A SOCIO-SPATIAL SURVEY OF WATER ISSUES IN MAKONDO PARISH, UGANDA

Citation: A SOCIO-SPATIAL SURVEY OF WATER ISSUES IN MAKONDO PARISH, UGANDA. (2013) by Macri, G; Rickard, A; Asaba, R; Mugumya, F; Fagan, G.H; Munck, R; Asingwire, N; Kabonesa, C; and Linnane, S. Dublin. ISBN: 978-1-873769-30-0

Table of Contents

Acknowledgements

Dr. Gloria Macri (DCU) and Aine Rickard (DKIT/NUIM) prepared the survey data for statistical analysis and for mapping respectively, and jointly carried out the analysis and wrote this report. The survey was designed and conducted by Richard Asaba (doctoral candidate NUIM/MAK) and Firminus Mugumya (doctoral candidate DCU/MAK). Both the survey and this report were led by Prof. G. Honor Fagan (NUIM) and Prof. Ronaldo Munck (DCU). The two doctoral candidates were co-supervised by Dr.Narathius Asingwire (MAK), Prof. G. Honor Fagan (NUIM), Prof.Consolata Kabonesa (MAK), and Prof. Ronaldo Munck (DCU).

The survey was undertaken with technical and financial support from the Water Is Life: Amazzi Bulamu Project (WIL) led by Dr. Suzanne Linnane (DKIT) and funded through the Irish Aid / HEA Programme of Strategic Co-Operation. We thank WIL and, in particular the Project Manager Arleen Folan, for the support offered in carrying out the survey. We wish to thank as well the Steering Committee of the Water is Life Project for their comments on the questionnaire and the first draft of this report.

We are also grateful to Alfred Etwom for initial processing of the survey data, to Josephine Asasira for the data files collected and developed and to Sam Kagwisagye for his work in updating the water-pump dataset for the study area. Thanks also to the colleagues at the National Centre for Geocomputation at NUIM who assisted with GIS file preparation. We are indebted to the Medical Missionaries of Mary (MMMs) who are active around water and health issues in Makondo Parish for their guidance and support. Special gratitude goes to the Community Health Workers (CHWs) who administered the survey questionnaire, Mrs. Agnes Kiwanuka, Gerald Majwega, Miss. Hasifa Kasozi, John Luyombya, Pascal Wamala, Mrs. Phoebe Kibuuka and Vincent Kabanda. Finally, we thank the local communities, study respondents and participants, local leaders, particularly the Local Council Chairpersons of each of the 15 villages and technical personnel in Makondo Parish and Lwengo District for their co-operation during the survey.

Introduction

This report details some of the key findings of a sociological survey that was undertaken in rural Makondo Parish, Lwengo District in Uganda. The cross-sectional survey was carried out between September and November 2011 and covered all the 15 villages in the Parish. The broad aim of the survey was to assess the livelihoods, health, gender and water governance issues in Makondo Parish. Prior to the survey, several preliminary visits were made to the study area, which were then followed by a rigorous literature review on rural water governance, health and livelihoods in Uganda and globally so as to identify the major themes and variables. These themes were then used to develop a quantitative or structured questionnaire. The questionnaire was structured under the following headings: household and interviewer identification; respondents' characteristics; household livelihoods and well-being, particularly poverty indicators like main source of income, money earned, dwelling type, and number of meals eaten; knowledge of the importance of safe water; access to safe water, such as type of water sources used, access to improved water sources, transportation of water; health issues like water-related diseases suffered, cost to the household of these diseases, steps taken to mitigate against the diseases; knowledge of hand-pump functionality; household water use and management, such as satisfaction with use, conflicts if any and decision-making on use; perceptions of safe water services and systems such as rating of safe water service delivery and why; knowledge of community-based water management systems and capacity building for sustainable utilisation of safe water. The final version was translated into *Luganda*, the local vernacular so as not to distort the meaning of the questions. This exercise was carried out by the Makerere University Institute of Languages, and the *Luganda* version was then used to train the Community Health Workers on how to administer and record standardised interviews, such as mastering the intended meaning of each and every question in the questionnaire, the expected data, recording and editing among others. The CHWs were also trained on how to use a GPS (Global Positioning System) unit so as to capture the necessary data for mapping the household locations. After training the CHWs, the questionnaire was piloted in one of the villages in a neighbouring Parish (called Nanywa) and again revised. The actual field work or data collection started with Misaana village in the North-Eastern part of Makondo Parish, then moved on to Luyiiyi-Kate, Luyiiyi-Protazio and ended with Kiguluka, the last village in the Parish on 14th November 2011. It took between three to four days on average to complete the survey in each village, and the first day of work in each village involved meeting the Village Chairpersons, explaining to then about the WIL Project, objectives of the survey and seeking their support in locating selected households for interviews. After every two-three days of data collection, meetings were held with the interviewers/CHWs to share

fieldwork experiences as well as edit field questionnaires. A total of six hundred and six (606) households selected proportionately across the 15 villages in Makondo Parish were covered in the survey. Despite several challenges that were met during the survey, such as failure by interviewers/CHWs to complete their assigned households in time; heavy rains that made driving on the village roads quite difficult especially in Kiteredde, Kiyumbakimu and Kiguluka villages, the survey was a success and data collection ended quite successfully, as the originally targeted sample was attained.

Methodology

This report has been compiled using the results of a baseline survey carried out in the Lwengo District of Uganda (part of which was formally known as Masaka prior to subnational district boundary changes carried out by the Ugandan Government in 2010/2011). The survey area consists of 15 villages in Makondo, which have a combined area of 33 square kilometres, with an approximate combined total of 1,730 households. In total, 606 households participated in this survey which equated to approximately 35% of the households in the survey area.

Following the process of preparation of the database for statistical analysis and mapping a total number of 547 respondents (households) remained in the sample.

During the inputting of responses into an SPSS database, survey data was split into two databases each containing respondents' answers to a subset of questions. In order to use this database for statistical analysis, the two databases needed to be merged in order to create a comprehensive database that included respondents' answers to all questions. This would allow for comparing and correlating variables during the analysis.

SPSS software has the facility of merging a split database, however a unique identifier for each questionnaire/respondent/household needs to be present in both databases. Hence, the two databases were initially checked in order to ensure that there are no errors in the inputting of the unique identifier (in this case variable A3 – Household number).

During the verification procedures it emerged that two cases had the same household number[1]. As a consequence, the SPSS facility for checking if these two cases are exact duplicates was used, with the result coming back as negative. It was thus decided to remove these cases from the database as, given this error, the merging of the two databases would otherwise not be possible. Furthermore, two other household numbers were identified as present in one database but not in the other[2]. Given that there needs to be a perfect match of the case numbers/unique identifiers in Database 1 and 2 to merge the two databases, the decision was made to delete these cases. Hence, a total of four database entries were deleted before the two databases were merged using the household number (variable A3) as the unique identifier.

Further steps were taken before the statistical analysis of the answers could be undertaken. In the first instance, frequency distributions were computed for all variables in order to identify any possible mistakes in the inputting of data and also to re-categorise the answers included in the open-ended answer choice ("Other"). Some of the answers to this answer category were incorporated into existing categories (where this was possible), while for other answers new

[1] There were two cases with the household number 69 in Database 1.
[2] Case number 735 (in Database 1) and case number 769 (in Database 2).

categories were created. Secondly, all questions involving a multiple-answer have been transformed into dummy questions (1 – Yes; 2- No) in order to facilitate the data analysis process.

Last but not least, other variables in the database (e.g. the size of the household, the age of survey respondents etc.) were recoded in order to ensure that the answer choices were most relevant for the analysis.

Given the nature of the questions and the type of information collected, many of the advanced statistical procedures were not an option for this report. Hence a number of frequency tables and cross-tabulations were produced in order to produce a broad view of the profile of respondents to the survey from a wide range of perspectives: socio-demographic, economic (poverty), health and access to water being the main relevant variables considered.

An important note needs to be registered at this stage. While cross-tabulations provide a straightforward way of seeing the patterns and correlations between variables, the findings were somewhat limited in this situation by a number of factors: firstly, the Chi-Square test (a statistical test which can be computed in order to check whether two variables are independent) could not be validated in most instances during the analysis. This was mainly due to the significant number of table cells with expected low count of cases in each cross-tabulation. This problem implies that in spite of a value of Chi-Square which may be statistically significant, the low number of expected counts for each cell of the table renders the test invalid. Secondly, in the case of the questions with multiple responses, Chi Square cannot be computed for the composite variable because each individual may be placed in one or more categories of answers (cells), hence failing to fulfil the requirements for running the Chi Square test.

Finally, it needs to be specified that when percentages are calculated for the questions which allow for multiple answers, the sum of percentages (calculated from the total number of respondents/households) resulting for each of the answers will always be above 100%. This is due to the fact that each individual may chose one, two or more answers, thus resulting in the inclusion of each respondent in more than one category of answers.

In addition to statistical analysis using SPSS, some spatial mapping and analysis was undertaken. In order to correctly map the data, several criteria needed to be fulfilled. Firstly, all households participating in the survey needed to have a valid longitude and latitude co-ordinate associated with their respective locations. Due to missing or incorrect co-ordinates, 27 cases were removed from the database. An additional 28 cases in the survey answered that they were living inside one of the 15 villages surveyed in this report, but when mapped, these households were in fact located outside the administrative boundary of these villages. As such, they were removed from the analysis so as to allow for comparisons across villages within the survey area. This left 547 valid household survey participants for both statistical and spatial analysis.

Secondly, a database of Geographic Information Systems (GIS) files is needed that will display various topographic and infrastructural features within the survey area, for example

rivers, roads, water pumps etc. The Water is Life project had previously compiled such a database, which was then added to for this report with some free–to-download GIS files made available by the Ugandan government. Sub-national district boundary changes were enacted by the Ugandan Government in 2011, however GIS files of these new boundaries are not currently available. Therefore the existing pre-2011boundaries have been used throughout this report. Some alignment errors occurred when projecting various files into the Arc 1960 projection, which were manually adjusted using a variety of existing maps of the area produced by the Ugandan authorities to provide geo-referenced points.

All households were mapped using GPS units to pinpoint their exact location, the longitude and latitude co-ordinates then being added manually to the survey database. Due to the sensitivity of the information and other ethical considerations, it was deemed inappropriate to display exact household locations in the area. To overcome this problem, two methods were used. Firstly, the number of households per 250 square metres were combined into a grid-square mesh covering the area. When mapped, these grid-squares provide a good visualisation of the distribution of household participants without disclosing their exact location. This grid-square method was most useful when visualising household distribution in relation to water-pump infrastructure in the area. Secondly, some data was combined so as to be mapped at the village scale, to allow comparisons across villages in the survey area. This slightly lessened the statistical issue of low numbers of households in some areas, by decreasing the number of potential categories to 15, thereby increasing the number of households per unit of analysis.

Unfortunately, neither method allows for a visualisation of the variation in responses within either grid-square or village, and thus is only useful for displaying cases related to one particular variable of interest. In addition, some of the detail within the dataset is lost as it is averaged across a wider geographical area. This, however, is vital to ensure anonymity for household respondents.

One final point to note is the difference in spelling between villages as defined by the Ugandan Government and that spelling used locally. For the purpose of this report, the official governmental spelling was used to ensure consistency and clarity.

1: Survey Location

Uganda is located in East Africa, a land-locked country which shares a border with Tanzania, Kenya, South Sudan, Democratic Republic of Congo and Rwanda. Although land-locked, the country also shares a considerable border with and includes a large portion of Lake Victoria, the largest freshwater lake in Africa (Figure 1). With an area of 243,000 square kilometres, Uganda is one of the smaller countries of the continent, with the majority of the country over 1,100 metres above sea level.

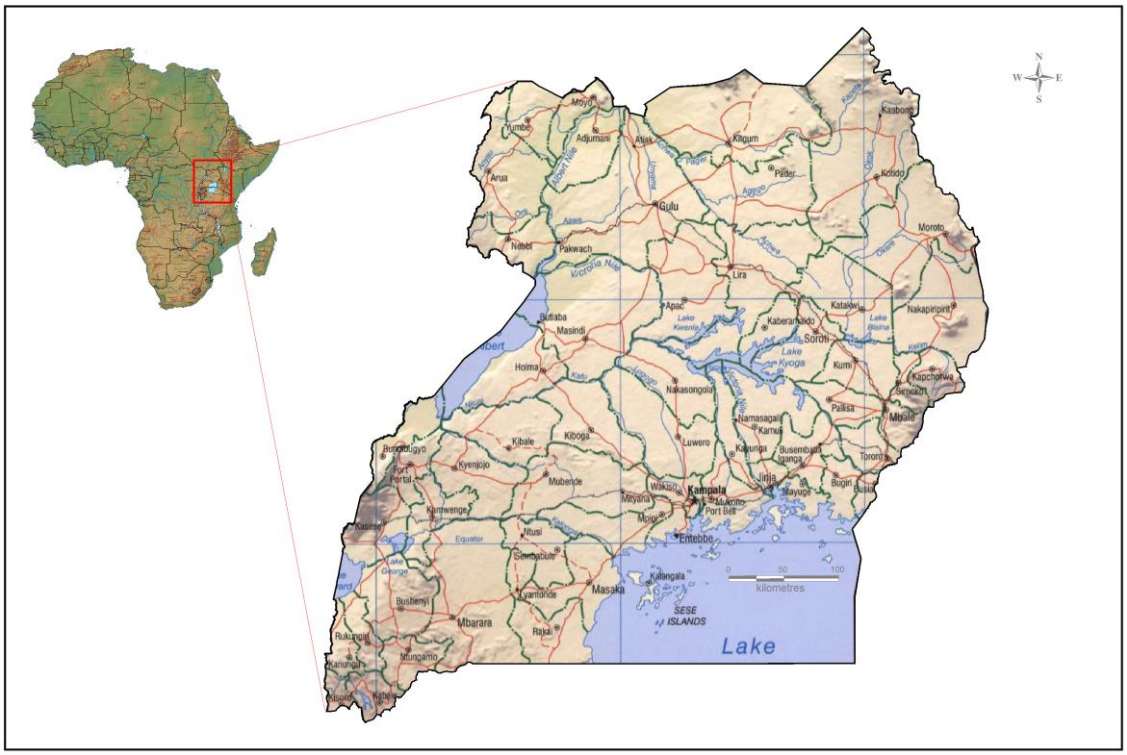

Figure 1 – Map of Uganda located within the African Continent

The Lwengo District of Uganda is located in the south-east of Uganda, along the border with Lake Victoria. Before administrative boundary changes were enacted in 2011, Lwengo covered an area of approximately 4,600 square kilometres (Figure 2). The area of interest for this report lies within the parish of Makondo in the west of Lwengo (now Lwengo), an area which housed 17,786 households in 2002 according to the census of Uganda for that year (Uganda Bureau of Statistics, 2006 – www.ubos.org).

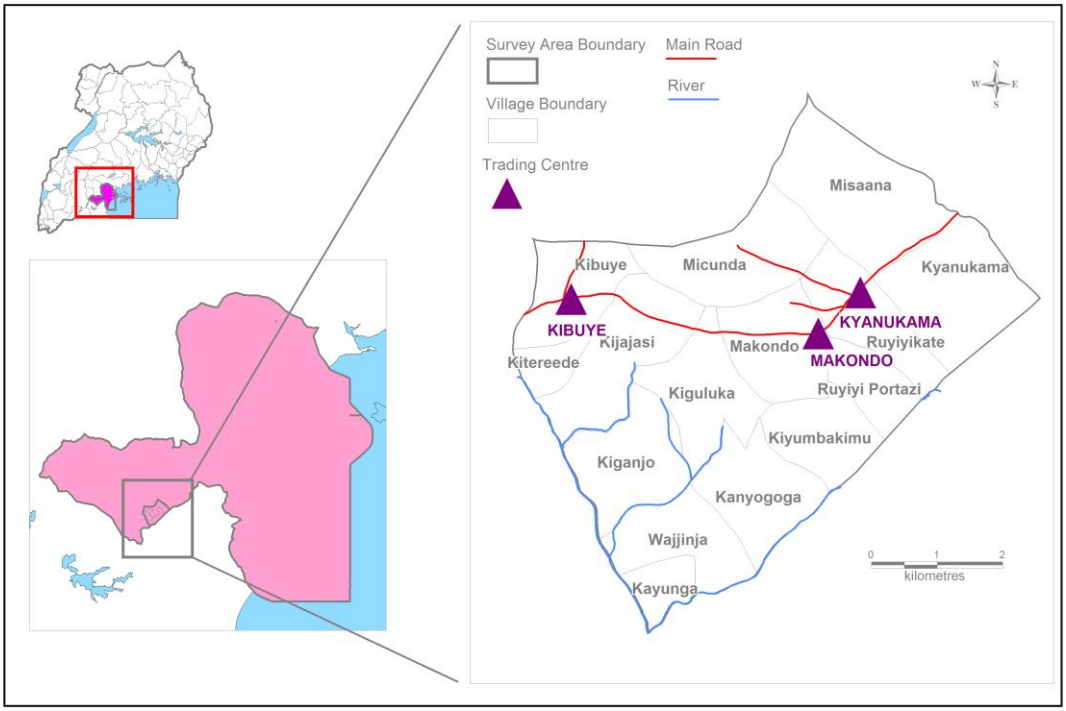

Figure 2 – Map of the survey area within the Lwengo district of Uganda

2: Profile of Respondents and Households

This section outlines some essential socio-demographic and geographic information about the survey participants, providing a gender profile, location of households, education levels, ethnicity, and religious affiliation among other attributes.

