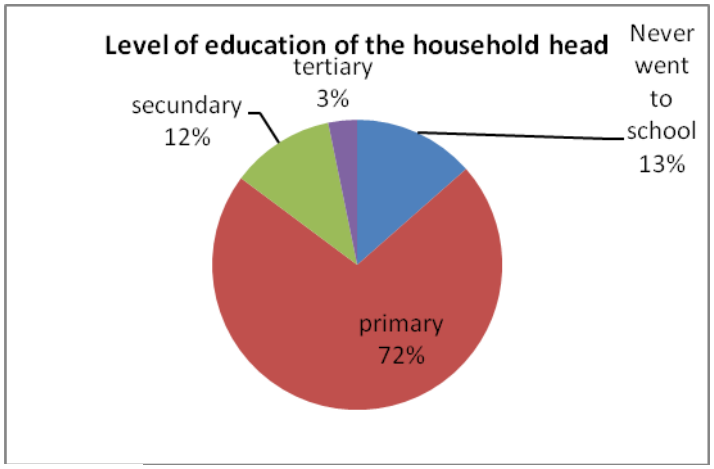
The table and charts below present the population surveyed – for each house, the head of household was asked to fill out the questionnaire.

Parish	Households	Men	Women	Girls	Boys	Total Children	Total People
Kanara	139	133	138	101	109	210	887
Kekubo	26	25	26	18	16	34	134
Nganiko	147	134	143	122	127	249	983
Nyarurambi	27	27	27	23	26	49	170
Rwenjaza	147	132	144	120	122	242	893
Rwenkubebe	166	138	164	147	134	281	1001
Rwenshama	125	120	122	103	108	211	698
Grand Total	777	709	764	634	642	1276	4766

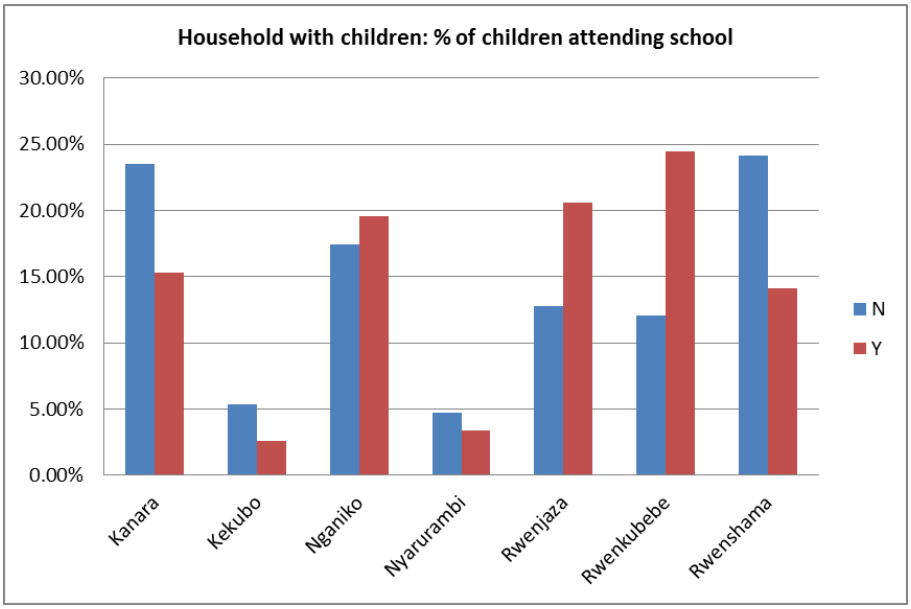
HH CHART 1:



HH CHART 2:



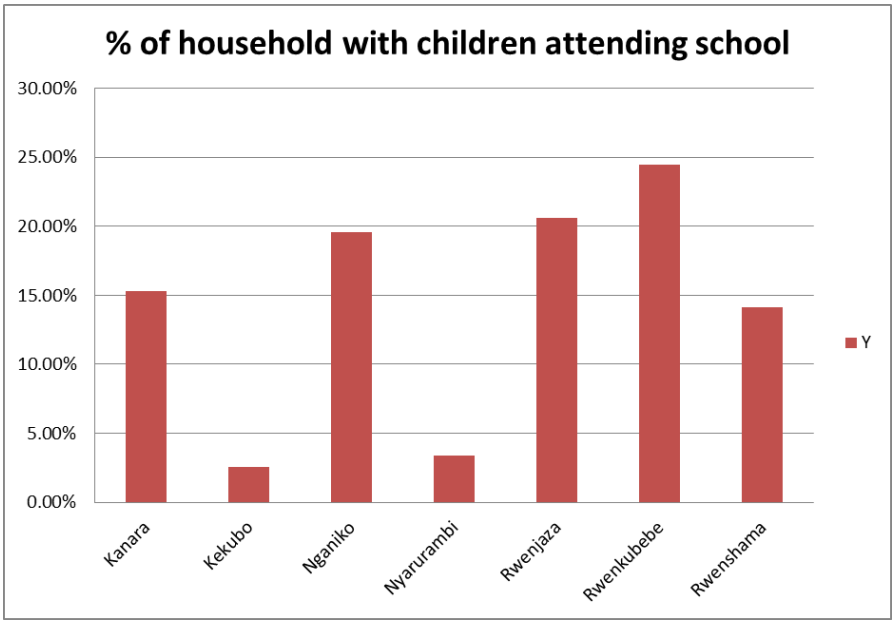
HH CHART 3:



This table lists the school with attendance of children from at least ten households in the survey. This covers 554 of the 588 households with children attending primary school.

Name school	No of households
Dura Primary	31
Kabirizi Primary	9
Kamayenje Primary	22
Kamuganguzi Primary	14
kanara primary	57
Kyanyinihuli Primary	23
kyanyinihuli Primary & Nyabani Primary	1
Mwora P School	24
Nganiko Primary	31
Ngoma primary	23
Nyabani Moslem Primary	28
Nyabani Primary	94
Nyabani Primary &Rutooma Primary	2
Nyarurambi Primary	21
Rutooma Primary	55
Rutooma Primary & Nyabani Primary	3
Rwenjaza Primary	52
Rwenshama primary	31
St judeNyamabale	20
St Pio Primary	13
Grand Total	554

HH CHART 14:



From the graph above Rwenkubebe and Rwenjaza Parishes have the most households with children attending school.

Water Supply

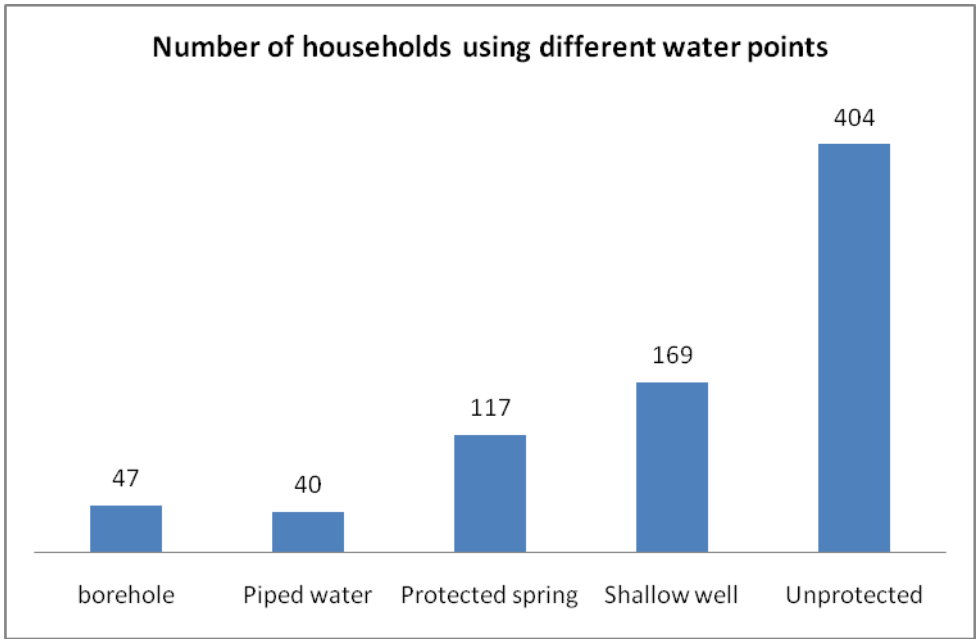
This section presents the results from the household survey relating to the households' access to water. 22% of all households use shallow wells as their water point and a further 52% use an 'unprotected' source – a natural source with no infrastructure.