In Figure 3 we observe the distribution of household respondents in the survey across the 15 villages of interest, in relation to the main road and tracks, rivers and town in the area. The villages in the survey area range from 800 square metres to 3.8 square kilometres in size, the mean value being approximately 2.2 square kilometres. The density of households per village participating in the survey range from 5 to 29 households per square kilometre, with the average number of households per village being 16.

Almost 60% of respondents, 320 households, are located less than 1 kilometre from the main roads in the area, with 97% of those surveyed living within 500 metres of the smaller tracks in the area. 38% of household participants live within a 2 kilometre catchment area of the main village in the area, Kiyumbakimu.

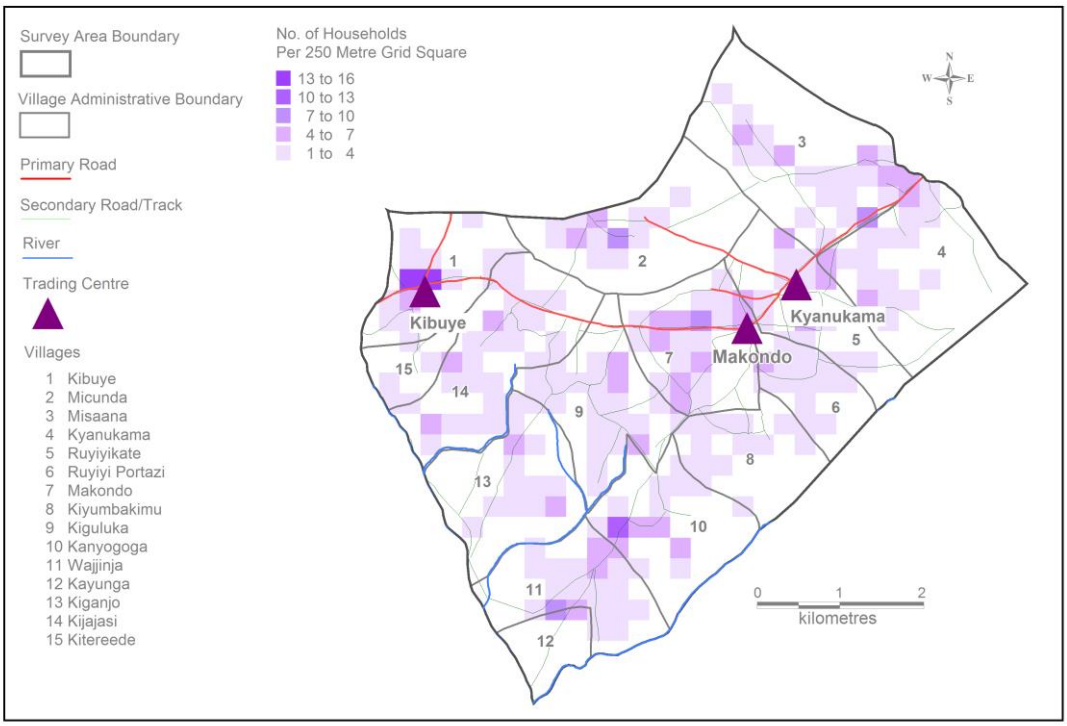

Figure 3 – Map showing the distribution of household participants in the survey per 250 metre grid-square

This map indicates a significant mismatch between village identity and official village boundaries, which could have a tangible impact on water management governance and local

political rule on the ground, and provides an interesting insight into potential planning issues in the area in the future.

The majority of respondents to the survey are females (63%) (see Figure 4). The age distribution of survey respondents indicates that a quarter of interviewees are in the 35-44 years age bracket (see Figure 5). A considerable percentage of respondents (69%) are educated to primary level, while a further 20% have no education (see Figure 6).

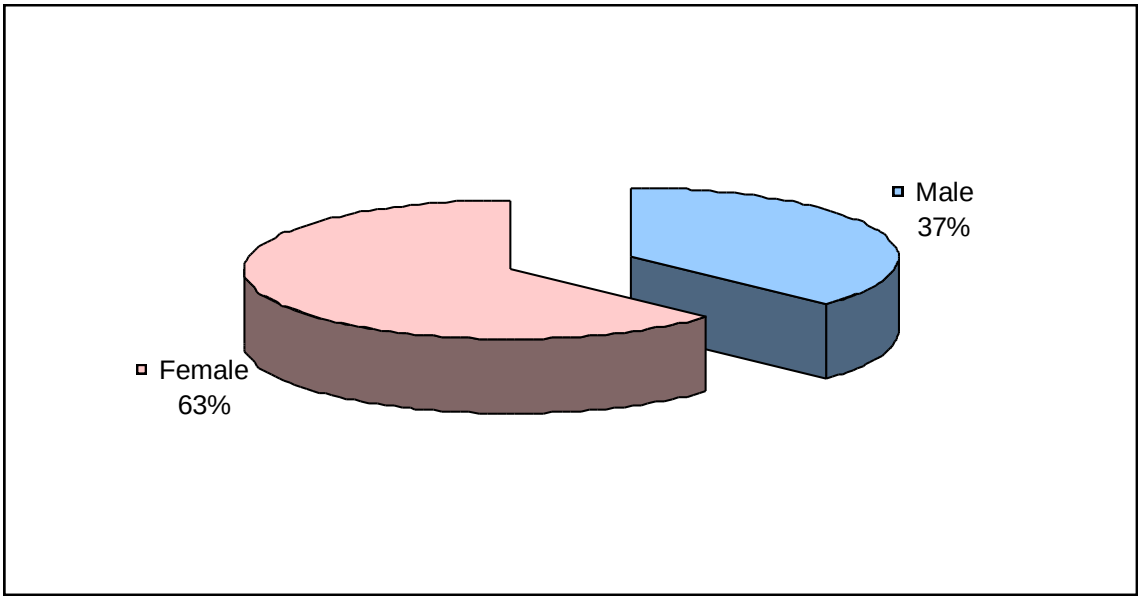

Figure 4 – The gender distribution of survey respondents

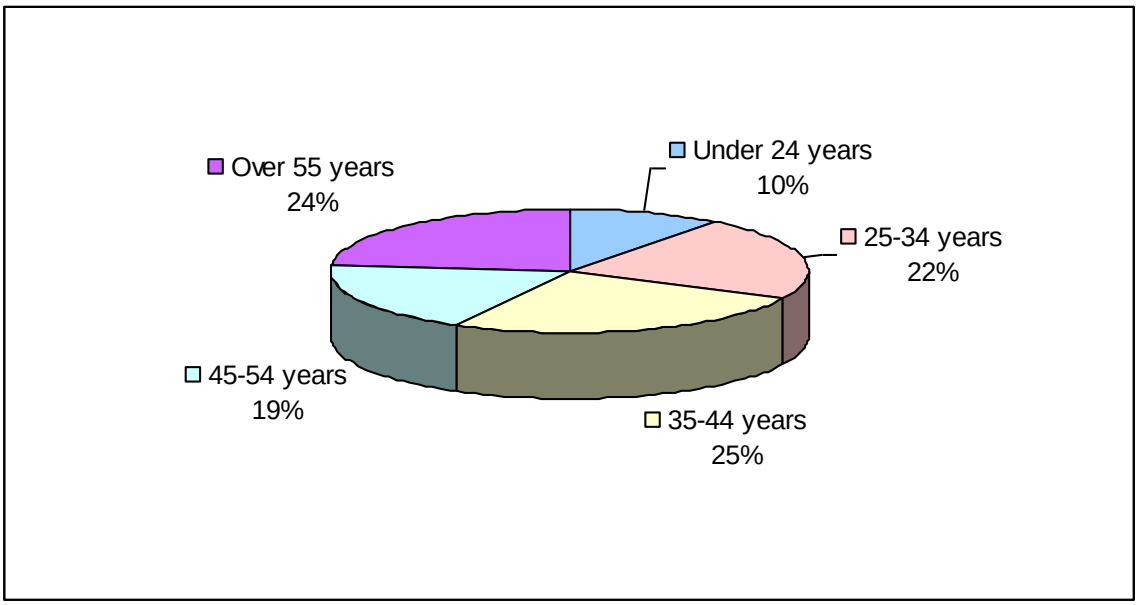

Figure 5 – The age distribution of survey respondents

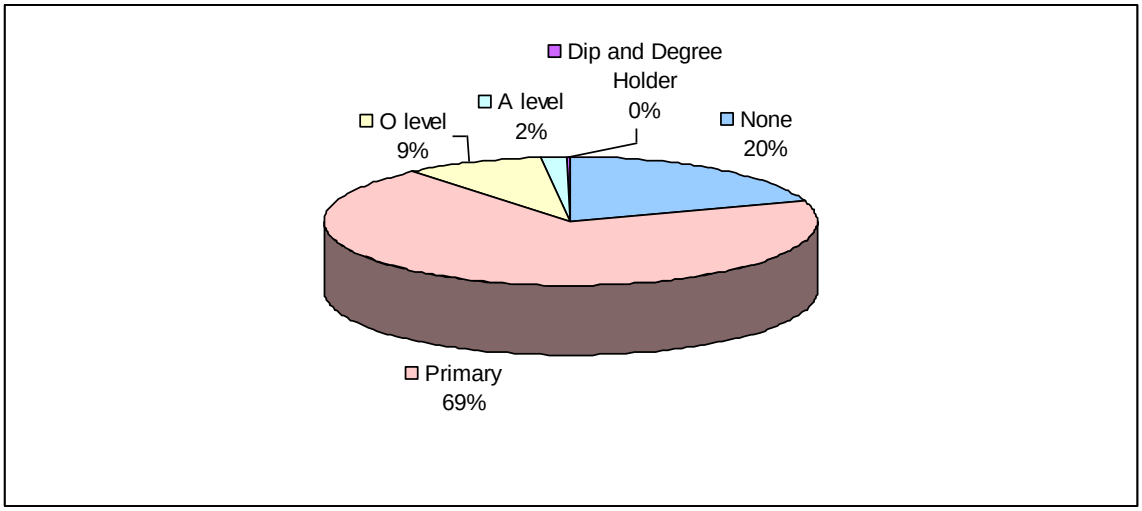

Figure 6 – Highest level of formal education achieved by survey respondents

Most respondents are married (61%), but a significant percentage are also widows or widowers (19%). A further 11% of participants in the survey are divorced (see Figure 7).

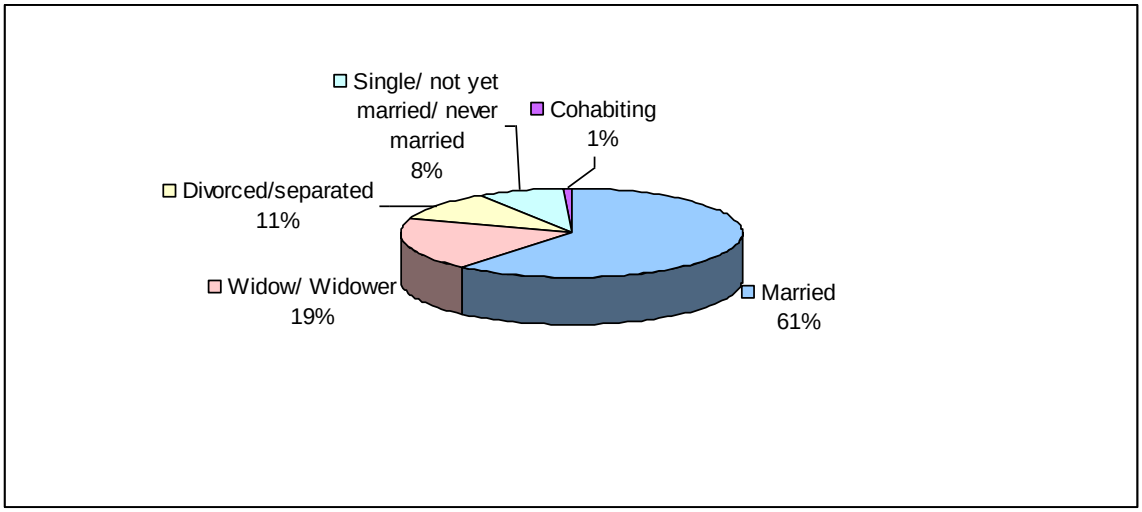

Figure 7 – Marital status of survey respondents

A brief look at the main occupations of respondents to the survey indicates that almost 90% are farmers (73% crop farmers/peasants and 16% mixed farmers). In spite of the high ratio of women participating in the survey, there are a very low percentage of respondents declaring their main occupation to be “Housewives” (3%). This indicates that women are actively involved in economic activities aimed at increasing household income (see Figure 8).

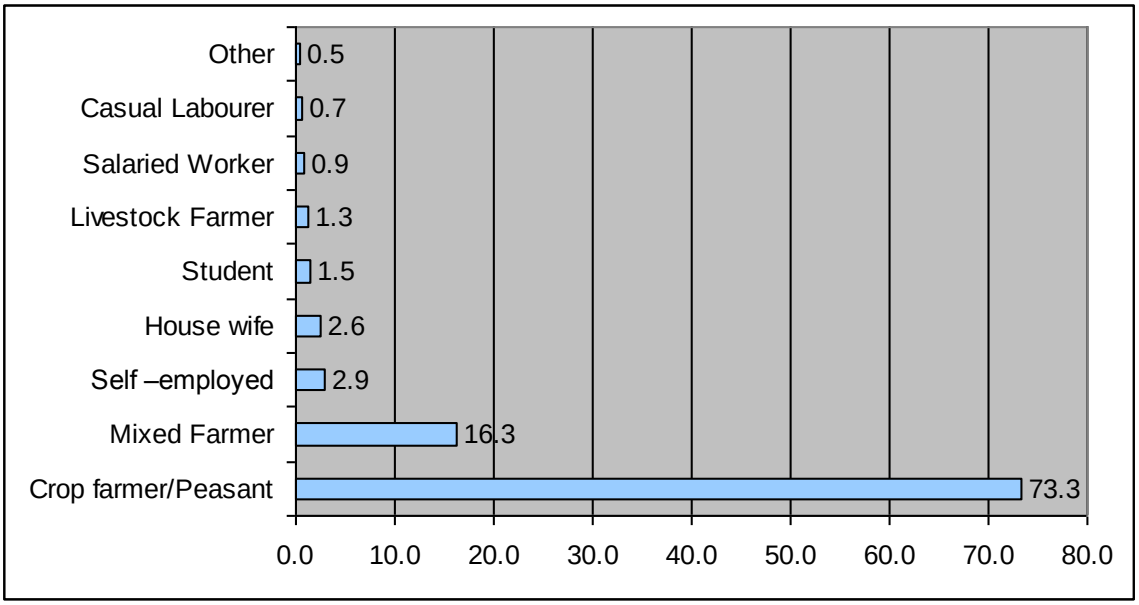

Figure 8 – Main occupation of survey respondents

The majority of respondents (72%) are from a Muganda tribe/ethnic background (see Figure 9). Figure 10 provides an insight into the religious denominations of survey participants. The figure shows that 60% are of the Roman Catholic religion, 22% are Muslims, 13% are Protestant and 5% Pentecostal.