Water source	No of households	% of households
Borehole	47	6%
Piped water	40	5%
Protected spring	117	15%
Shallow well	169	22%
Unprotected	404	52%
Grand Total	777	100%

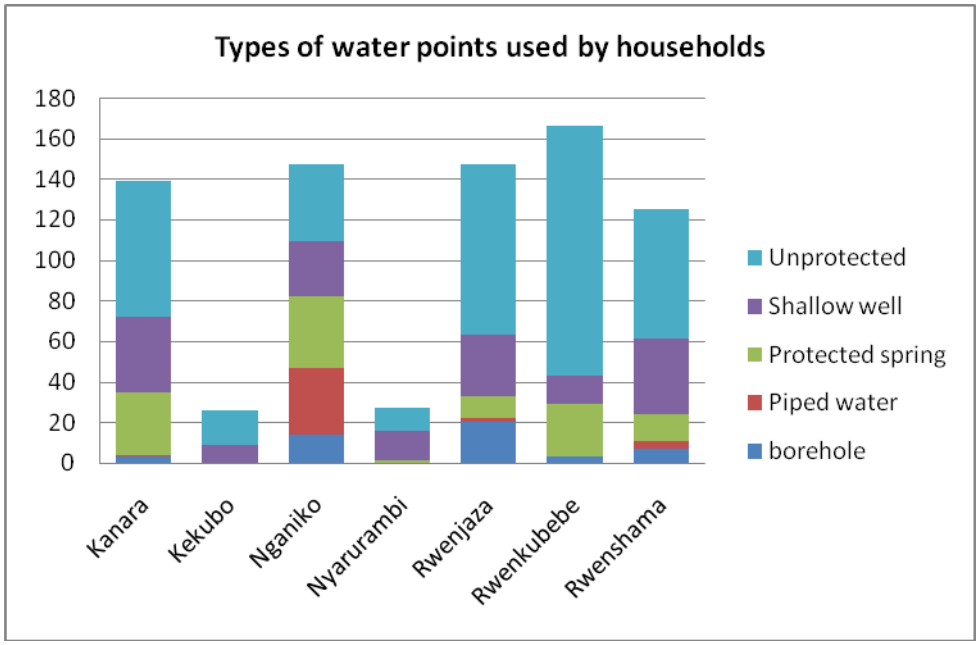
The table below presents the different water points being used by households in each Parish in Nyabani Sub County.

	Water source					
Parish	Borehole	Piped water	Protected spring	Shallow well	Unprotected	Grand Total
Kanara	3	1	31	37	67	139
Kekubo				9	17	26
Nganiko	14	33	35	27	38	147
Nyarurambi			1	15	11	27
Rwenjaza	20	2	11	30	84	147
Rwenkubebe	3		26	14	123	166
Rwenshama	7	4	13	37	64	125
Grand Total	47	40	117	169	404	777

HH CHART 4:



HH CHART 5:



Availability of water

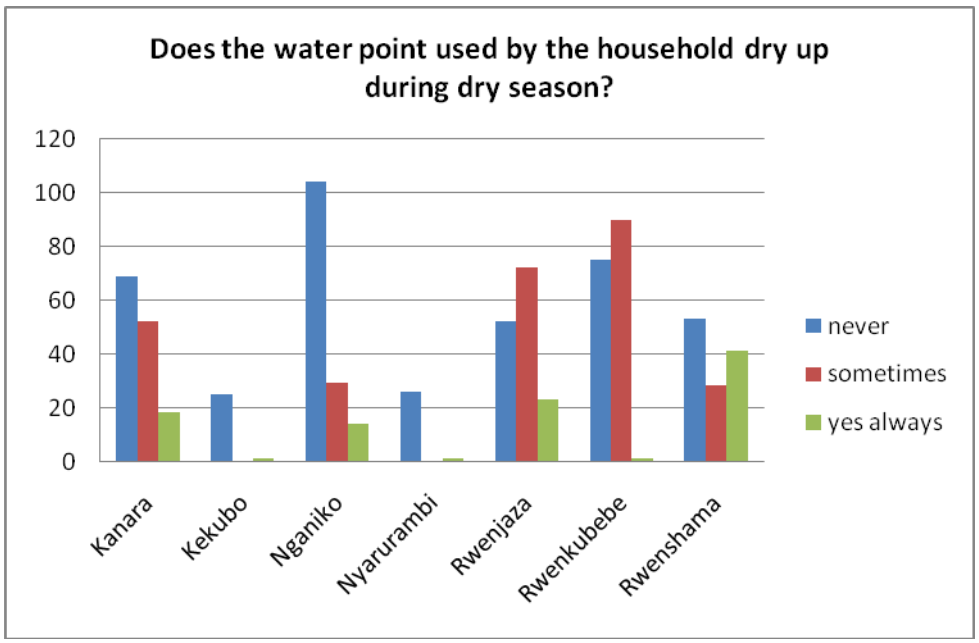
The table and charts below show that both shallow wells and unprotected sources, the most commonly used water sources, frequently dry up in the dry season.

	Does the water source dry up in the dry season?			
water source	never	no never	sometimes	yes always
borehole	70.21%	0.00%	27.66%	2.13%
Piped water	20.00%	0.00%	67.50%	12.50%
Protected	73.50%	0.00%	13.68%	12.82%

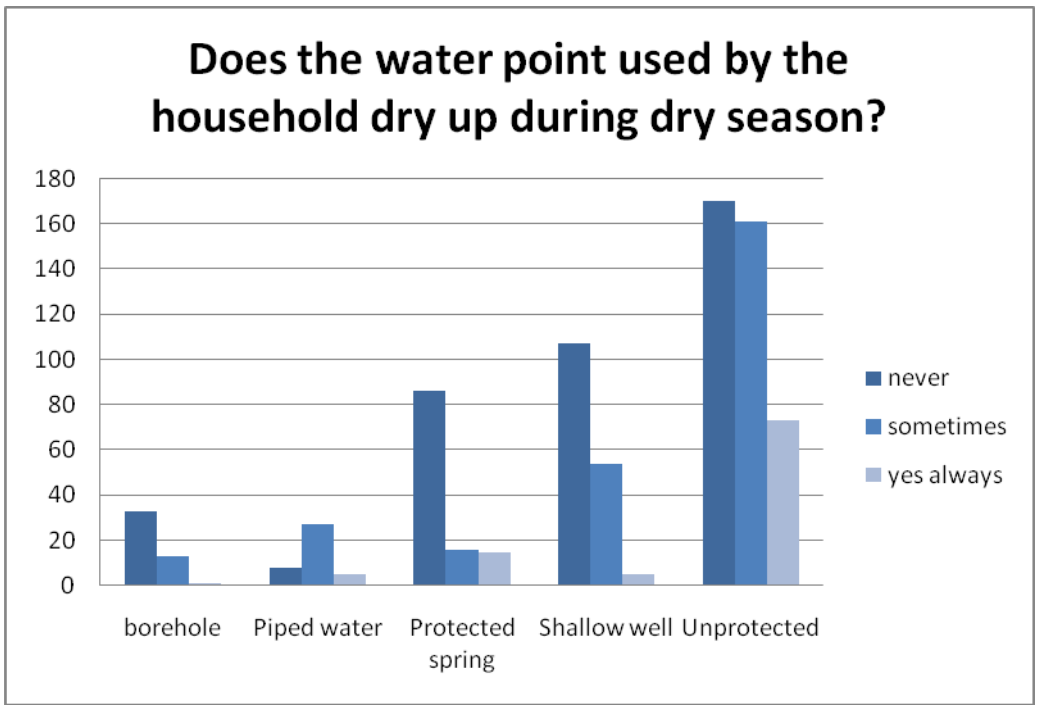
spring				
Shallow well	63.69%	1.19%	32.14%	2.98%
Unprotected	42.08%	0.00%	39.85%	18.07%
Grand Total	52.06%	0.26%	34.92%	12.76%

35% of all shallow wells sometimes or always dry up during the dry season.
58% of all unprotected sources sometimes or always dry up.
370 of the surveyed households use water sources which dry up.
It can also be seen that all parishes are affected by water points which dry up.

HH CHART 6:



HH CHART 7:



Of the households whose water source dries up:
85% use an alternative unprotected source
8% use an alternative shallow well
6% use an alternative protected spring

	Alternative source					
	borehole	Piped water	Protected spring	Shallow well	Unprotected	Grand Total
% of households	0.81%	0.27%	6.23%	8.13%	84.55%	100.00%

It can be seen than the percentage of people using and unprotected source is still very high, at 85% which means that the drying up of water points in the dry season results in more people turning to untreated, natural water sources which are more likely to provide unclean water.

Distance to water sources

Households were asked to estimate the distance to their nearest water source, but these estimates are not necessarily very accurate so the results below can be taken as an approximation.

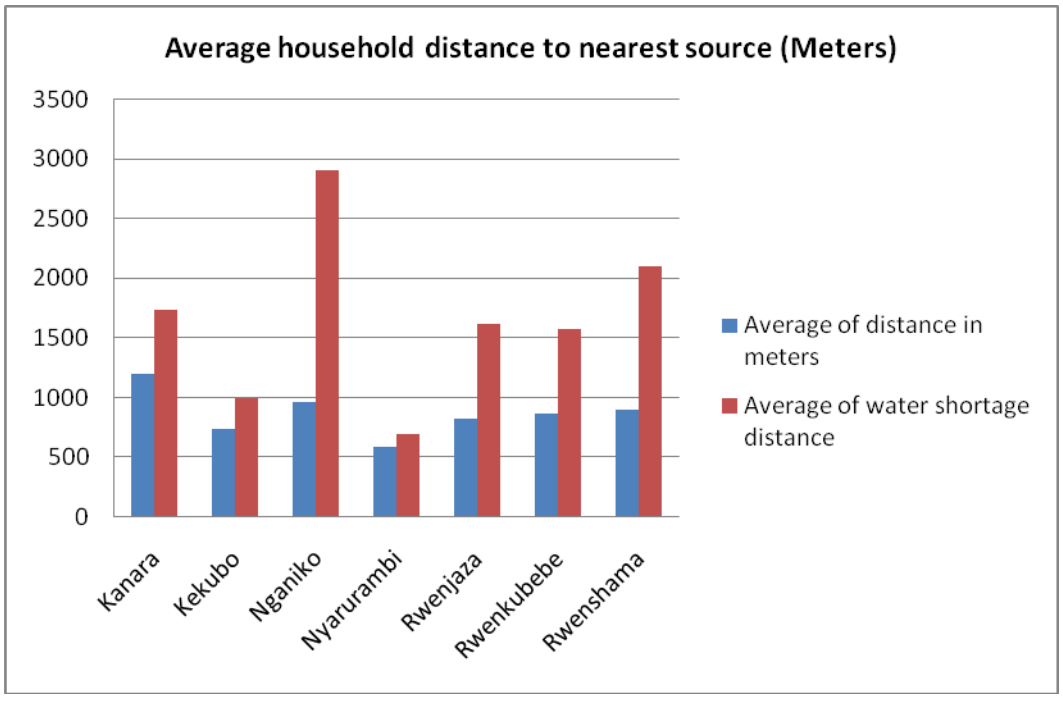
The overall average distance for households to the nearest water point is 740m.