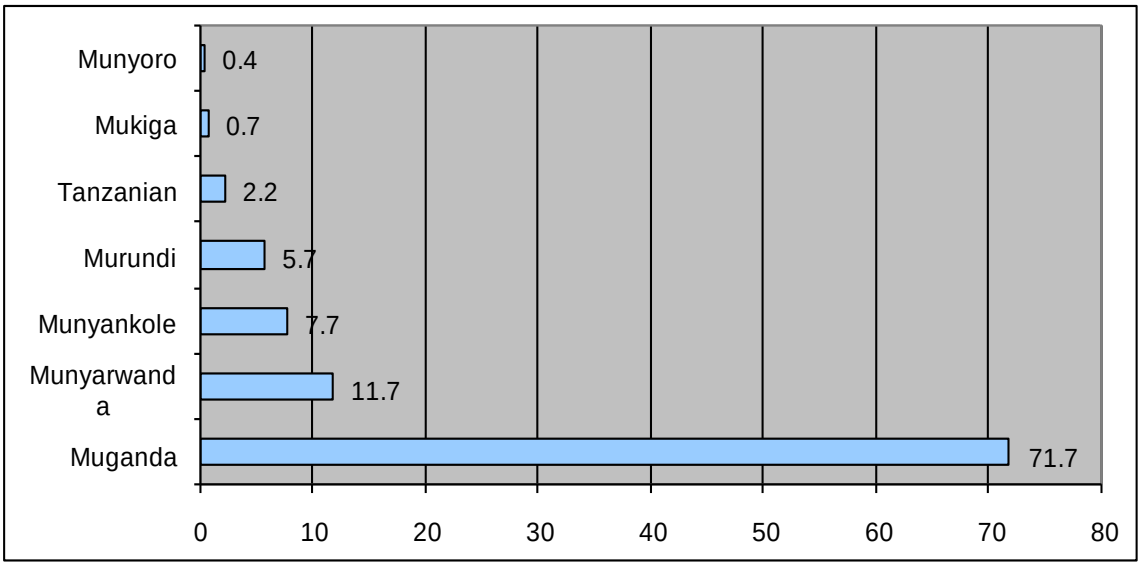

Figure 9 – Tribe/ ethnic background of survey respondents

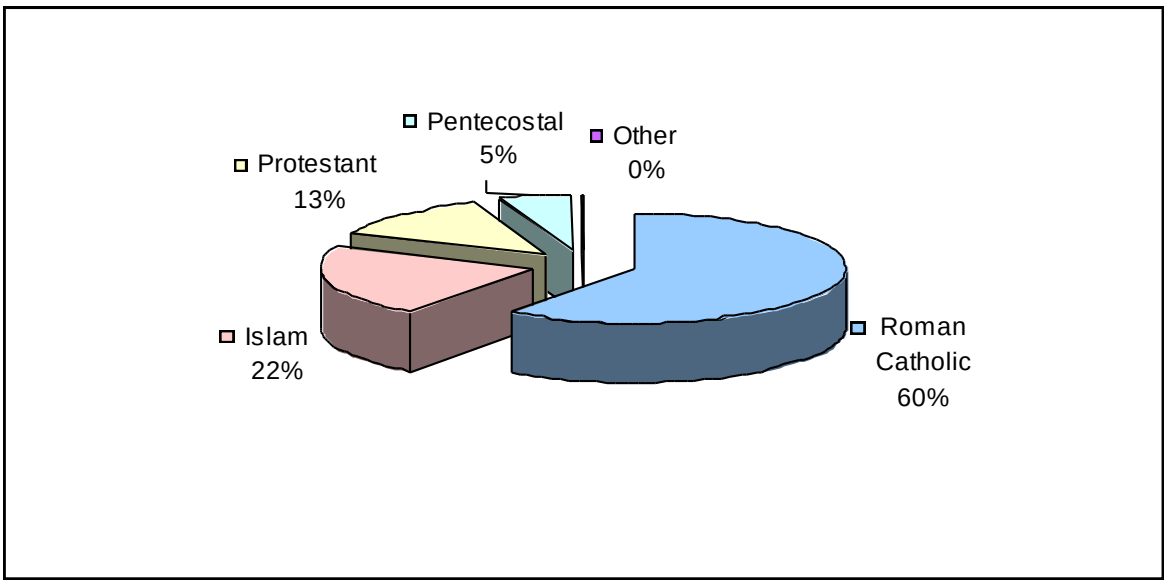

Figure 10 – Religious denomination of survey respondents

Figure 11 provides a comparison map of the location of households within the administrative village boundary in which they live, compared with the village they identified as their home village. It can be clearly seen from the map that there are discrepancies and different understandings of the location of village boundaries in the area. For example, a large proportion of those living in Kijajasi in the west have listed Kitereede as their home village in the survey.

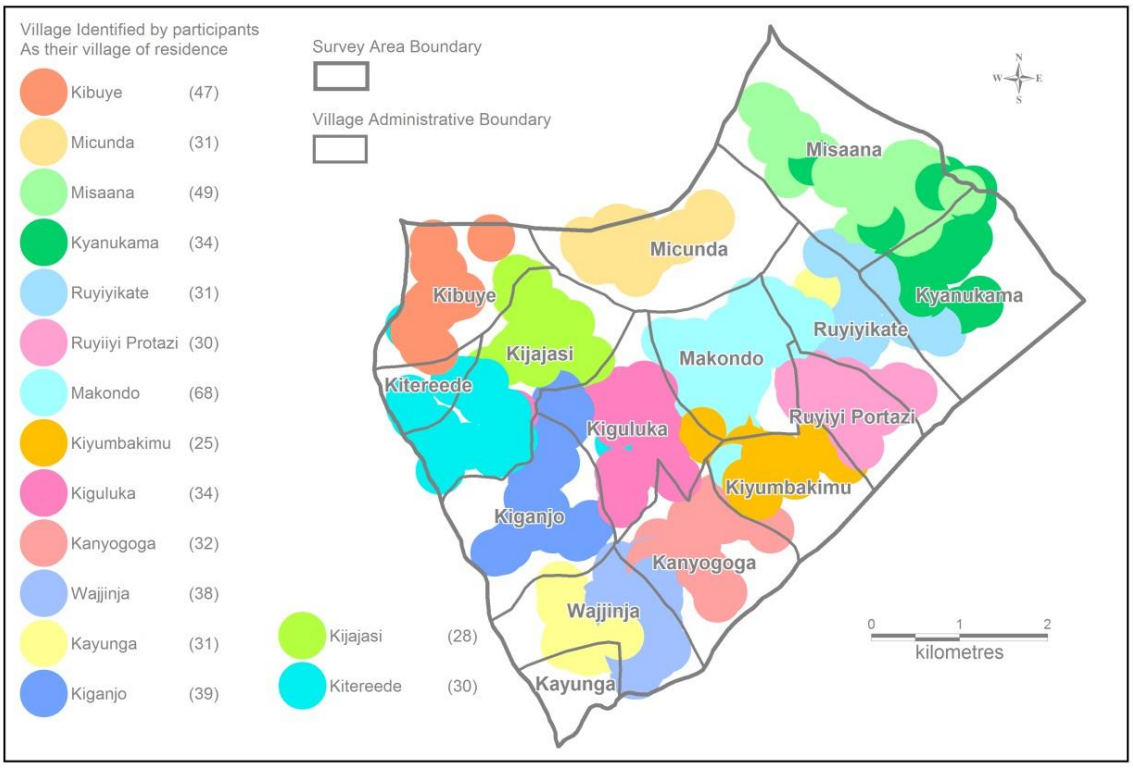

Figure 11 – Comparison map of response to village of residence and actual administrative boundaries of villages

Figure 12 shows that 44% of all households are considered large-sized (i.e. between six and 10 members) and 27% are medium-size (i.e. four - five members). It is interesting to note that slightly over 4% of respondents belong to a very large household (i.e. over 10 members). The percentage of respondents in small sized households is around 20% and a further 5% come from a single person household.

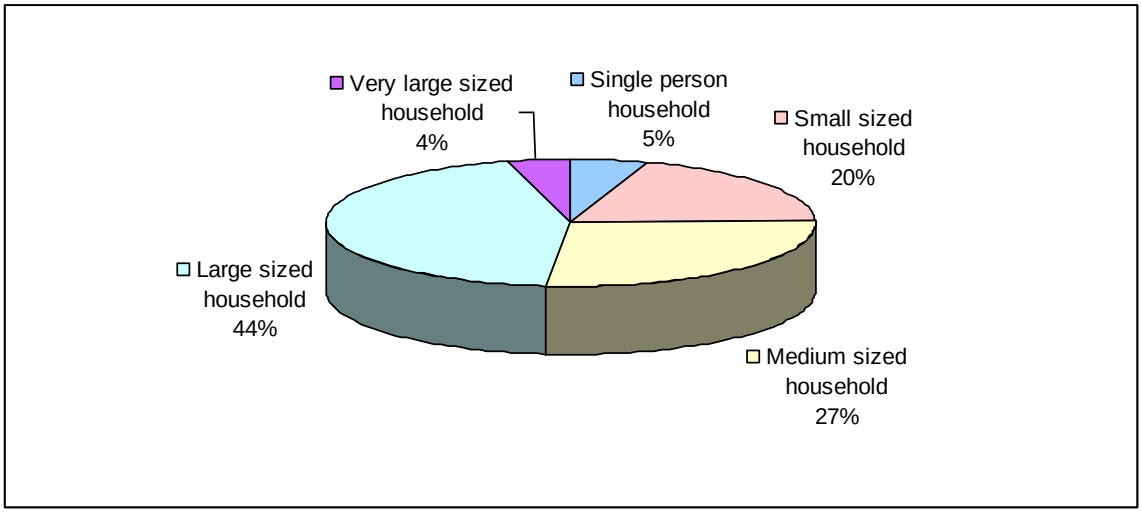

Figure 12 – Household size

The single-person households are more likely to be made of elderly people (41% of single-person households) and males (74% of single-person households). It needs to be noted however that the total number of single-person households in the survey is small (27 cases) therefore no generalisations can be made from the above-mentioned findings.

The majority of the households are led by males (72%), but 27% are led by women. The survey also recorded 1% of households as being led by children/orphans (see Figure 13).

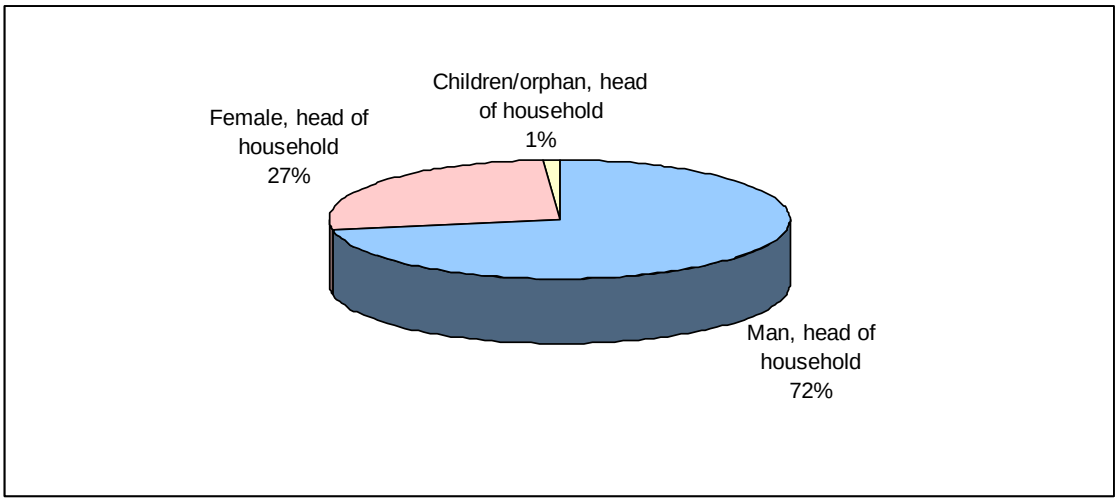

Figure 13 - Head of household

When cross-tabulating the "head of the household" variable with gender, findings are even more revealing (see Table 1): men are more likely to live in a male-headed household than in a female-headed household (94% of males surveyed live in a male-headed household). At the same time only 41% of women respondents live in a female-headed household. The correlation between these two variables (gender and head of household) is, however, not statistically significant[3].

Table 1 – Gender and Head of household

	Male	Female
Male headed household	93.6%	58.6%
Female headed household	5.0%	40.6%
Child/orphan headed household	1.5%	0.9%
Total number of respondents	202 (100%)	345 (100%)

The previous findings illustrated in Table 1 may be explained by looking at the relation between marital status and the head of the household variable. Data presented in Table 2 shows that most male respondents who are heads of household are married (81%). At the same time,

[3] The result of the Pearson Chi Square test of independence of variables is not reliable due to the fact that too many cells have an expected count of less than 5.

female respondents who are heads of household are more likely to have acquired this status following the death of their partner (59% are widows/widowers) or following divorce (23%). The correlation between the two variables (martial status and head of the household) is statistically significant[4]. This implies that women do not tend to be the de-facto heads of the household, but rather become heads of the household following divorce or the death of their male partner.

Table 2 – Head of household and marital status

	Male head of household	Female head of household
Married	80.7%	4.3%
Cohabiting	0.0%	3.5%
Widow/ Widower	4.3%	58.9%
Divorced/separated	11.2%	22.7%
Single/ not yet married/ never married	3.7%	10.6%
Total number of respondents	187 (100%)	141 (100%)

[4] The value of the Pearson Chi Square test of independence of variables is 203.473 which is significant at p value < 0.05. Two cells (20%) have expected count less than 5, which is considered acceptable from the statistical perspective.

3: Household Poverty

This section examines the various indicators of poverty among household members, including main source of income, money earned, dwelling type, and number of meals eaten.

A brief look at the main sources of income of participants in the survey (Figure 14) reveals that for most of them, the main source is agriculture (62% crop farming and 20% mixed farming). When analysing the level of the estimated monthly household income (Figure 15), the data shows that a majority of households (85%) are earning less than 50,000 UGX and less than 4% are earning over 200,000 UGX.

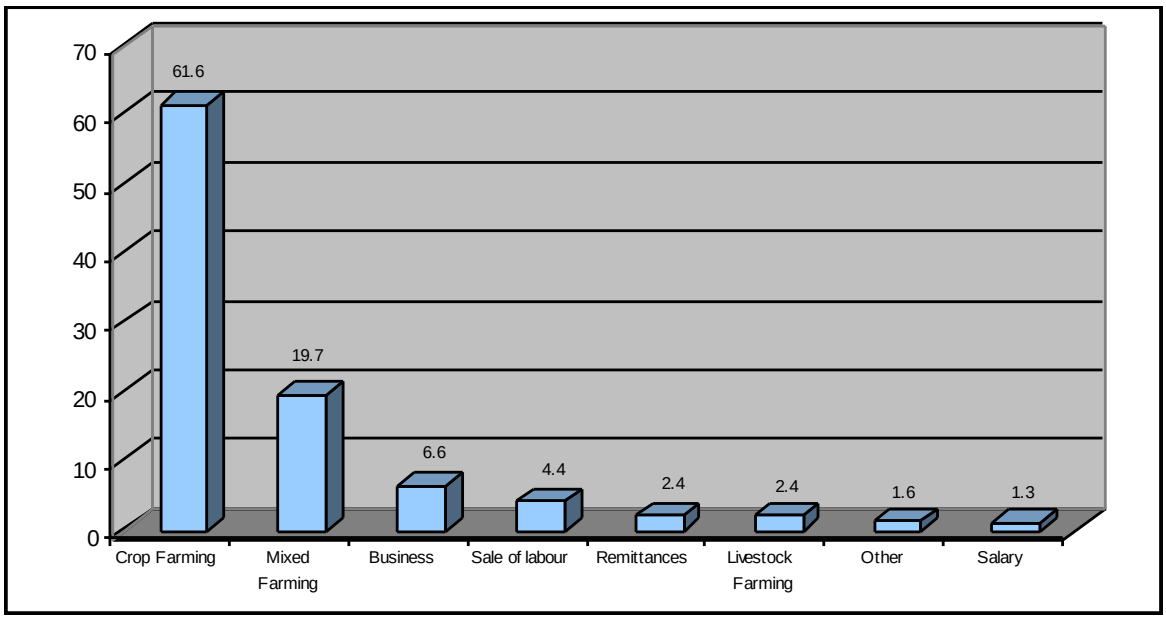

Figure 14 –Household's major source of income

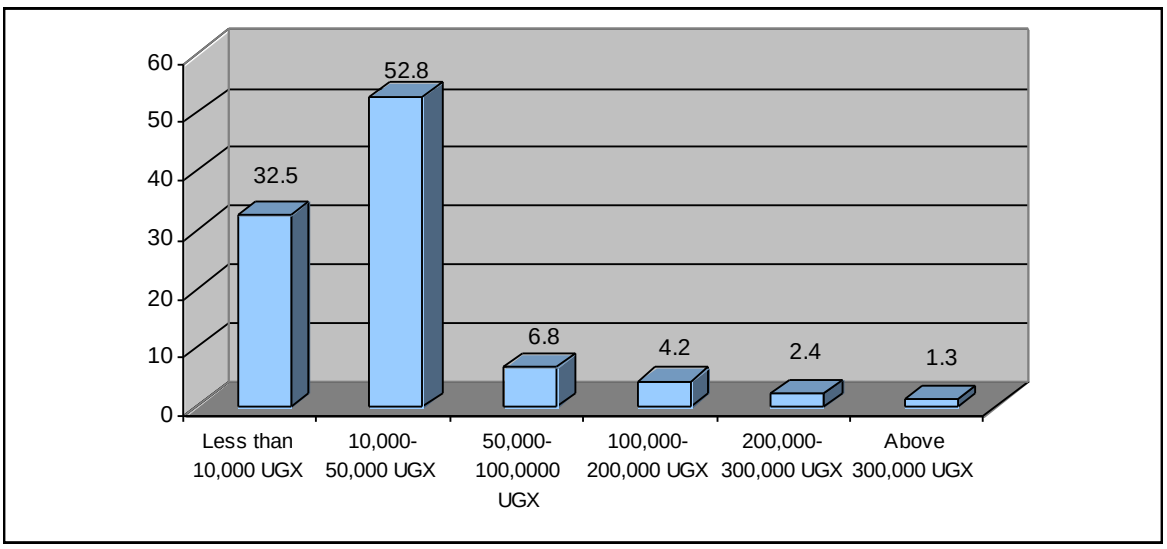

Figure 15 - Estimated monthly household income

Furthermore, Table 3 reveals that households with a high level of income (over 200,000 UGX) tend to be very large sized households, thus suggesting that the relative income per household member may still be low.