In all parishes the average distance to the nearest water point is at least 929m

In Kanara and Rwenjaza the distance is over 1km.

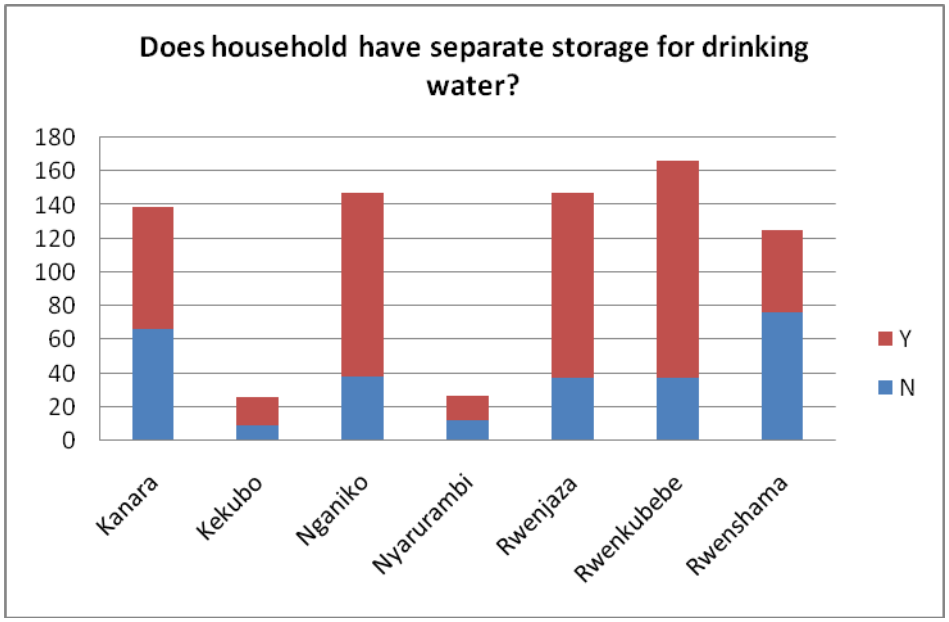
The average distance to a water source when the original source has dried up is 1864m.

HH CHART 8:

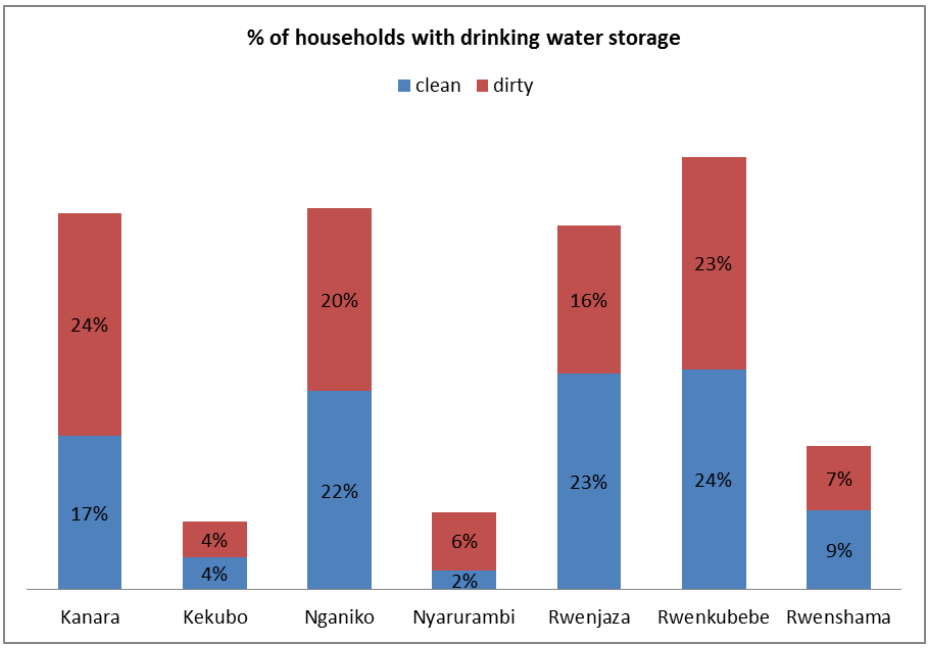


The charts below show the number and percentage of households with drinking water storage and whether this is clean. Overall 65% of households have drinking water storage – 41% of household with dirty water. Only 19 of the 777 households surveyed have rain water storage.

HH CHART 9:



HH CHART 10:



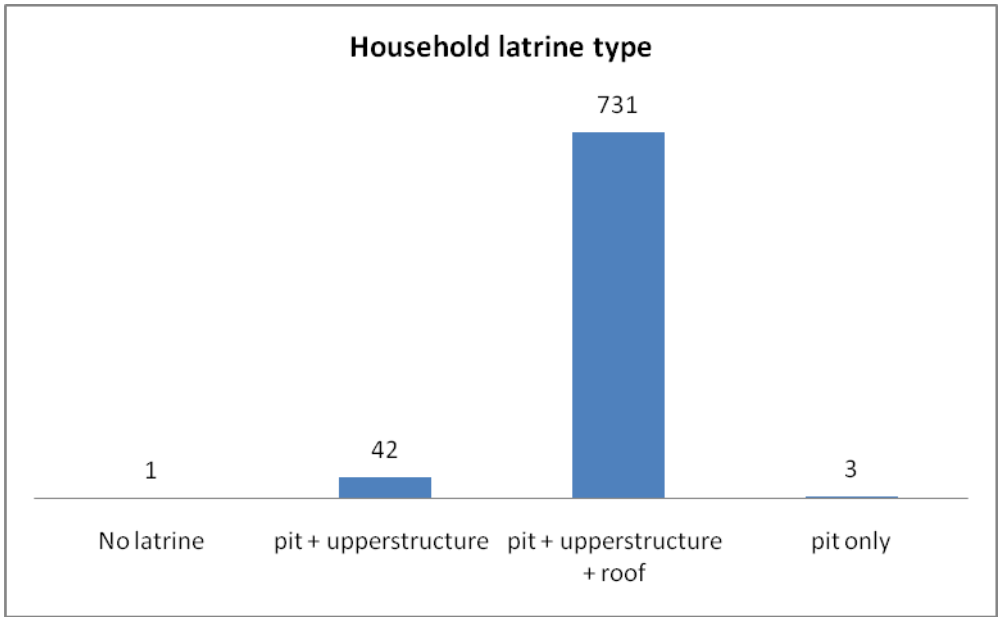
Sanitation

This section looks at the type and conditions of the latrines of the households surveyed.

Latrine type	No of households	% of households
No latrine	1	0.13%
Pit + upperstructure	42	5.41%
Pit + upperstructure + roof	731	94%
Pit only	3	0.39%
Grand Total	777	100%

Floor type	Total	% of households
Floor firm - no sanplat	675	86.7%
Floor not firm	102	13.1%
Grand Total	777	100%

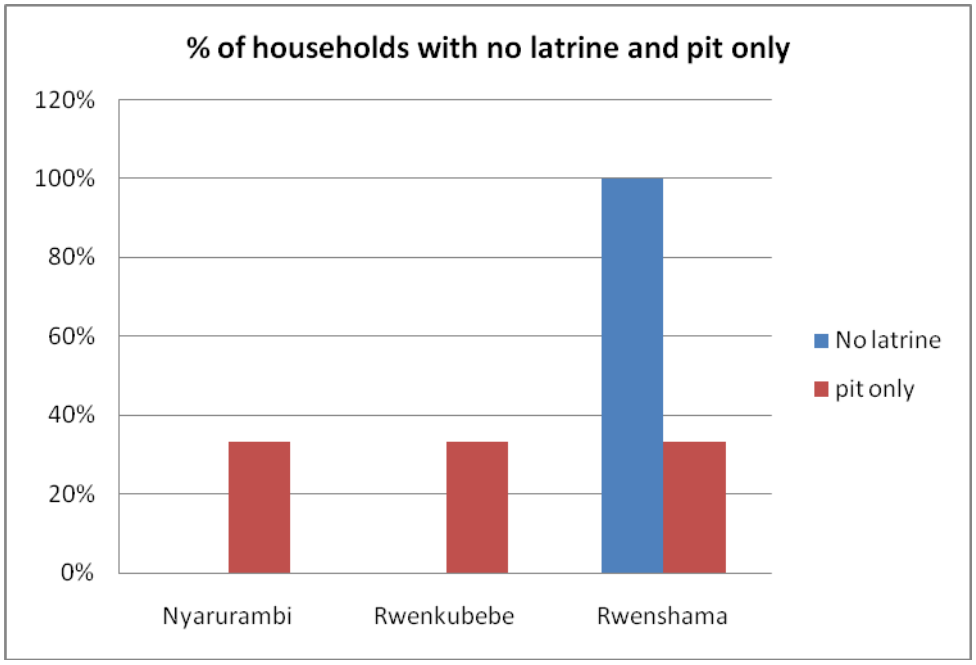
HH CHART 11:



74% of households with a latrine recorded the latrine maintenance as 'clean'.