Table 3 – Estimated monthly household income and size of the household

	Less than 10,000 UGX	10,000-50,000 UGX	50,000-100,0000 UGX	100,000-200,000 UGX	200,000-300,000 UGX	Above 300,000 UGX
Single person household	7.3%	4.5%	0.0%	4.3%	0.0%	0.0%
Small sized household	25.8%	17.6%	16.2%	8.7%	15.4%	0.0%
Medium sized household	32.0%	26.6%	16.2%	17.4%	30.8%	0.0%
Large sized household	33.7%	47.1%	59.5%	56.5%	46.2%	71.4%
Very large household	1.1%	4.20%	8.1%	13.0%	7.7%	28.6%
Total number of respondents	178 (100%)	289 (100%)	37 (100%)	23 (100%)	13 (100%)	7 (100%)

* The correlation is not statistically significant – too many cells have expected count less than 5.
** Percentages are calculated out of column totals.

Many households have a permanent (38%) and semi-permanent (35%) structure to live in, but there is also a considerable number of respondents (18%) living in households built with permanent materials, but with no cemented floors (see Figure 16).

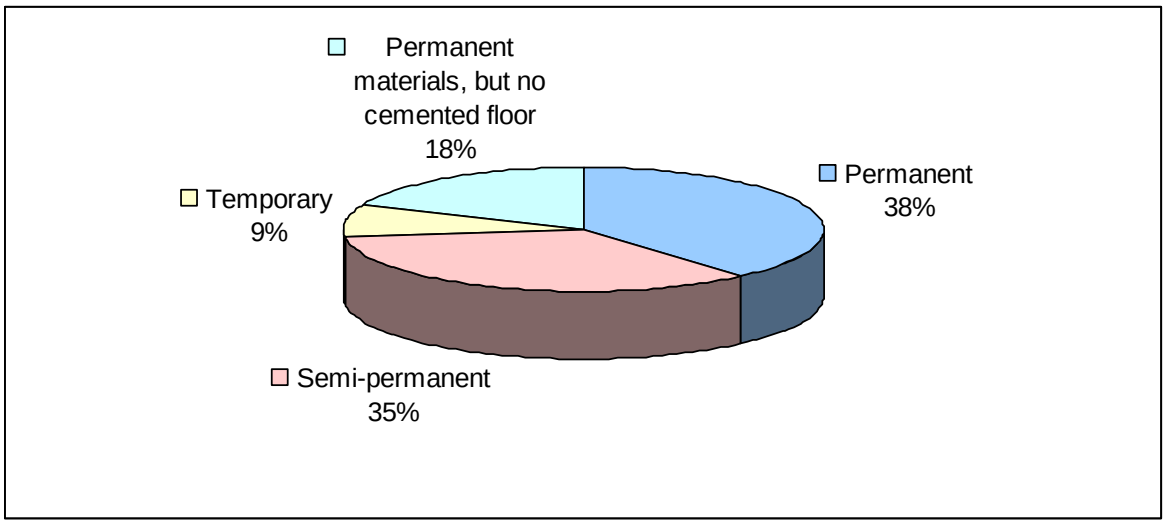

Figure 16 – Type of dwelling unit for households included in the survey

While there does not seem to be a pattern of correlation between the level of monthly household income and the type of the dwelling unit, it seems that most (86%) of those with incomes of over 300,000 UGX tend to live in permanent dwellings (see Table 4).

Table 4 – Estimated monthly household income and type of dwelling unit

	Less than 10,000 UGX	10,000-50,000 UGX	50,000-100,0000 UGX	100,000-200,000 UGX	200,000-300,000 UGX	Above 300,000 UGX
Permanent	27.0%	41.5%	67.6%	43.5%	15.4%	85.7%
Semi-permanent	42.7%	32.5%	16.2%	17.4%	61.5%	14.3%
Temporary	11.2%	7.6%	5.4%	13.0%	0.0%	0.0%
Built in permanent materials but no cemented floor	19.1%	18.3%	10.8%	26.1%	23.1%	0.0%
Total number of respondents	178 (100%)	289 (100%)	37 (100%)	23 (100%)	13 (100%)	7 (100%)

* The correlation is not statistically significant – too many cells have expected count less than 5.
** Percentages are calculated out of column totals.

When comparing earning patterns within the "Head of the household" variable, it emerges that all households with incomes over 300000 UGX and a very high percentage (85%) of those earning between 200,000 and 300,000 UGX are led by men. Hence, overall, households led by women seem to be obtaining lower incomes than those led by men.

Table 5 – Estimated monthly household income and head of household

	Less than 10,000 UGX	10,000-50,000 UGX	50,000-100,0000 UGX	100,000-200,000 UGX	200,000-300,000 UGX	Above 300,000 UGX
Male headed household	55.6%	76.8%	89.2%	82.6%	84.6%	100.0%
Female headed household	42.7%	22.1%	10.8%	17.4%	15.4%	0.0%
Child/orphan headed household	1.7%	1.0%	0.0%	0.0%	0.0%	0.0%
Total number of respondents	178 (100%)	289 (100%)	37 (100%)	23 (100%)	13 (100%)	7 (100%)

* The correlation is not statistically significant – too many cells have expected count less than 5.
** Percentages are calculated out of column totals.

Apart from the financial dimension, the welfare of a household can also be measured by the number of meals eaten by respondents. It emerges that while a large proportion of household participants (64%) have had three or more meals a day, a significant percentage of respondents 11% had only one meal and 25% had only two meals the day before the survey data was recorded (see Figure 17).

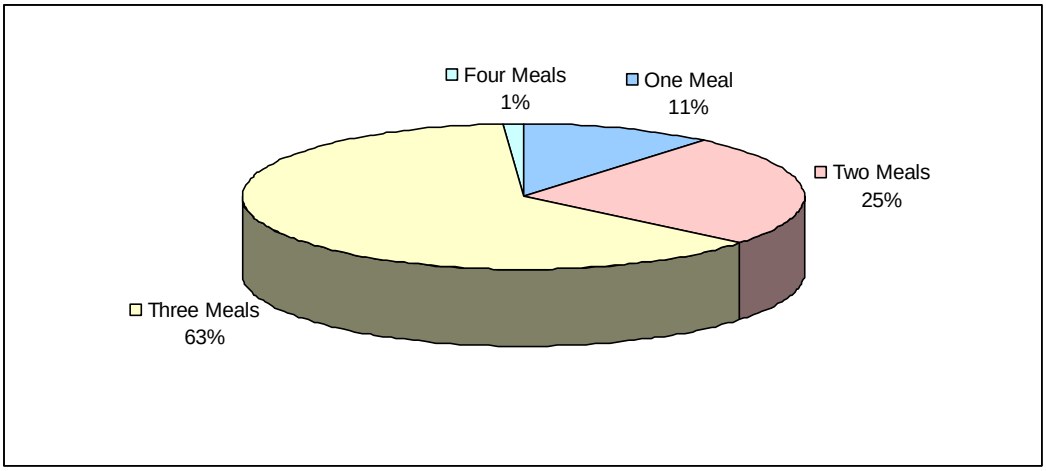

Figure 17 – Number of meals per day

In Figure 18, we can see the comparative poverty of each village using the number of meals eaten as a proxy measure. The maps shows the percentage of households within each village who have eaten two or less meals per day, as a proportion of the total number of households in that respective village. As can be seen from the map, the lighter-coloured areas in the central area close to Kiyumbakimu village have a lower proportion of households eating less than three meals, with less than 30% of villagers in these areas suffering such food poverty. Those, however, in the north- and south west of the area, shaded in darker colours, have at least 40% of villages eating less than three times a day.

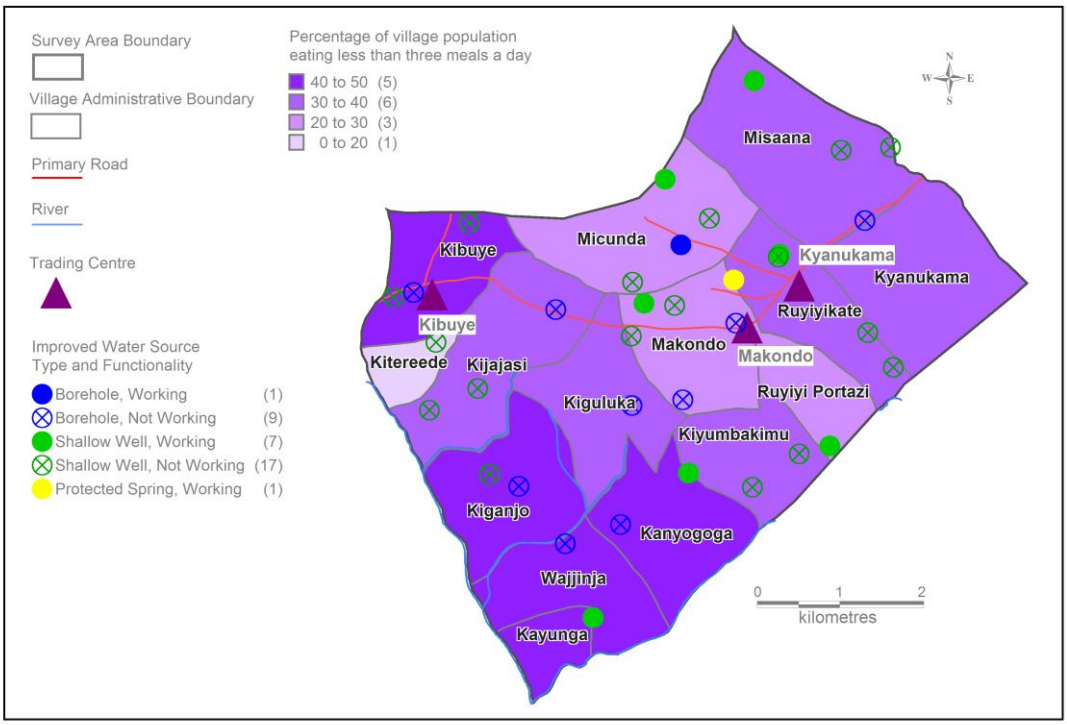

Figure 18 – Map of household respondents who had eaten less than three meals on the day before being surveyed.

A combination of a lack of food and a lack of money to buy the food seems to explain the lack of a diet containing at least three meals per day (see Figure 19).

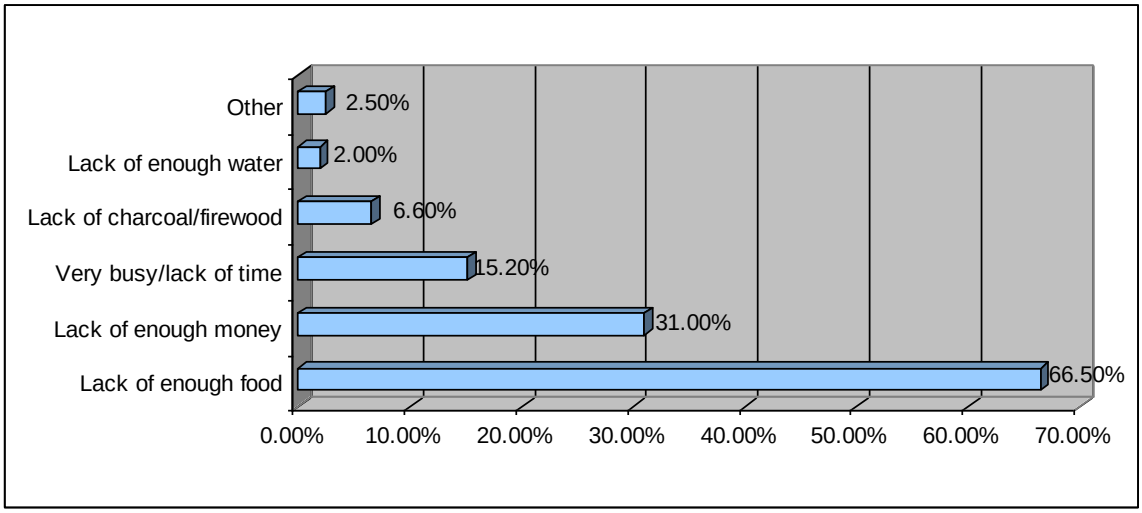

Figure 19 – Reason for consuming less than three meals a day. (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%).

Table 6 shows that households with a higher monthly income and who eat less than three meals per day are more likely to do so due to the lack of food (80%) rather than due to a lack of financial or other resources. This finding needs however to be treated with caution as the number of those households with a higher monthly income and who eat less than three meals per day are very small. It is however worth noting that no households earning in excess of 300,000UGX had eaten less than three meals on the day before being surveyed.

Table 6 – Estimated monthly household income and reason for less than three meals per day.

	Less than 10,000 UGX	10,000-50,000 UGX	50,000-100,000 UGX	100,000-200,000 UGX	200,000-300,000 UGX
Lack of enough food	72.4%	60.8%	60.0%	80.0%	66.7%
Lack of charcoal/firewood	8.0%	5.2%	20.0%	0.0%	0.0%
Very busy/lack of time	8.0%	20.6%	20.0%	20.0%	33.3%
Lack of enough money	24.1%	38.1%	40.0%	20.0%	0.0%
Lack of enough water	1.1%	3.1%	0.0%	0.0%	0.0%
Other	3.4%	2.1%	0.0%	0.0%	0.0%
Total number of respondents	87 (100%)	97 (100%)	5 (100%)	5 (100%)	3 (100%)

***** Percentages are calculated out of column totals.

4: Access to Water

This section discusses various issues relating to water access in the survey area including the type of water sources used, access to working improved sources in the vicinity, transportation, and cost of water.

Figure 20 shows the distribution of survey participants in relation to their nearest improved working source, including those within a 1km radius of a working source. As can be seen from the map, a large portion of household participants, notably in the west and east of the survey area, are outside of these 1-kilometre catchment areas, a total of 47% of all households surveyed. In addition, approximately half of the working water pumps in the area are within 1 kilometre of the main roads in the region. Interestingly, almost all participants were within a 1 kilometre radius of any improved water source but due to the poor function and lack of maintenance on some of these, several improved water sources remain idle and useless to the community.

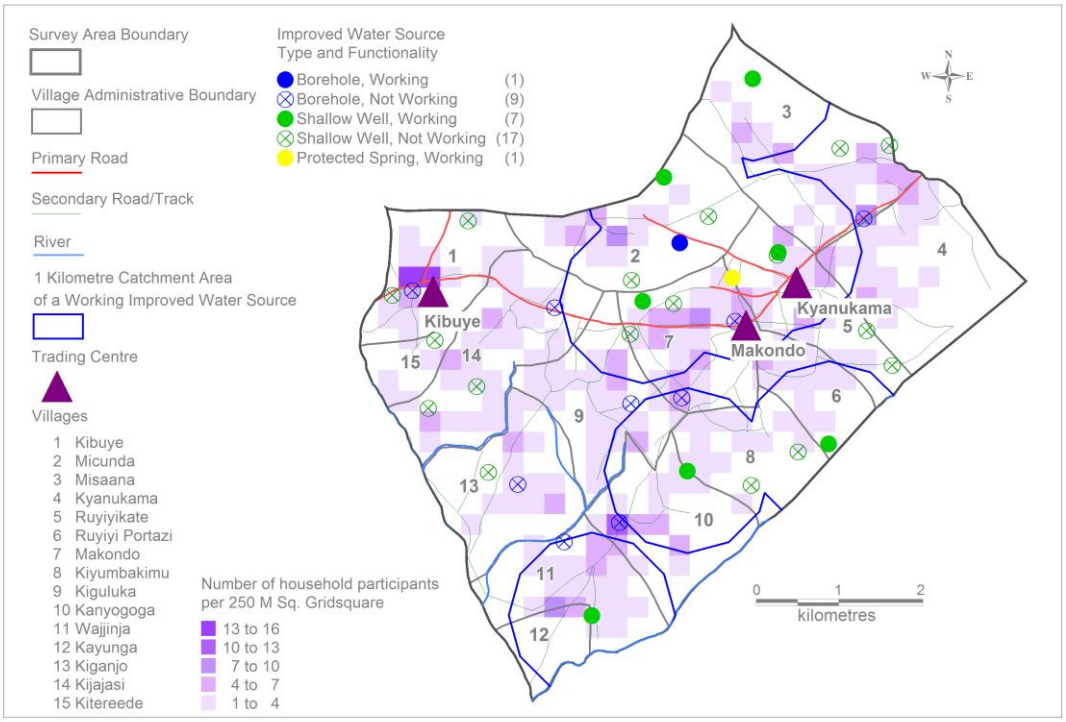

Figure 20 – Map of those households within and outside of a 1km catchment area of working improved water sources

When asked about their water-related expenditures, 60% of respondents indicated that most expenses are generated by the purchase of water storage equipment (see Figure 21). Expenses related to repairing of the pumps ranked second as 39% participants in the survey mentioned having to pay these costs. There were also a significant number (19%) of those surveyed who mentioned they incurred no water-related expense.