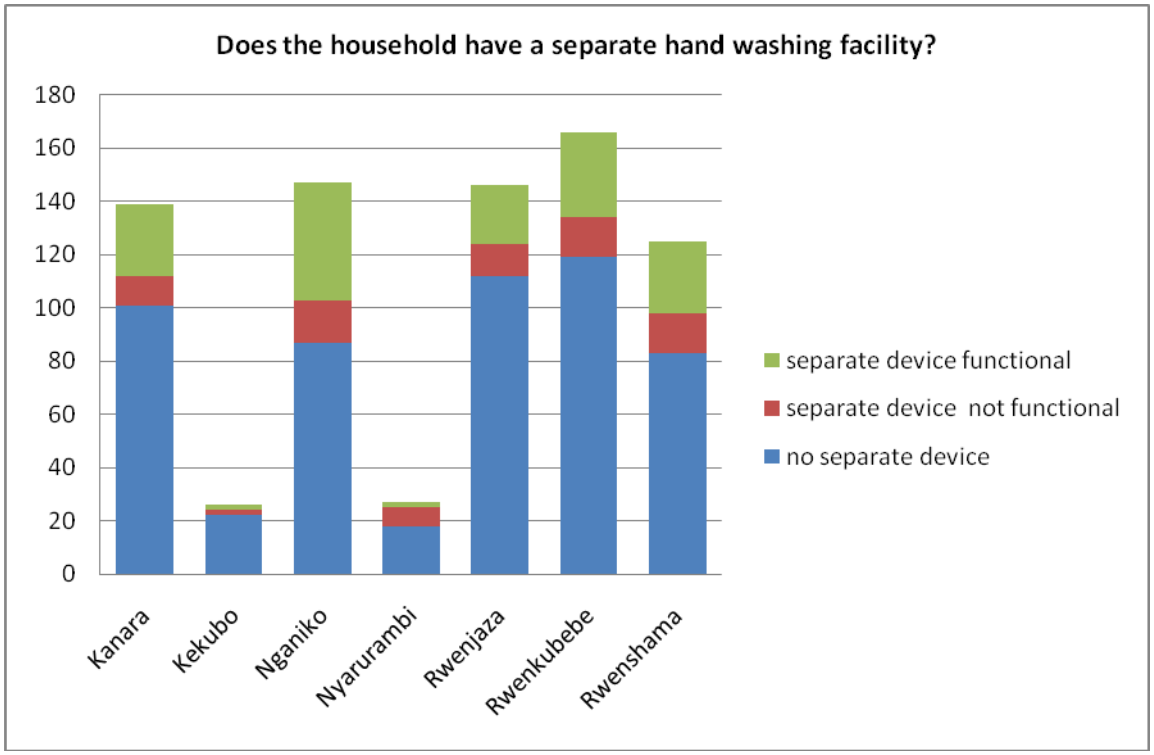
To give an idea of the latrine types in each parish, the following chart shows the % of households with no latrine or only a pit and no structure.

HH CHART 12:



Of the all households with a latrine, none is recorded having a concrete latrine floor.
The chart below shows the number of households with a separate hand washing facility for the latrine.
Only 20.1% of households have a functioning hand wash facility.
12.2% of those with a separate device use soap.
10.1% have a non-functioning device
70% have no separate device.

HH CHART 13:



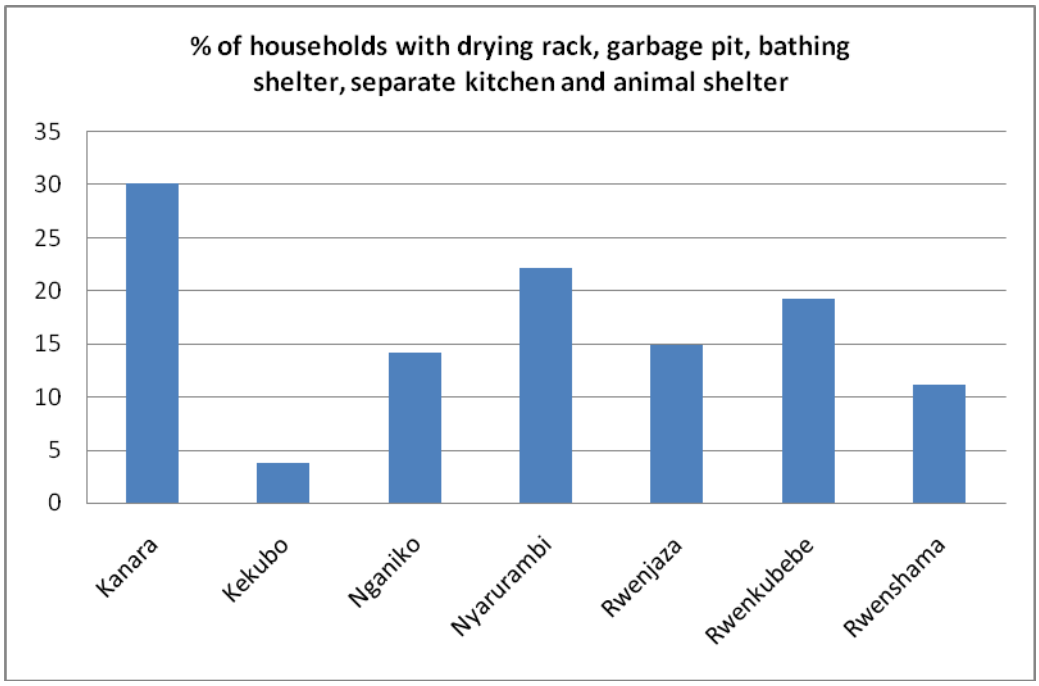
The table below shows the % of households with the infrastructure listed.

	% of households
Drying rack	54%
Garbage pit	42%
Bathing shelter	62%
Separate kitchen	81%
Animal shelter*	42%

*% of households with animals who have a separate animal shelter

The chart below presents the % of households in each parish which have the entire above infrastructure within the household.

HH CHART 15:



On overage 18% households have this entire infrastructure.
30% of households in Kanara have all of these things, compared to 4% in Kekubo.

Chart HH14:

Conclusion:

Sensitization in better hygiene and sanitation practices is still required at household level i.e. for handwashing with soap,animal shelters, separate kitchens and bathing shelters. To reduce the poor school performance for pupils due to water borne diseases, households should have separate safe storage for drinking water and pack it in clean water containers to take to school.
Provision of guttering materials to encourage people to harvest rain water hence reducing on WBD from unprotected sources and distances covered by women and children , this will help to minimize on absenteeism from school due to long distances covered in search for water, women to have time for other income generating activities i.e. gardening and selling merchandise.
Establishing of kitchen gardens to utilise manure from the Ecosan latrines for dietary improvement and income generation.

Establishing of tree nurseries of indigenous and agro forestry trees to reduce pressure on the existing trees, income generation, fuel wood and fodder for livestock. Women need to play a leading role because it's women who travel long distance looking for firewood.
Inter villages at household levels in hygiene & sanitation and awarding of best performance this will improve on hygiene and sanitation and adaptability of best practices.

health centre survey

There are three health centres located in Nyabani Sub County. The following table presents an overview of each. None of the health centres have doctors as staff, but there medical drugs available in Kanara and Rwenjaza except in Nyabani. Only Kanara health centre has medical equipment, Rwenjaza and Nyabani do not have.

Name of Health Centre	Parish	Village	category	Level of Health Centre	Nurses	Other staff	Total popn' served	no, of villages served	No. Of patients of WBD*s per year
Nyabani	Rwenkubebe	Nyabani	Government	level 3	6	4	20000	16	140
Kanara	Kanara	Kigarama	Government	level 2	3	3	15152	23	73
Rwenjaza	Rwenjaza	Nyarurambi	Government	level 2	4	2	4000	7	245

**Water Born Disease*

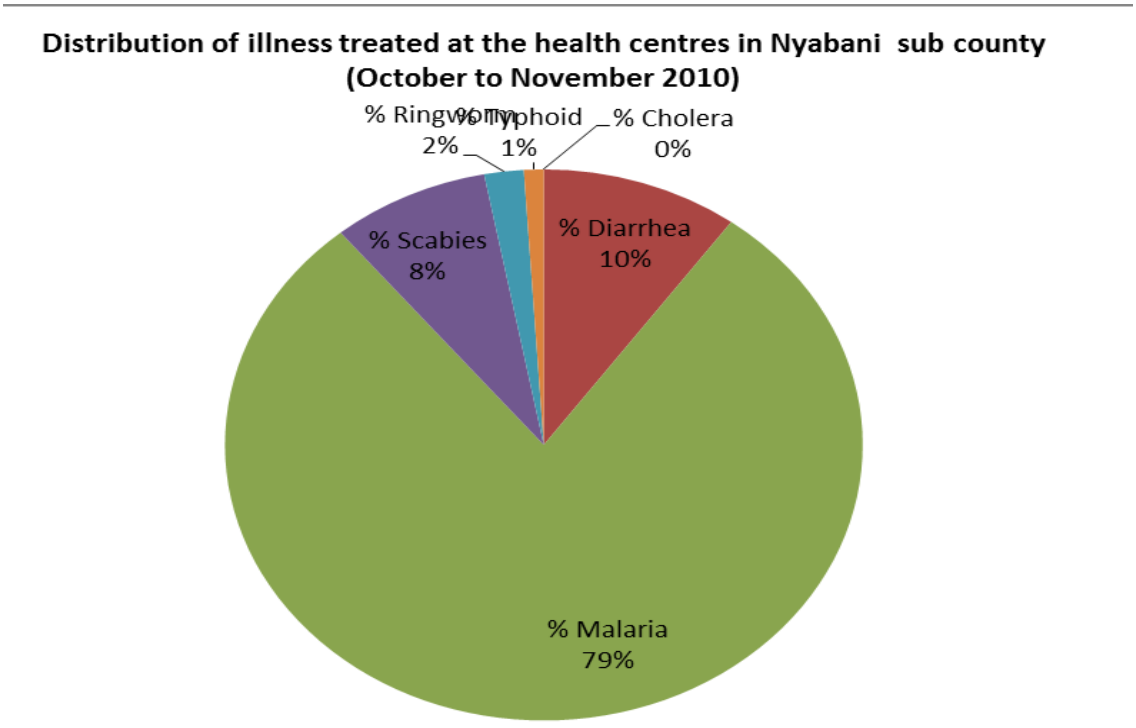
In the private clinics people have to pay for service delivery whereas public health centres services are free with some occasional small fees charged. Which health centre people use depends on their income and distance to the health centre. The quality of services between clinics and public health centres is different because at times private clinics can offer better services because people pay for it.
Treated illnesses: The table below presents the illnesses treated at the hospital over the 8 months: January-September 2010 when the data was collected.

Name Health Centre	Cholera	Diarrhoea	Malaria	Scabies	Ringworm	Typhoid
Kanara Health Centre	0	111	590	0	0	0
Nyabani Health Centre	0	80	2842	100	50	0
Rwenjaza Health Centre	0	295	520	310	45	40

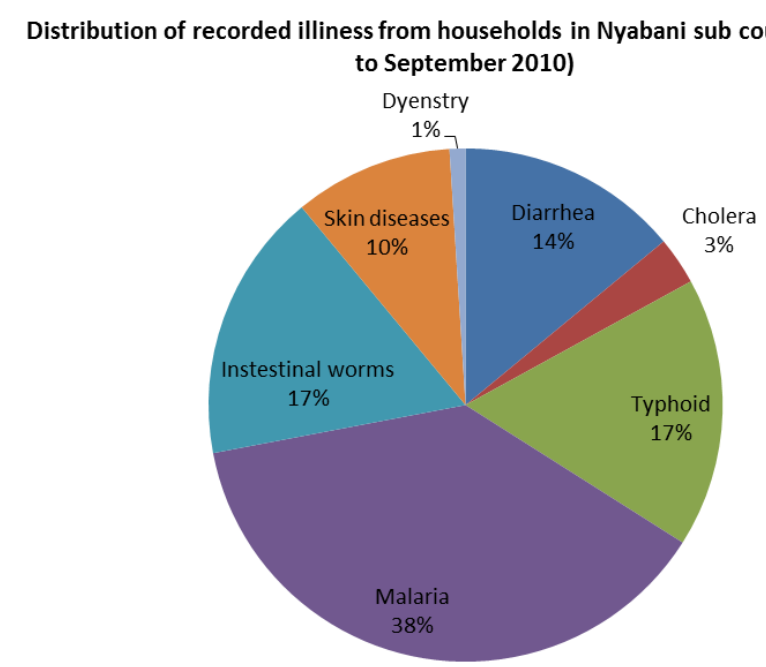
The table below shows the percentage of cases treated at health centers in the past six months. There are no Cholera cases treated at these Health centres because Cholera cases are referred to Ntara Health centre (IV) in Ntara Sub County.

The two charts show firstly the % of different illnesses treated at the health centres and secondly the % of illnesses reported by the households. Both charts show malaria and diarrhoea as highly reported diseases, but the household survey shows that in fact typhoid, intestinal worms and skin disease are also major problems, but that people do not travel to the health centres for these reasons.

HC CHART 1:



HC CHART 2:



Skin diseases and intestinal worms are both illnesses related to water but are not recorded at the health centres. This means that to measure the impact of a water programme on people's health, the data from the health centres is not a good indicator which can be used.

WATER SUPPLY: The table below presents the water service used by the health centres.

Name Health Centre	Kanara Health Centre	Nyabani Health Centre	Rwenjaza Health Centre

Village served	Kigarama	Nyabani	Nyarurambi
Water source	shallow well	borehole	others
Time to fetch water (min)	40	20	30
Shared with community	Y	Y	Y
Does sources dry up	Y	Y	Y
Distance covered during dry season	2hr	1.5hrs	1hr
Management of drinking water	boiling	boiling	Boiling
RWHT at the HC	Y	Y	N
RWHT (capacity)	10.000l	2.000l	
Length during dry season (months)	6	3	

SANITATION: THE TABLE above presents an overview of the hygiene and sanitation situation of the health centres.

Name Health Centre	Kanara Health Centre	Nyabani Health Centre	Rwenjaza Health Centre
Type of latrine	Ordinary	VIP latrine	VIP latrine
No of stances	3	3	3
Separation between stances	Y	Y	N
Cleanliness	clean	dirty	dirty
Hand washing facility	N	Y	N
Soap used	n/a	N	n/a
Soak pit	n/a	n/a	n/a
Garbage skip	N	Y	Y
No of skips		6	6
HC contribution*	Labor	Labor	Sand

**Health Centre contribution during the construction of water and sanitation facilities*

From the above two tables, some key points can be noted:
All health centres have to travel for more than an hour to fetch water in the dry season
All water points which are shared with the community.
All health centres use sources which dry up in the dry season.
All the health centres do not have enough latrines. The density of people per latrine stance is high.
Only Nyabani health centre has a hand washing facility.
The latrines at Nyabani and Rwenjaza Health Centres have been categorised as 'dirty'.
Kanara Health Centre has no garbage skip.
It was recorded that all of the Health Centres sensitise the patients to Water Borne Diseases. This sensitisation is done during immunisation, pre natal visits and when patients come for treatment. They are told the dangers of poor hygiene and sanitation and how they can minimise WBD occurrences in their households.There is no coordination between the sensitisation work of schools and the hospitals, each work independently
Conclusions
From the health centre result analysis it indicates the need for initial sensitization in hygiene and sanitation by JESE/PROTOS, these health centres are within the intervention areas. This is evidenced by poor sanitation practices i.e. facilities are dirty, no hand washing facilities and garbage skips. Interventions in the health centres would be in form of water and sanitation facilities like water tank, bio sand filters, hand washing facilities, provision of latrines like Ecosan and garbage skips.

Schools survey

The following schools were surveyed in Nyabani Sub County.

Name of School	Parish	Village	No of Pupils	No of Teachers
Rwenjaza Primary School	Rwenjaza	Rwenjaza	591	10
St Pios Primary School	Rwenjaza	Omubushenyi	238	7
Kabirizi Primary School	Kanara	Kabirizi 1	462	7
Ikamiro Primary School	Rwenjaza	Rukinga A	127	4
Nyarurambi Primary School	Rwenjaza	Nyarurambi	577	12
St Jude Rwemirama Primary School	Rwenkubebe	Rwemirama	570	6
Nyabani Primary School	Rwenkubebe	Rwenkubebe	637	13
Rutooma K Primary School	Nyarurambi	Rutooma A	821	14
Nyabani Secondary School	Nyabani	Rwenkubebe	352	17
Kanara Secondary School	Kanara	Kanara 1	165	10
Dura Primary School	Rwenshama	Kanyamburara	278	6
Mwora B Primary School	Kekubo	Mirambi	466	7
Rwenshama Primary School	Rwenshama	Rwenshama 1	689	15
Kanara Primary School	Kanara	Kanara Central	689	10
Ngoma Primary School	Kanara	Ngoma	499	7
Kamayenje Primary School	Nganiko	Kamayenje	574	8
Nganiko Primary School	Nganiko	Kemihoko	509	7
Kamuganguzi Primary School	Rwenshama	Nyakabungo	321	5

School sanitation:

All of the schools have separate latrines for boys and girls, with an average of 286 pupils per latrine. The table below shows that types of latrines in each school.

A *mobilet* is a latrine where the upper structure and slab are made of plastic.

An *ordinary latrine* is a pit latrine with no ventilation and the upper structure is made from reeds, wattle and mud.

A *VIP latrine* is an improved pit latrine with proper ventilation and supper upper structure made from bricks, cement and concrete slab.

Latrine type	No of schools
Ecosan & Ordinary	1
Ecosan &VIP	8
Ordinary	3
VIP	3
VIP & Mobilet	2
VIP &Ordinary	1
Grand Total	18

	Yes	%
Separate stance for teachers	14	78
Latrine clean	10	56
Hand washing facility	5	28
Facility used	4	22
Soap	2	11

Soak away pit	1	6
Garbage skip*	9	50

** All the 9 schools without garbage skip burn their waste.*

School water supply:

None of the schools has a tap stand. Only 01 has a water source used solely by the school, the rest share the source with the community. The table below shows the water sources used by the schools.

Water Source	No. of Schools
Protected spring	2
Shallow well	8
Unprotected Source	6
Water tank	2

[1]Average distance to next nearest source is 1100m
[2]RWHT capacity 4,000 and 10,000 litres
[3]14 schools report vandalism, 05 report trespassing and 02 lack of spare parts.

	Yes	%
Does the source dry up?[1]	15	83
Does the school provide safe drinking water	3	17
Is the water storage clean	3	17
Rain water harvesting tank?(RWHT)[2]	18	100
Is the tank functional	14	78
Challenges faced with using RWHT[3]	17	94

It is concerning to note that 6 or half of the surveyed schools are using an unprotected source for the school water. This means that the children and teachers are drinking untreated water. Only 3 of the 18 schools record that they 'provide safe drinking water'; 1140 children attend these 3 schools. The 7425 children attending the other 15 schools, 87% of the school children in the survey, are drinking unsafe water at school. This can be compared to the water points' survey, where 28% of households had access to water described as 'clear'. The schools were also asked about their preferred technology for RWHTs.