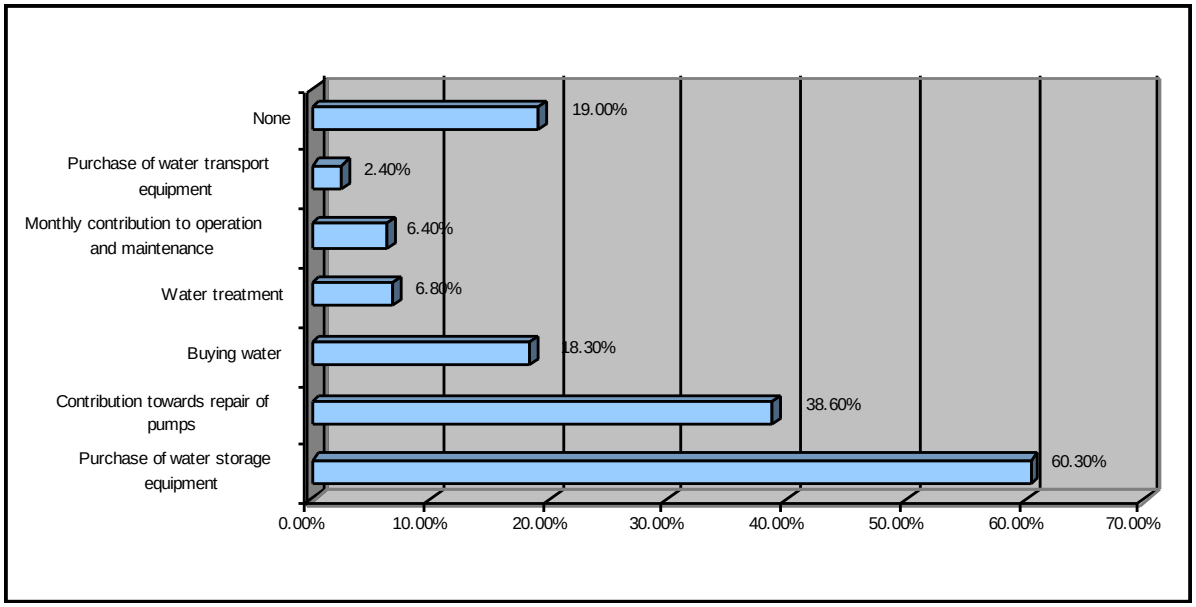

Figure 21 – Forms of water-related expenses (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%).

According to Figure 22, about 40% of all participants in the survey use an unprotected source as their main source of water. A further 26% use mainly a shallow well, while 20% use a borehole/deep well. A small number of respondents also use rain water (9%) and protected spring (5%) as their main water source.

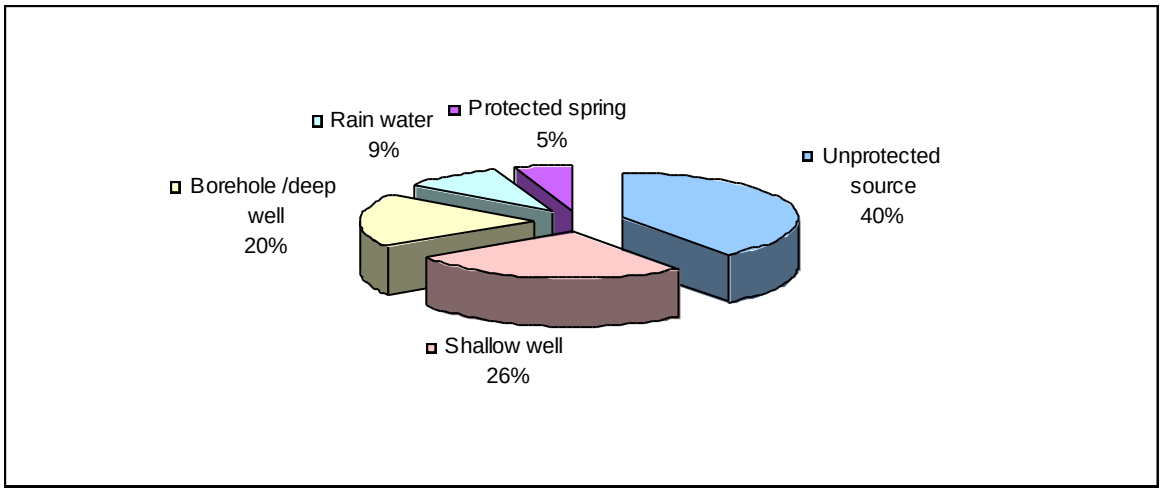

Figure 22 – The main source of drinking water for the household

It appears that the top three reasons for choosing a particular water source are linked to: water quality (54% of respondents), its proximity to the household (38% of respondents), and the ability to obtain the necessary quantity of water from that particular source in order to cover all household's needs (33% of respondents) - see Figure 23.

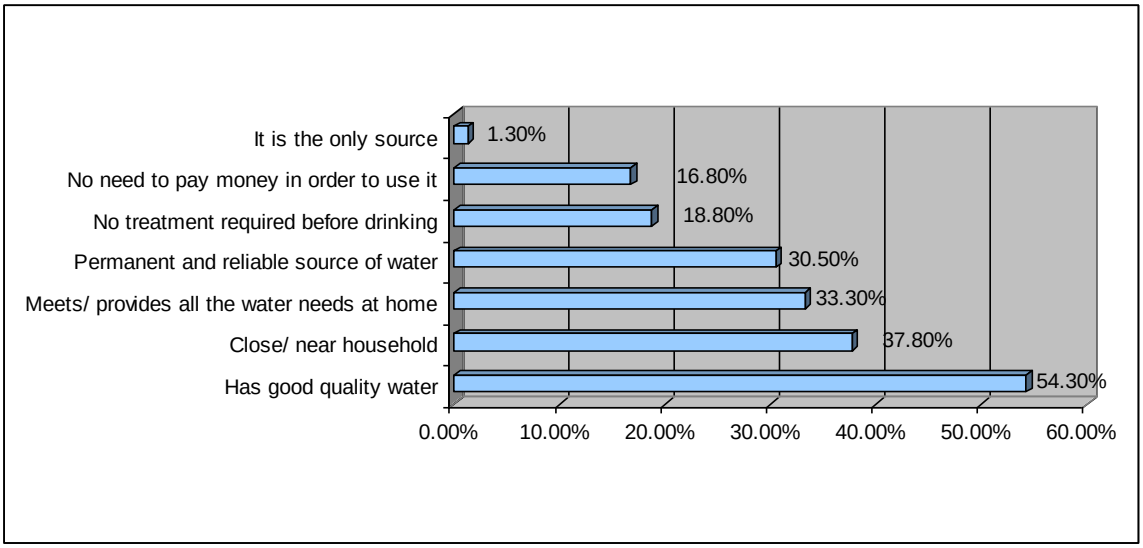

Figure 23 – The reason for choosing the main source for drinking water (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%).

Respondents whose main source of water is an unprotected source mainly use these sources due to the fact that they are permanent and reliable as well as the fact that these sources are providing for all water needs of the home. All other interviewees choose their main water sources based on its perceived quality (see Table 7).

Table 7 – Main source of water used and reason for using it as the main source of water.

	Borehole /deep well	Shallow well	Protected spring	Rain water	Unprotected source
Close/ near household	42.6%	37.1%	31.0%	68.0%	30.0%
Permanent and reliable source of water	21.3%	19.6%	41.4%	8.0%	46.1%
Has good quality water	83.3%	88.1%	75.9%	64.0%	12.4%
Meets/ provides all the water needs at home	20.4%	34.3%	17.2%	12.0%	46.1%
No treatment required before drinking	38.9%	23.1%	41.4%	20.0%	2.8%
No need to pay money in order to use it	3.7%	4.2%	3.4%	24.0%	31.8%
It is the only source	0.0%	0.0%	0.0%	2.0%	2.8%
Total number of respondents	108 (100%)	143 (100%)	29 (100%)	50 (100%)	217 (100%)

* Percentages are calculated out of column totals.

Respondents were asked about the perceived distance to their main water source. (Table 8). Mapping these results shows that many households in the west and east of the survey area, those outside a 1-kilometre catchment area of their nearest working improved water source feel they are walking less than a kilometre to get water from their main source. Potentially these households are not using an improved water source, their perception of distance is tempered by an

abundance of easy terrain, or some of the improved water sources in the area are seasonal in their functionality.

Table 8 – Perceived distance to the main water source

Perceived Distance	Percentage
Less than half a km.	39.5
Almost a km.	38.2
Nearly two km.	14.0
More than two km.	7.0
Not sure	1.3

A map of the distribution of households using an unimproved source as their main water source is given in Figure 24. As expected, the vast majority of such households fall outside a 1-kilometre catchment area of improved water sources in the area, namely in the west and east of the survey area, making up 39% of the entire sample. Interestingly, there are 52 households, almost 24% of those accessing unimproved sources, are living within the 1-kilometre catchments who still choose to use an unimproved source as their main water source.

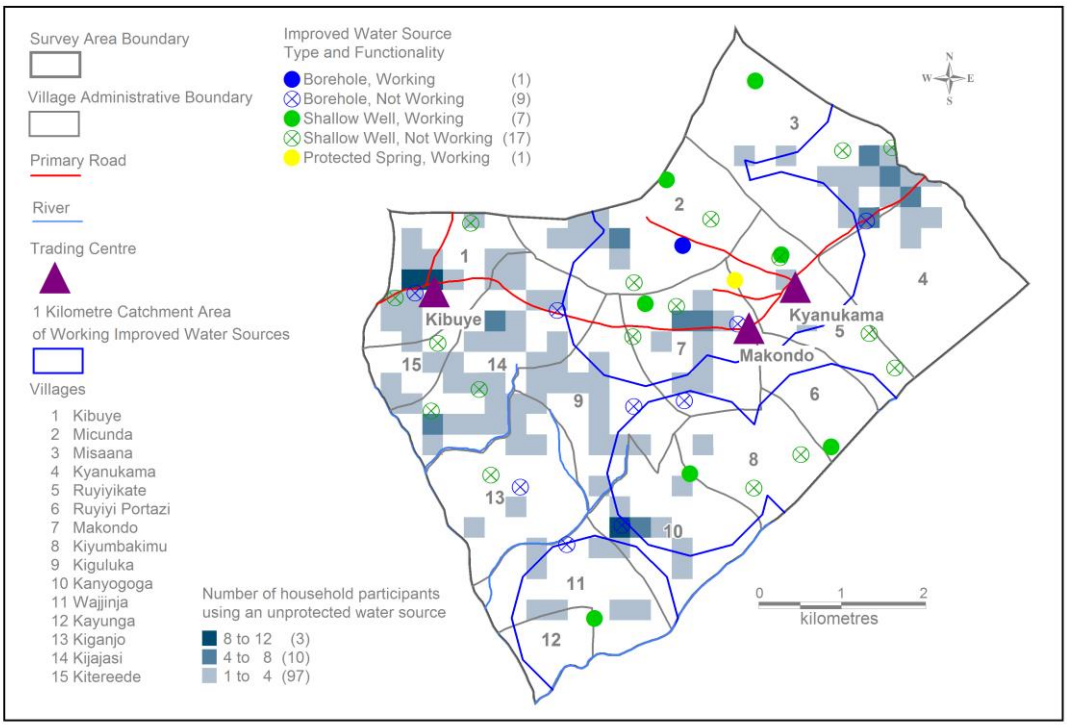

Figure 24 – Map of household participants using an unprotected water source as their main water source

From Figure 25 it appears that 41% of all respondents have encountered significant problems in collecting water from the main water source due to a lengthy distance to it. At the same time, participants in the survey are also concerned about the contamination of the main

water source (30%), congestion of users at the source (28%) and the poor quality of the road (27%).

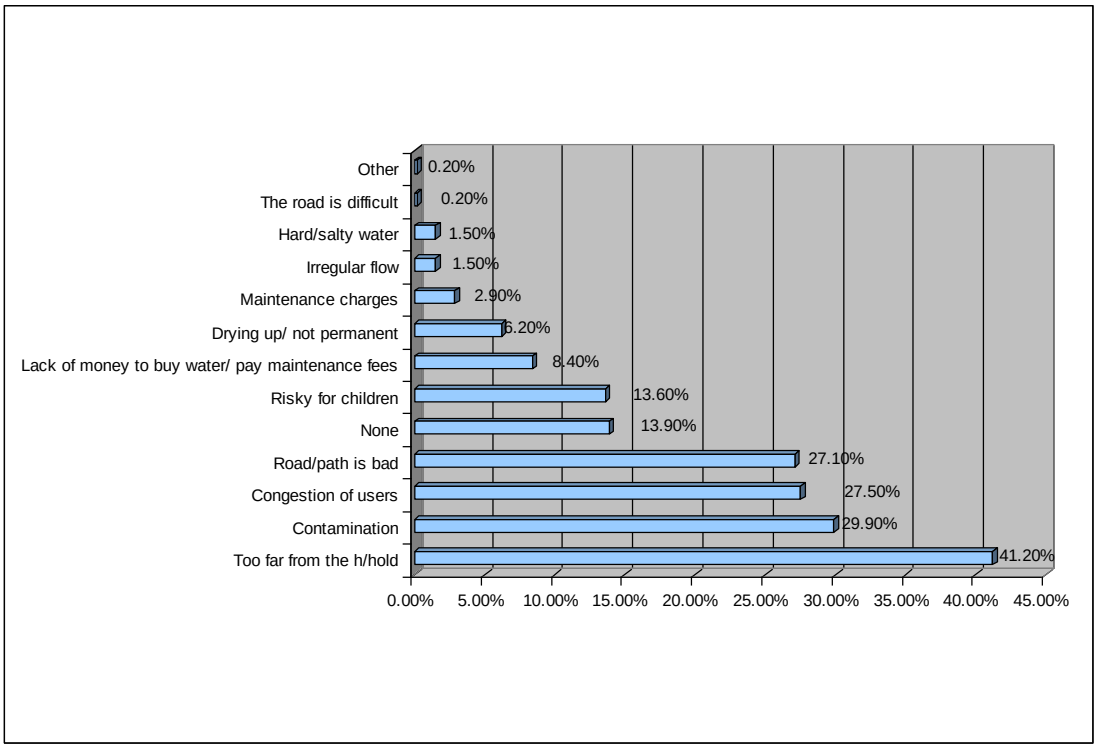

Figure 25 – Major problems in collecting water from the main water source (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%).

Table 9 shows that for those respondents using a protected spring or borehole/ deep well the main problems in using/ collecting water are linked to the distance from the household (48% and 40% respectively). Congestion of users at the source is seen as a problem by those whose main water sources are protected springs (62%), shallow wells (50%) and borehole/deep well (48%). Most of those who get their water mainly from rain collection (53%) mentioned that there are no major problems associated with using and collecting water. In the case of those respondents using an unprotected source, it emerges that most problems are related to contamination of the source (63%), but also its perceived distance from the household (41%) and the poor road or path to access it (36%).

Table 9 - Main source of water used and major problems in using/collecting water.