	Reasons for preferred choice in schools				
RWHT technology preferred	Durable	Easy to clean	Not prone to vandalism	Spares easily got	Grand Total
Ferro cement	7		3	1	11
Plastic	1	3		1	5
Under ground	1		1		2
Grand Total	9	3	4	2	18

Child to child clubs

Child to child clubs (C2Cs) are an approach that involves capacity building of pupils and teachers in appropriate hygiene and sanitation practices as well as promotional methodologies with an aim of causing transformation amongst the pupils and teachers while at school with anticipation that children will act as agents of change by passing on messages learnt at school to their parents and adoption of the ideal practices at home.
In Nyabani Sub county school hygiene and sanitation education has taken participatory approach which has seen the involvement of pupils, teachers, and members of school management

committee, Parents Teacher Association (PTA) and local authorities in identification of water, hygiene and sanitation problems, planning and monitoring change using participatory hygiene and sanitation transformation methodology. The problems identified range from poor water, hygiene and sanitation situation undesirable personal, food and environmental hygiene and drinking water handling practices by children, inadequate and lack of water and sanitation facilities, lack of appropriate structures for routine hygiene and sanitation promotion, poor operation and maintenance of water and sanitation facilities and vandalism of school facilities by the neighbouring communities and existing tools/visual aids were not depicting the situation in the schools.

Name of school	If yes how many members?	% of pupils	Boys2	Girls2	Year of formation	Club members and patrons trained	If yes who was responsible for training?	Club involved in H&S activities outside school?	Responsible persons involved in outside school activities
Dura Primary	25	9	10	15	2005	Y	Teachers	Y	Patrons & club members
Kabirizi Primary	8	2	5	3	2009	-	-	-	-
Kamayenje Primary	12	2	7	5	2009	Y	NGO	N	n/a
Kanara Primary	40	6	24	16	2009	Y	NGO	N	n/a
Mwora Primary	15	3	9	6	2009	N	n/a	n/a	n/a
Nganiko Primary	69	14	21	48	2010	Y	NGO	N	n/a
Nyabani Primary	10	2	5	5	2009	Y	NGO	Y	Patrons & club members
Rutooma Primary	10	1	4	6	2009	N	-	n/a	-
Rwenjaza primary	30	5	14	16	2007	Y	Teachers	Y	Patrons
Rwenshama Primary	78	11	30	48	2007	Y	NGO	Y	Club members
St Pios Primary	15	6	10	5	2009	Y	Teachers & NGO	N	n/a

Beneficiary schools are facilitated to compose songs, poems and plays that have messages on relevant desirable school environment as well as child hygiene and sanitation transformation while bringing out the magnitude of gender on hygiene and sanitation. All the health club members have songs, plays and poems on thematic areas that reflect the bad behaviours that need to be eradicated, and the good ones that need to be promoted in homes and schools. Patrons are facilitating the rehearsals and club members sensitize fellow pupils using music and drama during school health parades. The music and drama entails messages on such issues as hand washing, food hygiene and operation and maintenance of sanitation facilities, safe water handling as well as waste or garbage management.

Of the 18 schools surveyed, half or 11 of them have functioning C2C clubs – this means 70% of the school children covered in this survey attend a school with a C2C club. If all the schools had a C2C club, this would affect the remaining 2611 pupils.

On average around 6% of the pupils are members of a C2C club.

In three of the school there has been no training of C2C members.

Only four of the schools carry out H&S activities outside of the school.

	yes	no
Presence of child to child club[1]	11	7
Club functionality	8	3
Club members and patrons trained	8	2
Club involved in H&S activities at school[2]	8	2
Club involved in H&S activities outside school	4	5

[1]312 are the total number of C2C club members; 139 are boys while 173 are girls.
[2]In 03 schools teachers trained the C2C club activities while NGOs trained in 05 schools.
C2C clubs were formed between 2005 and 2010.

When C2C clubs are trained they receive core knowledge and skills regarding hygiene and sanitation as well environmental protection. This involves sensitizing pupils and staff on the desirable water handling and sanitation and hygiene practices using PHAST methodology as well as popularizing the water and sanitation facility operation and maintenance plans. Since pupils are agents of change, they transfer their knowledge got from C2C clubs and introduce it in their homes. For this reason it is important to conduct hygiene and sanitation activities in their communities.

To try and measure whether a C2C club has an impact on the level of hygiene awareness at the school, the following table shows which schools have both C2C clubs and clean latrines.

	Latrine cleanliness		
C2C club	Clean	Dirty	Grand Total
N	5	2	7
Y	5	6	11
Grand Total	10	8	18

It can be seen that where there is a C2C club, 5 of the 11 schools record their latrines as clean. Where there is no C2C club, 2 of the 7 schools have 'dirty' latrines. This could indicate that C2C clubs are not performing their hygiene and sanitation activities of keeping latrines clean.
Conclusions
Infrastructure: Some schools lack the necessary infrastructure such as a clean water source which does not dry up in the dry season or hand washing facilities with the latrines – in fact half of all schools use an unprotected water source and again half have no hand washing facilities. This in the first instance is a barrier to ensuring safe, sustainable water and sanitation at the school.
Behaviour: Good hygiene and sanitation practice in schools includes hand washing with soap after latrine use, before and after eating packed food and fruits, drinking boiled or filtered water, cleaning latrines, sweeping classrooms and the compound, proper garbage disposal and the establishment of demonstration gardens for application of Ecosan bi- products.
Home hygiene and sanitation practices include boiling and filtering drinking water, washing hands after using latrine and before and after eating food, proper faecal disposal, washing laundry, cleaning sanitation facilities, proper garbage disposal, cleaning of compounds, houses, usage of drying racks, animal shelters, separate kitchen and application of Ecosan bi-product in their gardens.
Most practices at school and homes are similar; however the hygiene and sanitation best practices taught at school are usually transferred to the pupils' homes through the Child to Child clubs' activities.

Recommended activities:

Scaling-up of Child to Child clubs, hygiene and sanitation activities and Ecosan usage after identifying the H&S needs in other schools.
Development of visual aids materials to promote proper O&M of sanitation facilities especially the new technologies i.e. Tippy taps, bio sand filters and Ecosans, to provide consistency usage even for new pupils, teachers and visitors.
Regular follow-ups and refresher trainings, because each year new pupils are admitted and others tend to relax or forget about the usage and maintenance.
Exchange visits and Inter school competition in terms of drama and music on hygiene and sanitation, to encourage and increase adoption of the new technologies.
Tree planting to combat climate change like establishment of tree nurseries i.e. fruit and indigenous species for IWRM
Investments in more infrastructure? Drinking water?Sanitation?Hand washing facilities?

CONCLUSIONS

OVERALL RECOMMENDATION FOR NYABANI SUB COUNTY

Water supply:

Construction of household rain water harvesting tanks, in villages without potential water sources, like in Nganiko central, Nganiko II and Rwesigire villages.
Rehabilitation of the already existing water sources but are not functioning due to mechanical problems.
Water quality testing and frequent treatment of contaminated water sources
Provision of more bio sand filters and safe storage containers to communities around the unprotected sources like river, swamps, streams and ponds.
Construction of more shallow wells and boreholes, or other technologies?
Sanitation:
Scaling –up Ecosan usage at institutional and household level in areas with very high water tables and collapsing soils, with more training and sensitization.
Refresher trainings and continued follow up on the hygiene and sanitation practices in schools, health centre, landing sites and households.
Development and distribution of promotional materials/visual aids i.e. hand washing, Ecosan usage.
Conducting of inter villages, houses competition and exchange visits to households with best practices in hygiene and sanitation.
Empowering of the village health teams in executing hygiene and sanitation activities i.e. bicycles, T-shirts and caps for identification and easy mobility.
IWRM:
Protection of catchment areas, through planting indigenous tree species along river banks. This will control on erosion and siltation of the lake, lowering of water tables.
Promotion of water and conservation methods i.e. terracing and agro forestry.
Utilisation of run-off water from water points, through establishment of kitchen garden, water troughs.

9. SUGGESTIONS FOR FURTHER DATA COLLECTION

Before carrying out a further survey, it is very important to define the village names and which parishes they are situated in – there was often confusion about what was a village or simply a location within a village (e.g. a market place), as well as where the villages were located.
In the household survey it would be useful to collect data on levels of household income – this can give an idea of what kind of new infrastructure people may be able to afford.
For the EcoSan survey it is necessary to make the distinction between when the EcoSan was constructed, when it was finished (with upper structure complete), and when people started to use it.
It could be useful to record the period during the year that RWHTs (depending on capacity) provide water.
A further survey could also ask people exactly which water point they are using, so that the experiences of users compared to the spot-checks on the water points can be compared.
To ultimately measure the impact on improved access to clean water and sanitation, it is important to have accurate data from the health centres, including the time period over which the data was recorded.
Without a visit to a health centre, is it very difficult for people to accurately diagnose their own illnesses, so collecting household data on illness is very subjective and may be inaccurate to the point that is not worth recording. At the least the questions should be simplified to symptoms which people can truly verify (i.e. diarrhoea).

In 2006 a first baseline study of water and sanitation in Nyabani Sub County was carried out by FORUD. This chapter will make a comparison of the data in the 2006 baseline study and the current 2010 study. Further to this, in 2010 the Ugandan Directorate of Water Development, Ministry of Water and Environment published the 'Uganda Water Atlas' which presents information on water access and infrastructure in each district in Uganda. There will also be a discussion of the differences between the Water Atlas and the findings of the 2010 baseline study.