	Borehole /deep well	Shallow well	Protected spring	Rain water	Unprotected source
None	19.4%	11.9%	10.3%	53.1%	4.1%
Too far from the household	48.1%	39.9%	58.6%	22.4%	40.6%
Road/path is bad	13.9%	25.2%	41.4%	16.3%	35.5%
Risky for children	7.4%	7.7%	10.3%	8.2%	22.1%
Congestion of users	48.1%	50.3%	62.1%	8.2%	1.8%
Irregular flow	1.9%	3.5%	3.4%	0.0%	0.0%
Drying up/ not permanent	1.9%	1.4%	0.0%	2.0%	13.4%
Contamination	5.6%	7.7%	3.4%	18.4%	62.7%
Maintenance charges	6.5%	4.9%	0.0%	4.1%	0.0%
Lack of money to buy water/ pay maintenance fees	13.0%	14.7%	6.9%	6.1%	2.8%
Hard/salty water	0.9%	0.0%	0.0%	2.0%	2.8%
The road is difficult	0.0%	0.0%	0.0%	0.0%	0.5%
Other	0.0%	0.0%	0.0%	0.0%	0.5%
Total number of respondents	108 (100%)	143 (100%)	29 (100%)	49 (100%)	217 (100%)

* Percentages are calculated out of column totals.

In the case of the households which are using an alternative water source, that the main reason for doing so is linked to the ability of the alternative source to cater for all water needs of the household (37% of respondents), followed by its perceived superior water quality in comparison with the main source (33% of respondents). Other key reasons are related to the reliability of the source and its proximity to the home (see Figure 26).

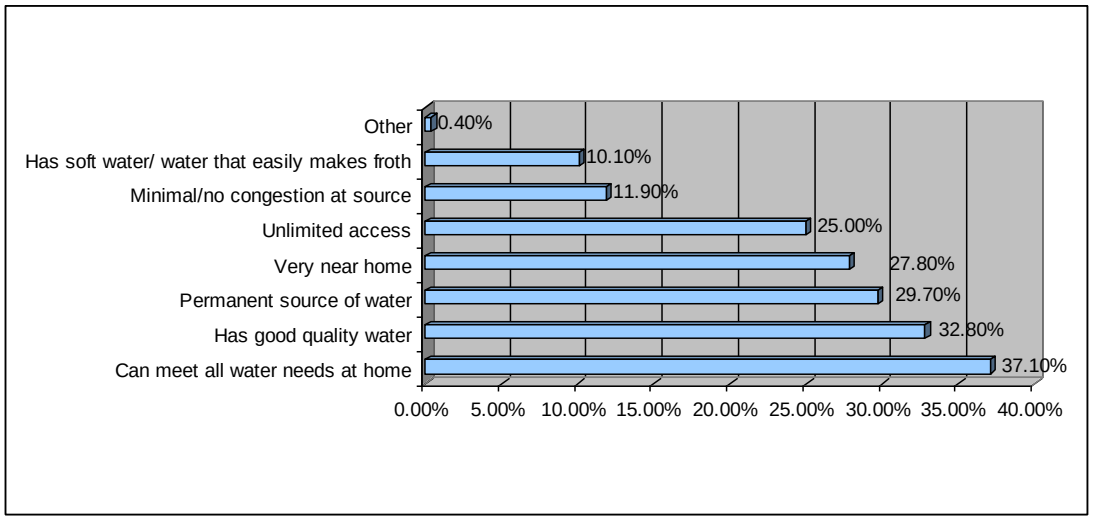

Figure 26 – The reason for using alternative sources (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%).

When asked about the main means of transporting water to their homes, hand/head lifting is by far the preferred method (91% of the total number of respondents), followed by a bicycle (36% of the number of respondents), as seen in Figure 27.

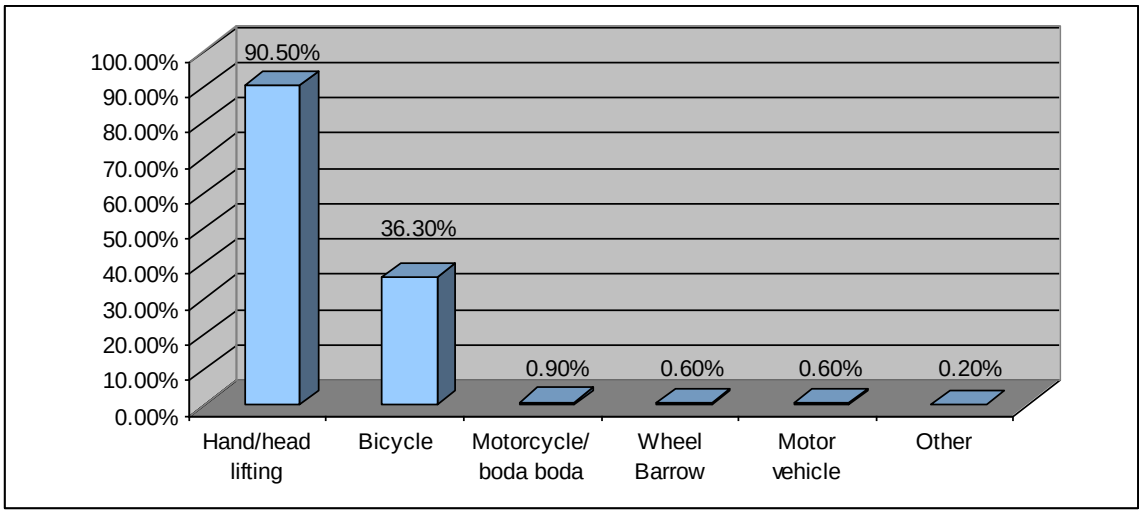

Figure 27 – Type of transport mainly used. (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%)

Almost 73% of respondents find that transporting water is a very tiring process that requires a lot of energy. Bad road terrain and the lengthy time taken to bring water to the household seem to be important sources of problems when transporting water (see Figure 28).

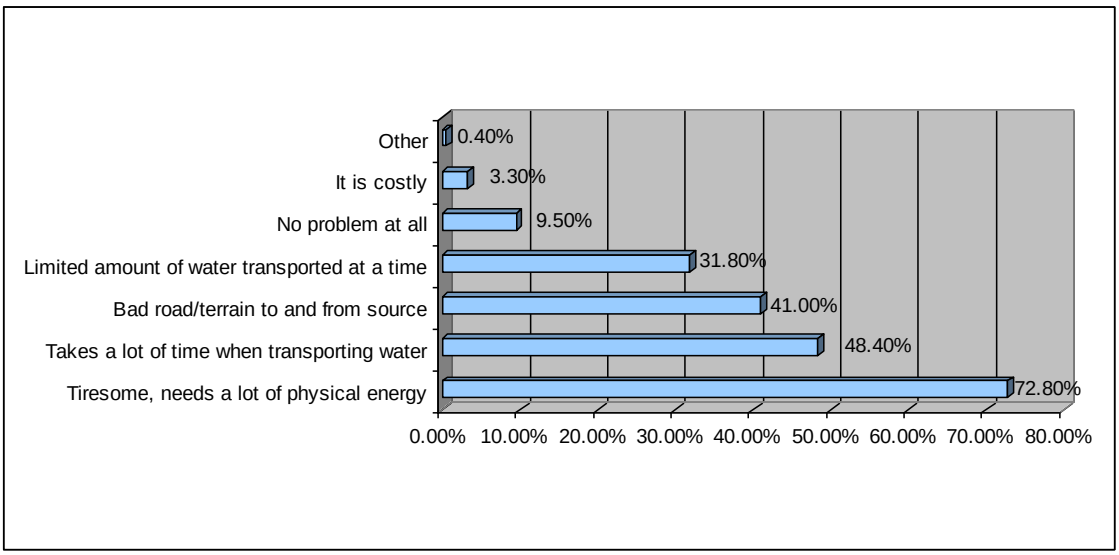

Figure 28 – Problems with the method of transporting water (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%)

As previously stated, most participants in the survey use hand/head lifting and the bicycle as the main forms of transporting water (see Table 10). For both means of transportation, the main challenges in transporting water seem to be related with the amount of physical energy required by carrying out this task, but also the lengthy time needed to fetch the water and the bad road surface/terrain. It is interesting to note that respondents who use motorcycles or motor vehicles also find this activity very tiresome. The recorded count for these categories (motorcycles or motor vehicles) is however very small, thus the findings need to be treated with caution.

Table 10 – Means of transportation and main problems encountered when transporting water

	Bicycle	Hand/head lifting	Wheel Barrow	Motorcycle/ bodaboda	Motor vehicle	Other
No problem at all	9.1%	9.3%	0.0%	0.0%	0.0%	0.0%
Tiresome, needs a lot of physical energy	74.2%	72.8%	66.7%	100.0%	100.0%	100.0%
It is costly	3.0%	3.7%	0.0%	0.0%	33.3%	0.0%
Bad road/terrain to and from source	43.9%	40.8%	100.0%	40.0%	66.7%	100.0%
Takes a lot of time when transporting water	46.5%	49.5%	100.0%	100.0%	33.3%	0.0%
Limited amount of water transported at a time	30.8%	32.3%	0.0%	0.0%	0.0%	0.0%
Other	1.0%	0.2%	0.0%	0.0%	0.0%	0.0%
Total number of respondents	198 (100%)	493 (100%)	3 (100%)	5 (100%)	3 (100%)	1 (100%)

*The total number of respondents who answered both questions is 545.
**Percentages are calculated out of column totals.
*** Given the fact that both questions allowed for multiple answers, the sum of the counts of each column exceeds 545 – the total number of respondents who answered both questions

Most respondents (45%) seem to use one to three jerricans of water per day on average, while a further 44% use between four and six jerricans per day in their households (see Figure 29).

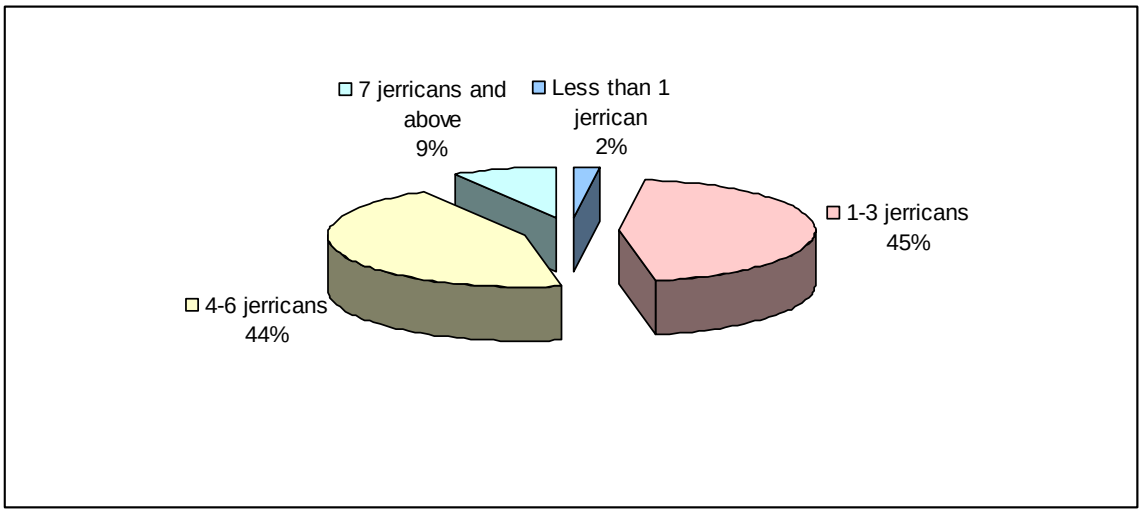

Figure 29 –Jerricans are used on average per day in the household

Less than a third of respondents buy water from water vendors, with the majority of this third doing so only in the dry season (see Figure 30).

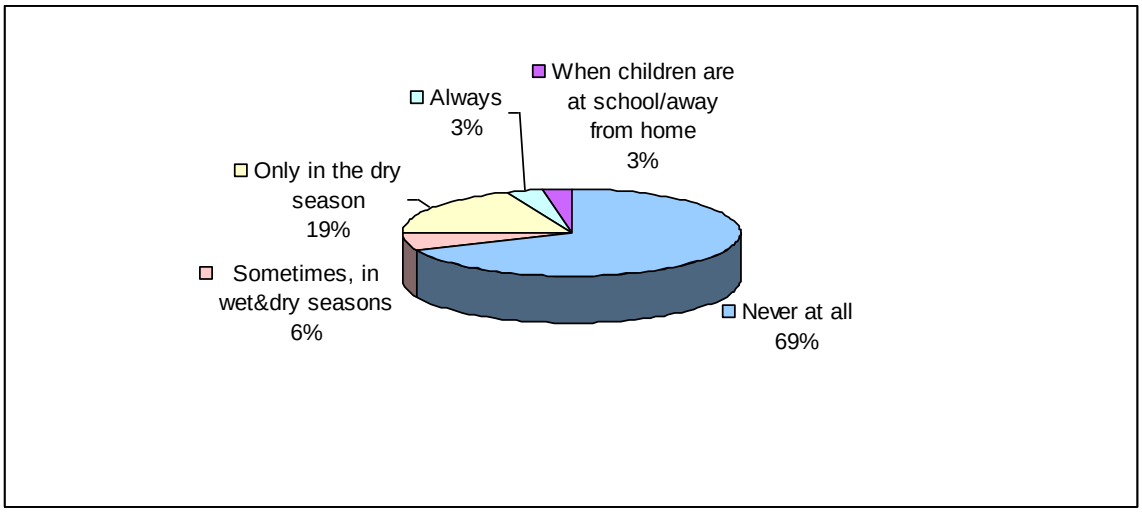

Figure 30 – Buying water from the water vendors

When asked about the qualities which they would like to see in a water source (see Figure 31), most respondents referred to the clean and safe quality of the water (70% of respondents), while 56% of all participants in the survey would like to have access to an improved water source and 53% would like the source to be closer to home.

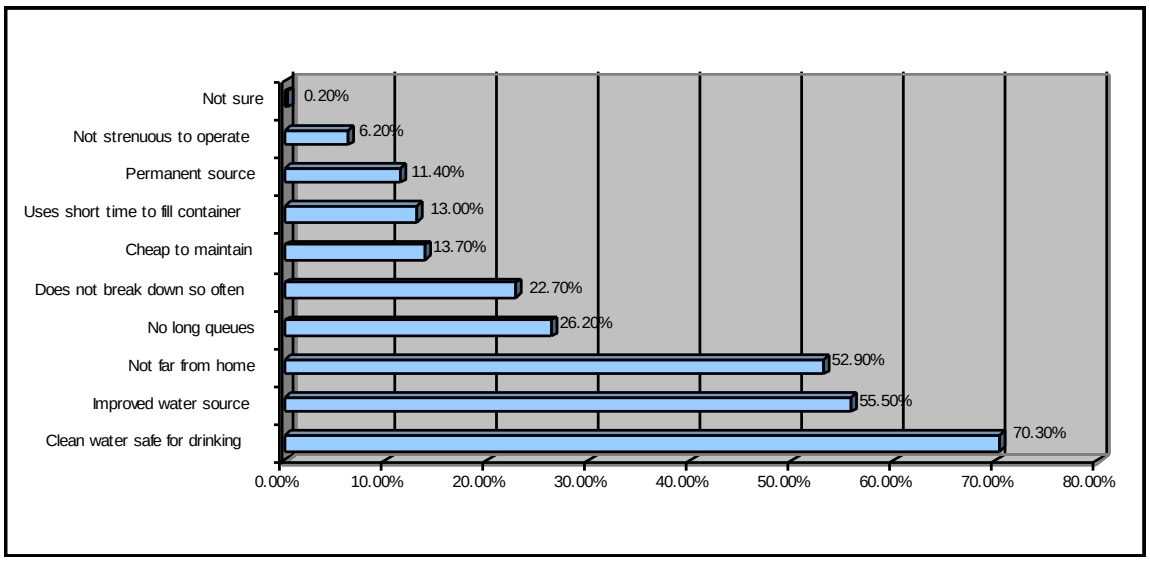

Figure 31 – Qualities you would like to see in the water source (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%)

5: Health and Water

This section discusses the responses to various health-related questions posed in the survey, including types of disease suffered, cost to the household of these diseases, and steps taken to mitigate against water-related disease.

The survey found that 88% of respondents mention that their main strategy for ensuring that the water they use in the household is safe is to boil it. A considerable number of respondents also indicate that they ensure that water is kept in well-cleaned containers (57%) and that they clean these containers regularly (46%) (see Figure 32).

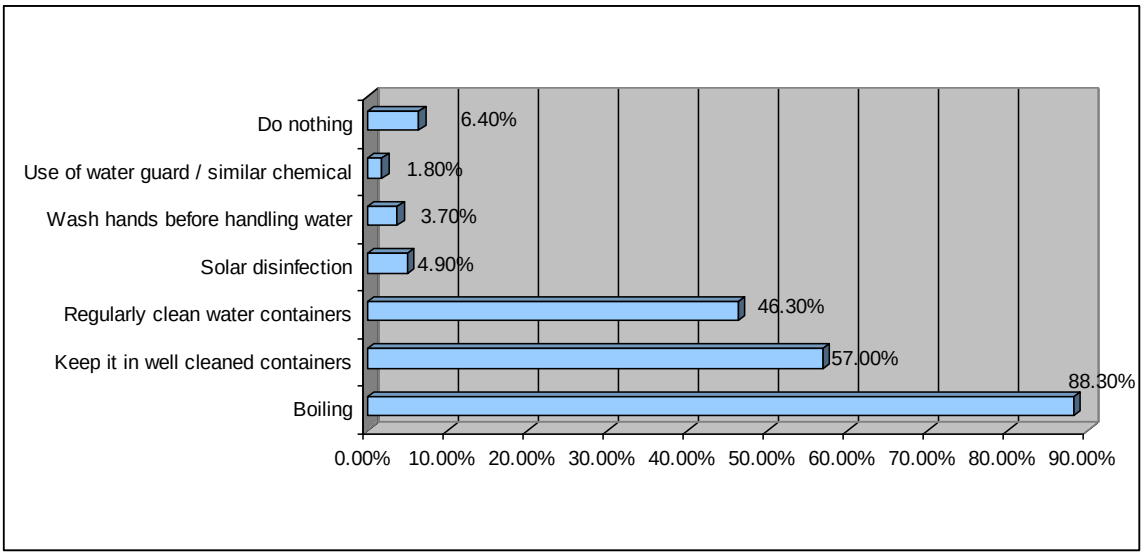

Figure 32– Methods of ensuring water is safe. (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%)

No clear pattern of distribution in responses emerges from cross-tabulating the main source of drinking water and the strategies employed by respondents in order to ensure that water is safe (see Table 11).

Table 11 – Main source of water and ensuring water is safe

	Borehole /deep well	Shallow well	Protected spring	Rain water	Unprotected source
Boiling	88.0%	90.2%	96.6%	98.0%	83.9%
Use of water guard / similar chemical	1.9%	1.4%	0.0%	2.0%	2.3%
Keep it in well cleaned containers	64.8%	53.1%	79.3%	56.0%	53.0%
Wash hands before handling water	5.6%	3.5%	0.0%	0.0%	4.1%
Regularly clean water containers	50.9%	50.3%	41.4%	52.0%	40.6%
Solar disinfection	2.8%	3.5%	3.4%	8.0%	6.5%
Do nothing	4.6%	5.6%	0.0%	2.0%	9.7%
Total number of respondents	108 (100%)	143 (100%)	29 (100%)	50 (100%)	217 (100%)

*Percentages are calculated out of the column totals

Of the total number of households included in the survey it appears that 76% have experienced malaria, 42% have had at least one family member who suffered from stomach aches, while the incidence of diarrhoea is also notable (37% of households). The question allowed for multiple answers, hence the sum of percentages for each disease exceeds 100%.

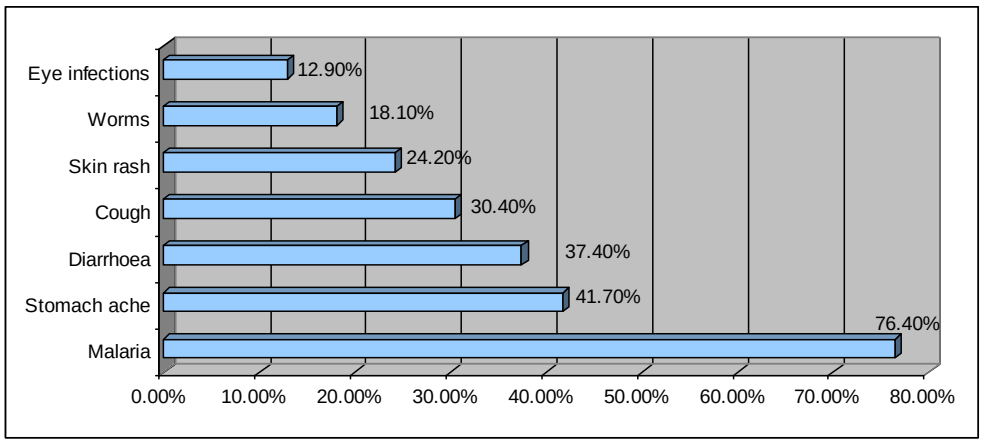

Figure 33 – Diseases suffered by at least one member of the household

Household participants provided information on a variety of water-related diseases experienced by at least one household member over the year prior to the survey being undertaken in 2011. Diarrhoea and worms are two common problems resulting from the use of bad quality water. Interestingly, when mapping the distribution of household participants who had suffered from these diseases, 119 households and 52 households respectively, there is no marked spatial trend between households within or outside the 1-kilometre catchment areas for improved water sources. Neither is there a distinct trend of these diseases displayed for those who state they use unprotected water sources as their main water source. A comparison of diarrhoea rates across villages is shown below in Figure 34. The central villages around Kiyumbakimu have experienced the highest proportion of participant households experiencing these diseases.

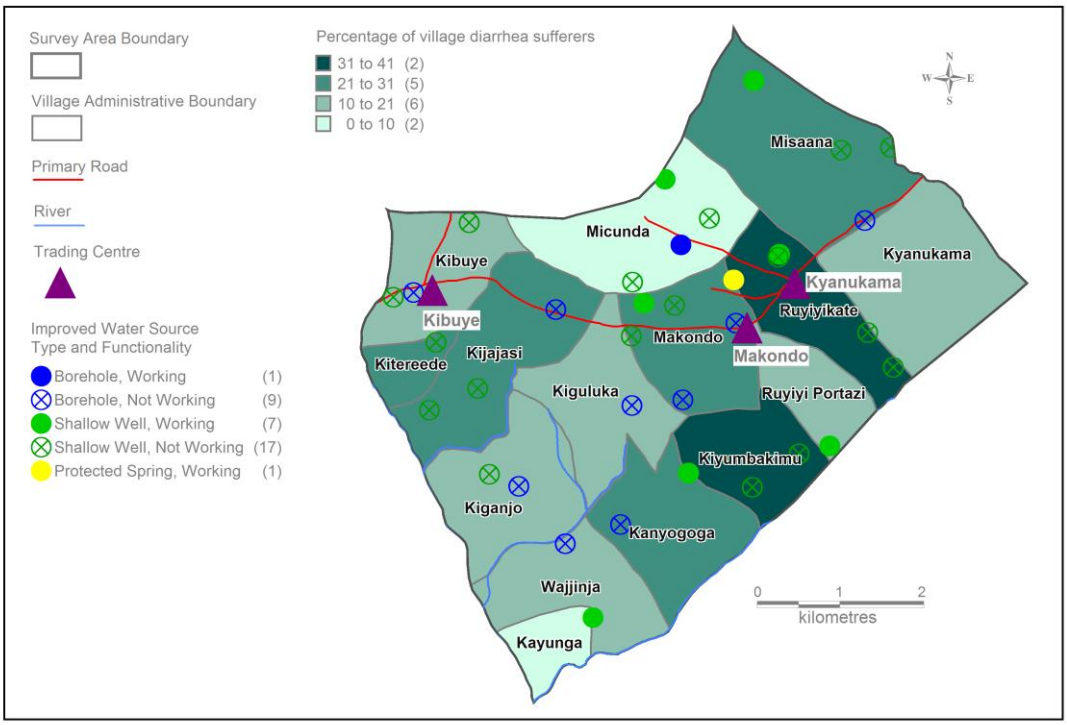

Figure 34 – Map of village rates of diarrhoea as a proportion of total village population

As seen from Figure 35, water-related diseases seem to have a significant impact on the household with 67% of respondents indicating that these diseases have increased their usual household expenditure. In addition to this aspect, water-related diseases also have an impact on school attendance (for 43% of the households) and on income (due to diminished family labour) (for 38% of the households).

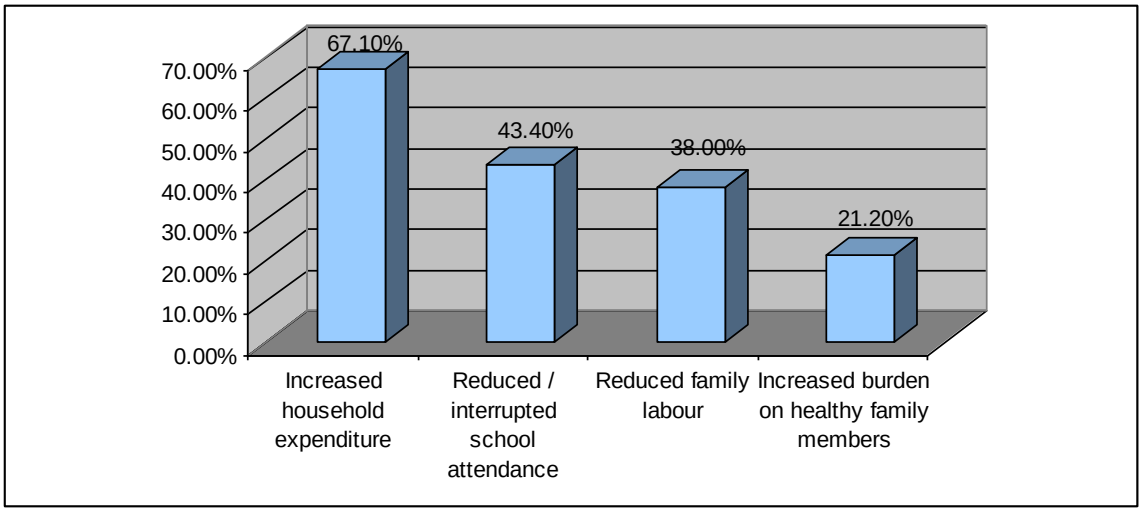

Figure 35 – How are water-related diseases affecting the household? (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%)

In order to cope with the burden of the expenses incurred following a water-related disease, most households have had to forfeit food (41% of respondents), clothing (17%) and education (15%). A considerable percentage of respondents (41%) also mentioned that they could not remember what expenses they had to forfeit.

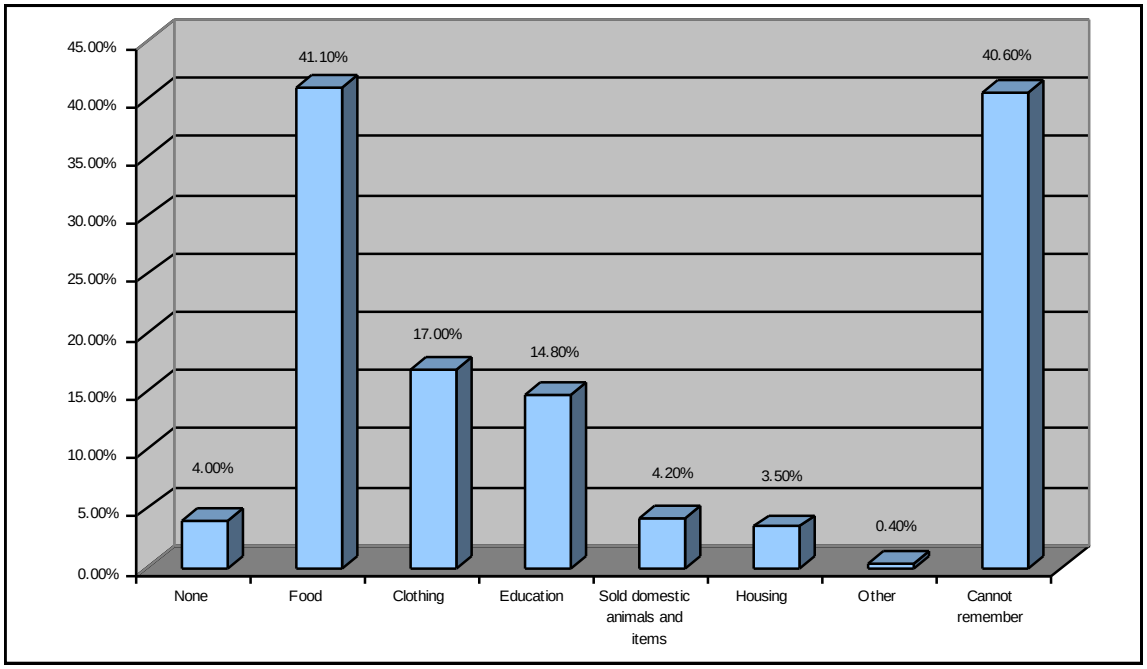

Figure 36 – Forfeited expenditure in order to treat disease. (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%)

It appears however that the general perception of participants in the survey is that the trend in prevalence of diseases in the household is decreasing (see Figure 37)

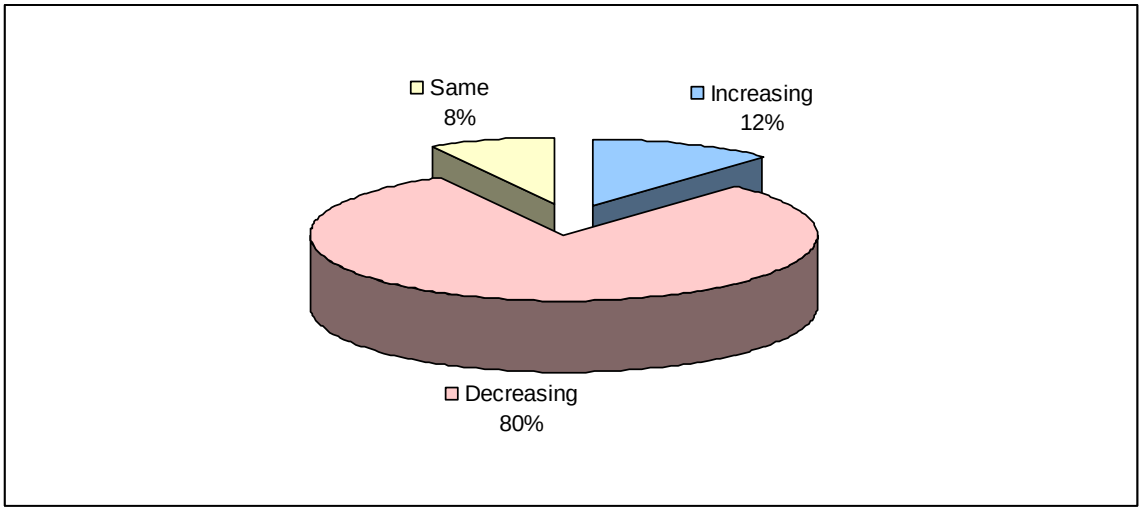

Figure 37 – Trend in prevalence of diseases in the household.

Referring to the benefits of using clean and safe water in the household, most respondents (90%) felt that improved health of the household members and a reduction in the number of diseases is of paramount importance. Furthermore 30% of interviewees also highlighted that

cleaner and safer water would boost the usage and consumption level of water in the home (see Figure 38).

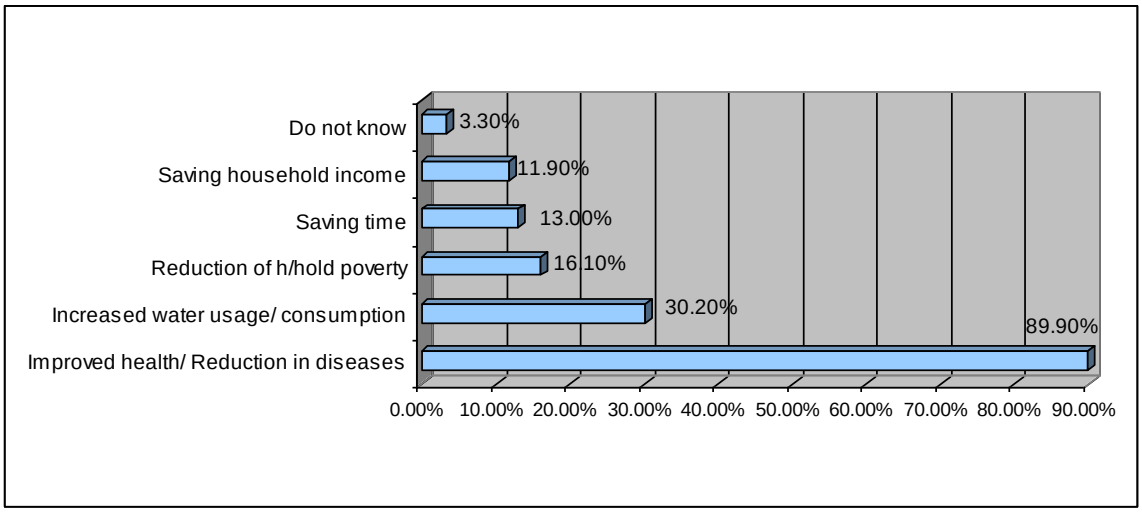

Figure 38 - Benefits of using clean and safe water. (Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%)

Figure 39 highlights that many respondents (40%) cannot remember the overall amount spent for treating diseases in the household. Of the remaining households, a majority (32%) have spent between 10,000-50,000 UGX on treating diseases.