10. Comparing Baseline Surveys of 2010 Vs 2006

In 2006 a first baseline studies of water and sanitation in Nyabani and Mahyoro Sub Counties were carried out by FORUD and JESE. This chapter will make a comparison of the data in the 2006 baseline study and the current 2010 study. Further to this, in 2010 the Ugandan Directorate of Water Development, Ministry of Water and Environment published the 'Uganda Water Atlas' which presents information on water access and infrastructure in each district in Uganda. There will also be a discussion of the differences between the Water Atlas and the findings of the 2010 baseline study.

10.1. 2006 BASELINE STUDY FOR NYABANI

The baseline study carried out in 2006 covered all 5 parishes in Nyabani Sub County: Nganiko, Kanara, Rwenshama, Rwekubebe and Rwenjaza. Since this time two new parishes in Nyabani have been added (Kekubo and Nyarurambi) with some villages are now located in the new parishes; this means it is not possible to make exact comparisons of parish data. In the 2006 baseline hand washing in households and schools, WATSAN committee functionality were not included in the baseline.
The table below compares the water supply infrastructure recorded in 2006 and 2010. Tap stands and unprotected sources were not included in the 2010 baseline; in 2006 no improved springs had been constructed. The figures in brackets presents the number of non-functional water points i.e. 2 (1) means there are 2 shallow wells in Rwenjaza, one of which is not functioning.

TABLE 1

	Shallow wells /boreholes		Protected springs		Tap stands*	Improved spring
	2006	2010	2006	2010	2006	2010
Parish						
Rwenkubebe	1 (1)	5 (1)	2	2	-	1
Rwenshama	2	10 (2)	1	2	-	4 (1)
Rwenjaza	1	8 (1)	2 (1)	-	-	2 (1)
Nganiko	4 (3)	4 (1)	4 (2)	2	10	1
Kanara	15 (10)	19 (1)	12 (5)	2	-	2
Total	23 (14)	46 (6)	21 (8)	8	10	10 (2)

In 2006 a total of 44 water points were recorded (not including tap stands) compared to 64 in 2010. Shallow wells have been the most developed water point, with 23 new shallow wells appearing between 2006 and 2010.
What about the decrease in springs???
* Tap stands were not recorded in the 2010 baseline survey as they are private, with a private owner who charges 100ugx per Jerrican and household tap owners pay per month. It would be interesting to see tap stand data for 2010 to see if the numbers of private stands has changed.
The following table compares data on household water and sanitation, given in the percentage of households with the following facilities.

TABLE 3

	Drinking water storage containers		No access to sanitation facilities		Hand washing facilities	
	2006	2010	2006	2010	2006	2010
Parish						
Rwenkubebe	42%	78%	15%	0.0%	0.0%	19%
Kanara	41%	53%	57%	0.0%	23%	19%
Rwenjaza	42%	75%	48%	0.0%	0.0%	15%
Nganiko	28%	74%	5%	0.0%	0.0%	30%
Rwenshama	29%	39%	14%	0.8%	2%	22%
Kekubo	n/a	65%	n/a	0.0%	n/a	8%
Nyarurambi	n/a	56%	n/a	0.0%	n/a	7%
Sub County average	28%	65%	6%	0.13%	4%	20%

The results shows major improvements in the percentage of households with separate containers to store drinking water, as well as those with hand washing facilities and a reduction of the households without a latrine.
The next table compares some extra household data available from the two surveys, showing the percentage of homes with bathing shelters, drying racks, garbage pits and separate shelters for animals.

TABLE 4

	Bathing shelter		Drying rack		Garbage pit		Separate shelter for animals	
	2006	2010	2006	2010	2006	2010	2006	2010
Parish								
Rwenkubebe	20%	81%	59%	81%	5%	37%	54%	43%
Kanara	39%	64%	45%	76%	17%	55%	51%	45%
Nganiko	55%	78%	56%	75%	6%	31%	42%	47%
Rwenshama	27%	72%	21%	50%	0.0%	48%	33%	40%
Rwenjaza	36%	80%	47%	68%	0.0%	44%	47%	40%
Kekubo	n/a	62%	n/a	54%	n/a	42%	n/a	42%
Nyarurambi	n/a	89%	n/a	67%	n/a	56%	n/a	33%
Sub County average	27%	75%	35%	70%	4%	43%	35%	43%

The results are very positive and there have been improvements, apart from separate shelter for animals with a slight decline in 2010 as a result of people no longer keep animals.
The following table shows the number of children attending the surveyed schools in Nyabani. There is a total increase of 27% in the number of children attending these schools.

TABLE 5

	Total students	
	2006	2010
School		
Nyabani Primary	1000	637
Nyabani S.S.S	326	352
Nyabani moslem Primary	450	-
St Jude Primary	288	570
St James Primary	-	-
Rwenshama Primary	800	689
Dura Primary	-	278
Mwora Primary	350	466
Damasco church sch	181	-
Rwenjaza Primary	610	591
Ikumiro Primary	220	127
Rutooma Primary	698	821
St Pio Primary	300	238
Nyarurambi Primary	-	577
Nganiko Primary	465	509
Kyanyinaihuri Primary	-	-
Kamayenje Primary	443	574

Rwesigire church Sch	150	-
Kanara Primary	-	689
Ngoma Primary	-	499
Kabirizi Primary	-	462
Kanara S.S.S	-	165
Buhumurro Nursery Sch	-	-
Kamuganguzi	-	321
Total	6281	8565

Some schools were not included in the 2010 baseline and in 2006 number of boys and girls were not included, which made it impossible to compare the girls and boys enrolment for the two baselines.

10.2. Uganda Water Atlas 2010

The following tables compare data between the Uganda Water Atlas 2010 and the current 2010 baseline study carried out by JESE/PROTOS.

	% of population with access to water supply	% of functionality of water supply
Water Atlas 2010	89%	76%
Baseline study 2010	n/a	86%*

*Only data on shallow wells, boreholes and protected springs are included.
There are clearly major differences in the data between the two baselines. One explanation for this is the difference in the way that that the surveys were carried out, as well as the way that different parameters have been defined.

	Baseline survey 2010			**Water Atlas 2010**		
	Functional	Non functional	Total	Functional	Non functional	Total
Protected springs	16	2	18	39	6	45
Shallow wells	39	3	42	43	13	56
Deep boreholes	4	3	7	5	6	11
Rain water harvesting tanks	n/a	n/a	n/a	12	8	20

The Water Atlas 2010 regards a water point which has been non-functional for over 5 years as 'abandoned' and thus not included in the data; the 2010 baseline survey however has included all water points in the data. The Water Atlas defines rural 'access' to water as the percentage of people within 1km of an improved water source. An improved water source includes protected springs, shallow wells, deep boreholes, gravity flow schemes, surface water and ground water pumped schemes and rain water harvesting tanks. This means that the Water Atlas covers a wider range of water points that the 2010 baseline which also leads to differences in access and functionality figures. The 2010 baseline survey includes households using unprotected natural water sources, which means it is not possible to compare the number of households less than 1km from an improved water point.
Rural functionality is defined by the Water Atlas as the percentage of improved water sources that are functional at the time of spot-check – this definition is that same for both surveys. Finally the differences between the recorded numbers of water points can also be partly explained by the fact that there is sometimes confusion in differentiating between a borehole and a shallow well.

10.3. 2006 BASELINE STUDY FOR MAHYORO

The baseline study carried out in 2006 covered all 5 parishes in Mahyoro Sub County: Bukurungo, Kitonzi, Nyakeera, Nyakasura and Mahyoro. Since this time two new parishes in Mahyoro have been added (Kanyabikere and Kyendangara) with some villages are now located in the new parishes; this means it is not possible to make exact comparisons of parish data.
The table below compares the water supply infrastructure recorded in 2006 and 2010. Tap stands and unprotected sources were not included in the 2010 baseline; in 2006 no improved springs had been constructed. The figures in brackets presents the number of non-functional water points i.e. 2 (1) means there are 2 shallow wells in Bukurungo, one of which is not functioning.

TABLE C2

	Shallow wells /boreholes		**Protected springs**		**Tap stands***	**Unprotected sources**	**Improved spring**
	2006	2010	2006	2010	2006	2006	2010
Parish							
Bukurungo	2 (1)	6 (1)	2			6	1
Kitonzi	15 (1)	18 (3)				8	
Nyakeera	1	3	2	3 (1)		7	1
Nyakasura	9	16 (1)	9	1		15	
Mahyoro	7 (2)	13 (3)	1	1	22	5	
Kanyabikere	n/a	2 (1)	n/a				
Kyendangara	n/a	6	n/a				
Total	34 (4)	65 (9)	14	5 (1)	22	41	2

In 2006 a total of 48 water points were recorded (not including tap stands or unprotected sources) compared to 72 in 2010. Shallow wells have been the most developed water point, with 31 new shallow wells appearing between 2006 and 2010. There is also a borehole recorded in the 2010 baseline in Mahyoro parish, but the results for shallow wells and boreholes have been put together due to confusion in distinguishing between a borehole and a shallow well.
* Tap stands were not recorded in the 2010 baseline survey as they are private, with a private owner who charges 100ugx per Jerrican and household tap owners pay per month. It would be interesting to see tap stand data for 2010 to see if the numbers of private stands has changed.
The table below presents the information on water management in the Sub County. It can be seen that there have been major changes between 2006 and 2010, where there are 26 more committees in place and 21 more committees collecting user fees. The percentage of water points with functional WATSAN committees has risen from 54% in 2006 to 72% in 2010.

TABLE C3

	Functional WATSAN/tap stand committees		**No. of committees which collect a user fee**	
	2006	2010	2006	2010
Parish				
Bukurungo	1	7	0	4
Kitonzi	4	8	0	4
Nyakeera	3	7	4	3
Nyakasura	13	16	10	15
Mahyoro	5	10	0	7

Kanyabikere	n/a	1	n/a	0
Kyendangara	n/a	3	n/a	2
Total	26	52	14	35

The following table compares data on household water and sanitation, given in the percentage of households with the following facilities.

TABLE C4

	Clean water containers		**Access to latrine**		**Hand washing facilities**	
	2006	2010	2006	2010	2006	2010
Parish						
Bukurungo	26%	54%	90%	93%	6%	26%
Kitonzi	14%	55%	89%	91%	4%	20%
Nyakeera	71%	48%	91%	95%	16%	22%
Nyakasura	27%	63%	95%	98%	5%	43%
Mahyoro	31%	64%	90%	93%	8%	31%
Kanyabikere	n/a	76%	n/a	99%	n/a	43%
Kyendangara	n/a	46%	n/a	93%	n/a	30%
Sub County average	29%	58%	90%	98%	7%	29%

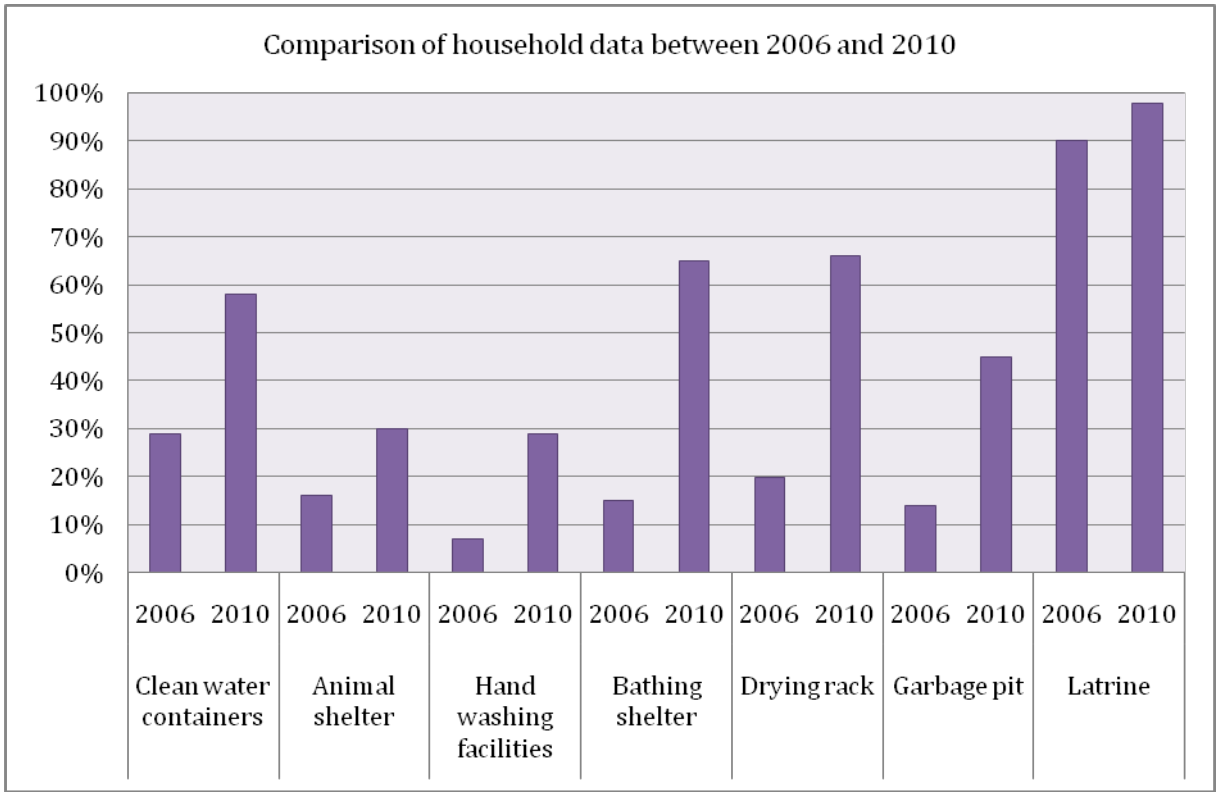
The results shows that have been major improvements in the percentage of households with clean containers to store drinking water, as well as those with hand washing facilities and a reduction of the households without a latrine.
The next table compares some extra household data available from the two surveys, showing the percentage of homes with bathing shelters, drying racks, garbage pits and separate shelters for animals.

TABLE C5

	Bathing shelter		**Drying rack**		**Garbage pit**		**Separate shelter for animals**	
	2006	2010	2006	2010	2006	2010	2006	2010
Parish								
Bukurungo	11%	47%	15%	59%	13%	44%	8%	27%
Kitonzi	9%	72%	13%	79%	9%	32%	14%	34%
Nyakeera	42%	70%	53%	81%	31%	52%	40%	36%
Nyakasura	12%	76%	21%	67%	7%	42%	14%	31%
Mahyoro	16%	56%	19%	49%	17%	50%	15%	34%
Kanyabikere	n/a	92%	n/a	98%	n/a	61%	n/a	24%
Kyendangara	n/a	58%	n/a	51%	n/a	45%	n/a	17%
Sub County average	15%	65%	20%	66%	14%	45%	16%	30%

The results are very positive and there have been improvements in every area compared between the two baselines.

Chart HH11



The following table shows the number of children attending the surveyed schools in Mahyoro. There is a total increase of 17% in the number of children attending these schools.

TABLE C6

	Boys attending		Girls attending		Total students	
	2006	2010	2006	2010	2006	2010
School						
Kanyabikere Primary	275	196	155	152	430	348
Mahyoro Moslem Primary	132	124	100	99	232	233
Kitonzi Primary	543	945	483	938	1026	1883
Nyanga Primary	150	152	90	148	240	300
Busanza Primary	120	203	200	222	320	425
Ihunga Primary	230	254	210	236	440	490
Nyakeera Primary	120	98	80	83	200	181
Mahyoro Primary	345	402	355	344	700	746
Karambi Primary	22	273	297	279	219	552
Bukurungo Primary	240	275	380	266	620	541
Kabaye Primary	410	206	200	176	610	382
Total	2587	3138	2550	2943	5037	6081

TABLE C7

	Hand washing facilities		Hand washing facilities with soap	
	2006	2010	2006	2010
Kanyabikere Primary	Y	N	N	N
Mahyoro Moslem Primary	Y	Y	Y	N
Kitonzi Primary	-	Y	-	Y
Nyanga Primary	-	Y	-	Y
Busanza Primary	Y	N	N	N
Ihunga Primary	Y	Y	Y	Y
Nyakeera Primary	N	N	N	N
Mahyoro Primary	-	Y	-	N
Karambi Primary	N	Y	N	N
BukurungoPRimary	-	Y	-	Y
Total	4	7	2	4

The table above presents data on hand washing facilities at the schools and whether they have soap (note that there was not data for all schools). In the 2006 baseline survey there is not data for every school, but the results shows that there are more schools in total with hand washing facilities and soap. On the other hand is can be seen that facilities in Kanyabikere Primary and Busanza Primary have decreased.

10.4. UGANDA WATER ATLAS 2010

The following tables compare data between the Uganda Water Atlas 2010 and the current 2010 baseline study carried out by JESE/PROTOS.

	% of population with access to water supply	% of functionality of water supply
Water Atlas 2010	95%	91%
Baseline study 2010	n/a	87%*

**Only data on shallow wells, boreholes and protected springs are included.*

There are clearly major differences in the data between the two baselines. One explanation for this is the difference in the way that that the surveys were carried out, as well as the way that different parameters have been defined.

	Baseline survey 2010			Water Atlas 2010		
	Functional	Non functional	Total	Functional	Non functional	Total
Protected springs	4	1	5	7	0	7
Shallow wells	55	8	63	63	7	70
Deep boreholes	0	1	1	0	0	0
Rain water harvesting tanks	n/a	n/a	n/a	14	0	14

The Water Atlas 2010 regards a water point which has been non-functional for over 5 years as 'abandoned' and thus not included in the data; the 2010 baseline survey however has included all water points in the data – one of which for example has been non-functioning for 7 years. The Water Atlas defines rural 'access' to water as the percentage of people within 1km of an improved water source. An improved water source includes protected springs, shallow wells, deep boreholes, gravity flow schemes, surface water and ground water pumped schemes and rain water harvesting tanks. This means that the Water Atlas covers a wider range of water points that the 2010 baseline which also leads to differences in access and functionality figures. The 2010 baseline survey includes households using unprotected natural water sources, which means it is not possible to compare the number of households less than 1km from an improved water point.

Rural functionality is defined by the Water Atlas as the percentage of improved water sources that are functional at the time of spot-check – this definition is that same for both surveys. Finally the differences between the recorded number of water points can also be partly explained by the fact that there is sometimes confusion in differentiating between a borehole and a shallow well.

11. Conclusions

It is clear that there are major differences in the results between the different baseline surveys. Comparing exact data has not been possible as the geographical areas covered, as well as the infrastructure and definitions used in the three surveys vary widely. What can be said is that the results of any baseline survey will depend greatly on how the survey is carried out, when (functionality can also depend on whether a water source is surveyed in the rainy season or not), how different parameters are defined and whether the results are based on subjective estimations (for example the 2010 baseline asked people to estimate the distance to their nearest water point) or scientific methods.

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