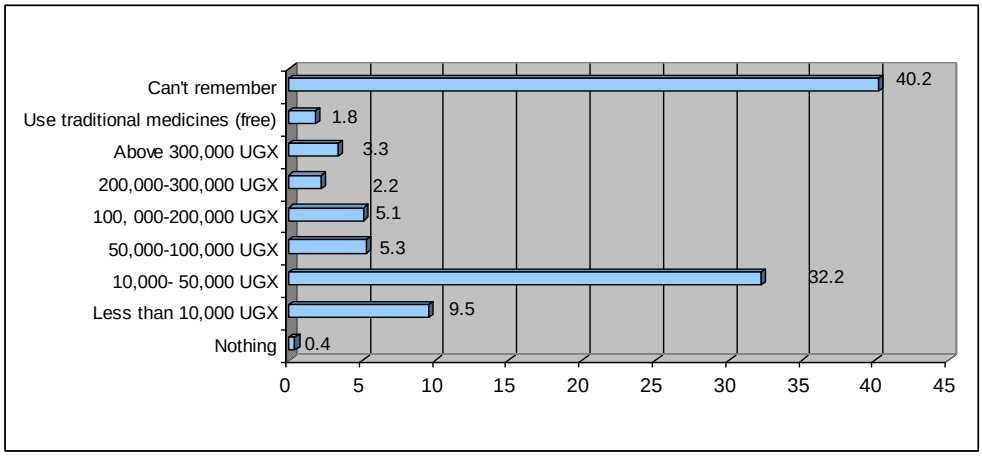

Figure 39 – Household expenses on treating diseases in the last year

There is no clear pattern emerging from the cross-tabulation of the types of diseases experienced by the household and the effects which each disease has on the household (Table 12).

Table 12 – Disease affecting the household and effect on the household.

	Diarrhoea	Stomach ache	Cough	Worms	Eye infections	Skin rash	Malaria
Increased household expenditure	68.6%	69.5%	66.3%	56.9%	52.6%	51.9%	69.8%
Reduced family labour	38.8%	42.0%	36.7%	39.7%	39.5%	39.0%	36.4%
Reduced / interrupted school attendance	49.6%	39.7%	54.1%	55.2%	36.8%	54.5%	46.3%
Increased burden on healthy family members	24.0%	20.6%	30.6%	27.6%	18.4%	19.5%	22.3%
Total number of respondents	121 (100%)	131 (100%)	98 (100%)	58 (100%)	38 (100%)	77 (100%)	242 (100%)

* The total number of respondents who answered both questions is 315.
** Percentages are calculated out of column totals.
*** Given the fact that both questions allowed for multiple answers, the sum of the counts of each column exceeds 315 – the total number of respondents who answered both questions)

No clear pattern of distribution could be identified in Table 13 which presents the cross-tabulation between the type of disease suffered by household members and the level of disease-related expenses. The relation between these two variables may be influenced by the fact that some diseases are more contagious, therefore affecting more household members and, as a consequence, increasing the overall level of medical expenses paid by the household.

Table 13 – Disease affecting the household and household expenses for treating the disease

	Diarrhoea	Stomach ache	Cough	Worms	Eye infections	Skin rash	Malaria
Nothing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
Less than 10,000 UGX	8.2%	14.0%	14.1%	15.3%	11.9%	16.5%	10.4%
10,000- 50,000 UGX	61.5%	53.7%	51.5%	50.8%	50.0%	55.7%	56.6%
50,000-100,000 UGX	9.8%	9.6%	11.1%	10.2%	7.1%	5.1%	10.0%
100, 000-200,000 UGX	9.0%	8.1%	7.1%	5.1%	9.5%	8.9%	8.4%
200,000-300,000 UGX	1.6%	2.9%	3.0%	1.7%	2.4%	5.1%	4.4%
Above 300,000 UGX	9.8%	8.1%	9.1%	15.3%	11.9%	6.3%	6.4%
Use traditional/indigenous medicines that are free/not paid for	0.0%	3.7%	4.0%	1.7%	7.1%	2.5%	2.8%
Total number of respondents	122 (100%)	136 (100%)	99 (100%)	59 (100%)	42 (100%)	79 (100%)	249 (100%)

* The total number of respondents who answered both questions is 326
** Percentages are calculated out of column totals.
*** Given the fact that the variable "type of disease" (represented on the column) allowed for multiple answers, the sum of the counts of each column exceeds 326 – the total number of respondents who answered both questions)

Table 1 indicates that respondents in households who have suffered from worms and eye infections are more likely than others to perceive that there has been an increase in the number of diseases suffered by members of their household.

Table 14 – Disease affecting the household and trend in the prevalence of the disease

	Diarrhoea	Stomach ache	Cough	Worms	Eye infections	Skin rash	Malaria
Increasing	14.0%	15.7%	18.8%	20.3%	19.5%	9.0%	12.2%
Decreasing	77.7%	78.4%	77.1%	78.0%	73.2%	79.5%	78.0%
Same	8.3%	6.0%	4.2%	1.7%	7.3%	11.5%	9.8%
Total number of respondents	121 (100%)	134 (100%)	96 (100%)	59 (100%)	41 (100%)	78 (100%)	246 (100%)

* The total number of respondents 322.
** Percentages are calculated out of column totals.
*** Given the fact that the variable "type of disease" (represented on the column) allowed for multiple answers, the sum of the counts of each column exceeds 322 – the total number of respondents who answered both questions)

6: Household Water Usage

This section looks briefly at the decision making process around water-use in the household.

A total of 87% of respondents mention that they are always satisfied with the way water is used in their household, with a further 7% highlighting that they are somewhat satisfied (see Figure 40). There are also a percentage of respondents (6%) who mentioned that they are never satisfied with this aspect.

Almost the same distribution of answers is noted from the question related to conflicts or disagreements over the use of water in the household (see Figure 41): 89% respondents mentioned they have never experienced this situation and 11% have sometimes experienced conflict over the usage of water in the home.

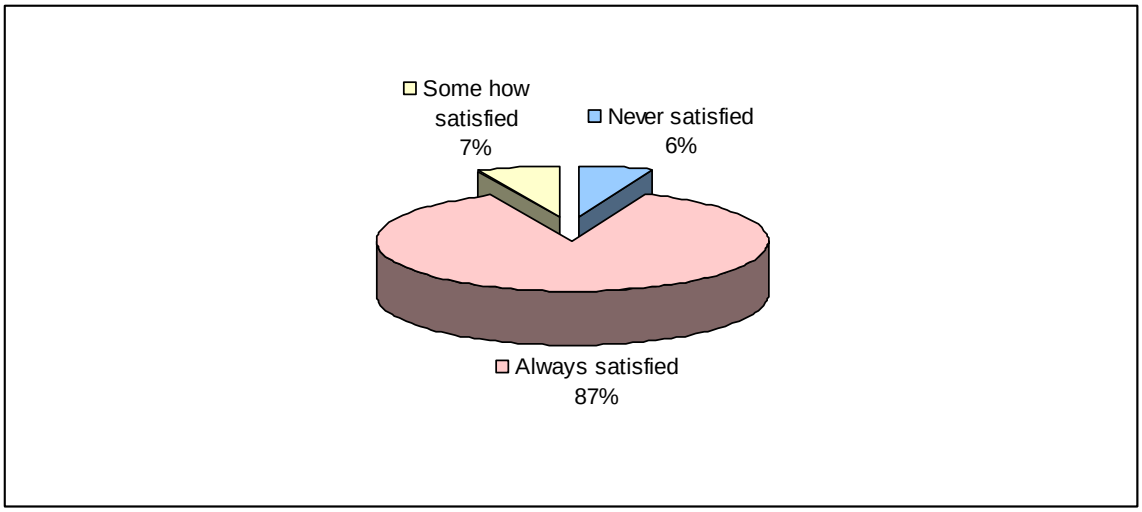

Figure 40 – Satisfaction with the way water is used in the household

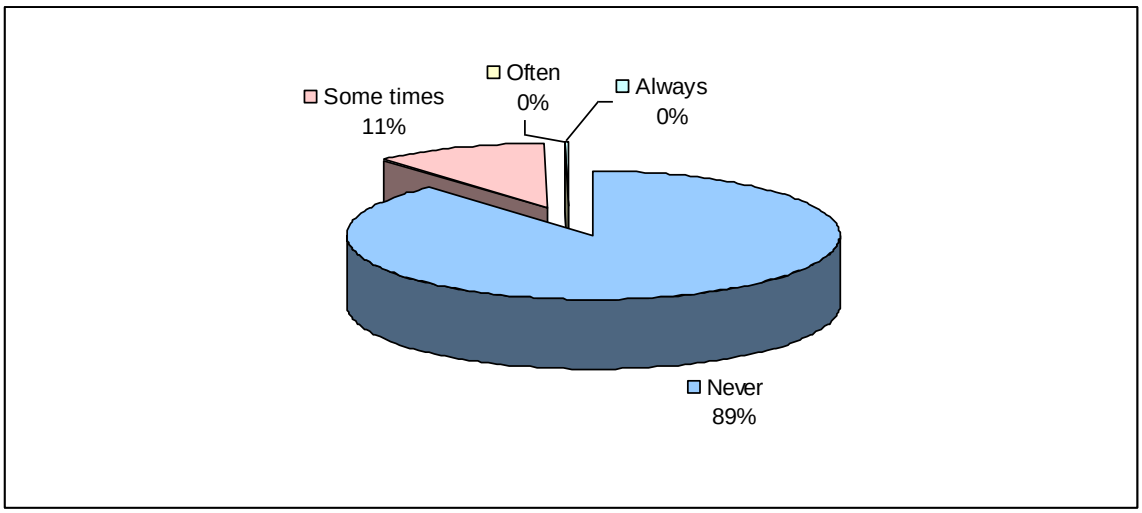

Figure 41- Frequency of disagreements over the way water is used in the household

Among those respondents who mentioned that they are not entirely satisfied with the way the water is used in the household, 62% feel that the usage of water in the home burdens those fetching the water. 42% of participants in the survey also say that there is a lot of water wastage in the home.

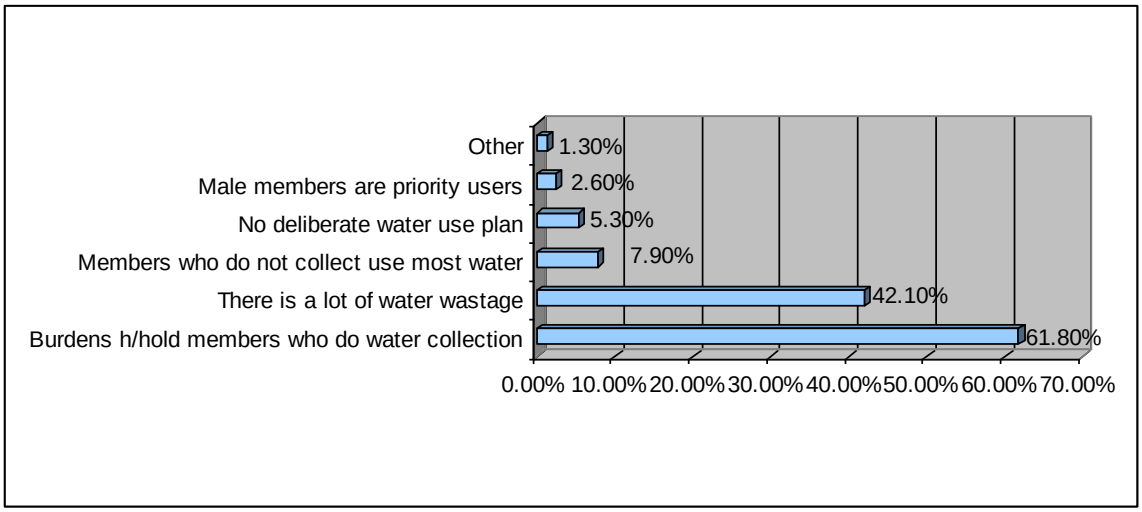

Figure 42 – Reason for not being satisfied with the way water is used in the household (Percentages are calculated out of the total of respondents who mentioned that they are not entirely satisfied with the way the water is used in the household. Given the fact that this question allowed for multiple answers, the sum of percentages for each option exceeds 100%)

Survey data presented in Figure 43 indicate that in 77% of the situations, adult females in the household are making the decisions in relation to how the water is allocated. Only in 11% of households is this decision made democratically, involving all household members.

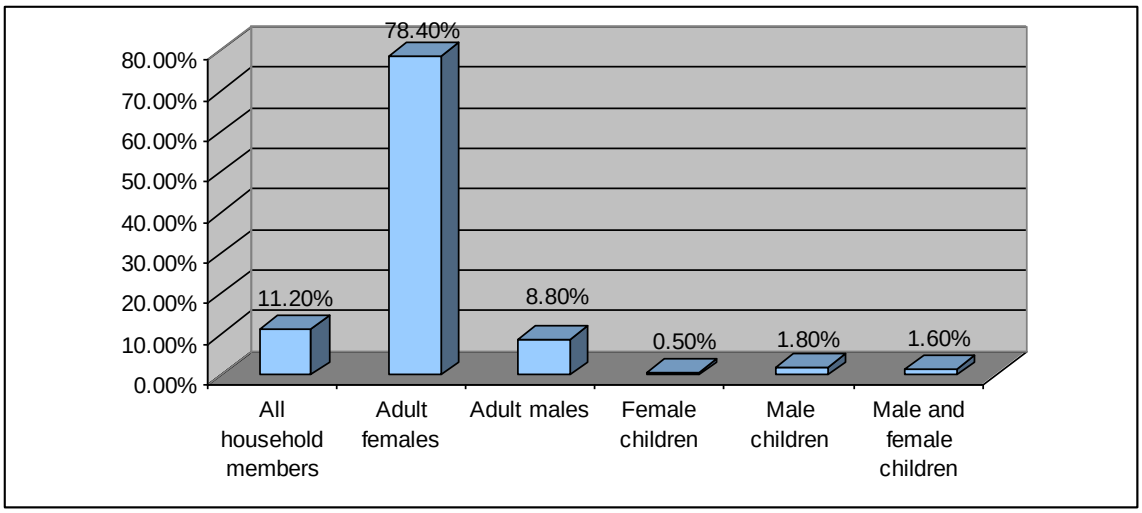

Figure 43 – The person in charge of making decision in relation to how water is used in the household

7: Safe Water Services and Programmes

This section assesses household perceptions around safe water provision in their locality and their involvement in securing these services.

The majority of respondents (96%) rate the provision of clean and safe water as a top priority (Figure 44).

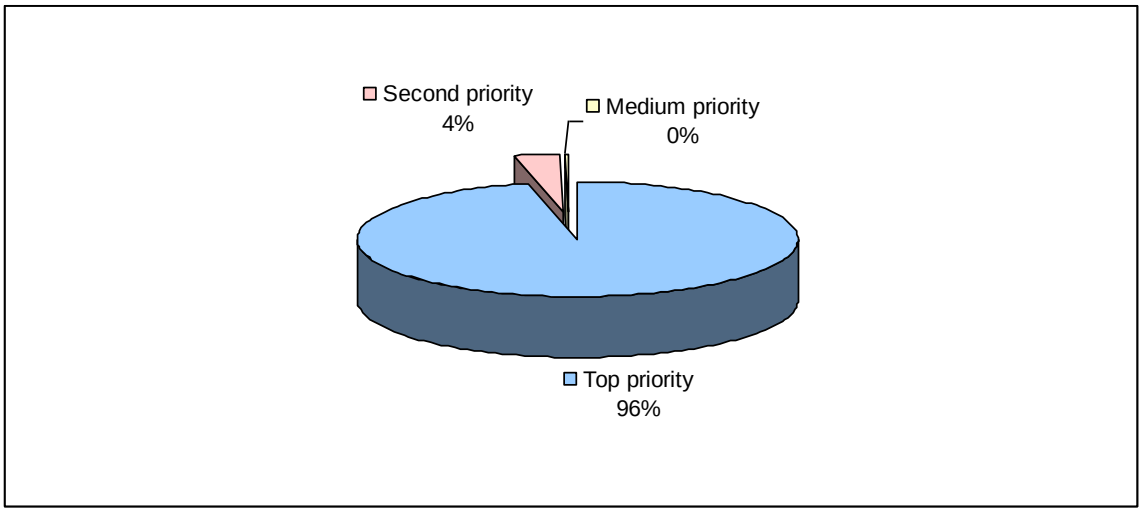

Figure 44 – Ranking of household needs

More than half of participants rate the delivery of safe water services in their community as either fairly good (38%) or good (14%) – see Figure 45. Furthermore, according to Figure 46 almost 54% of respondents rate the delivery of safe water programmes in their community as fairly good or good.

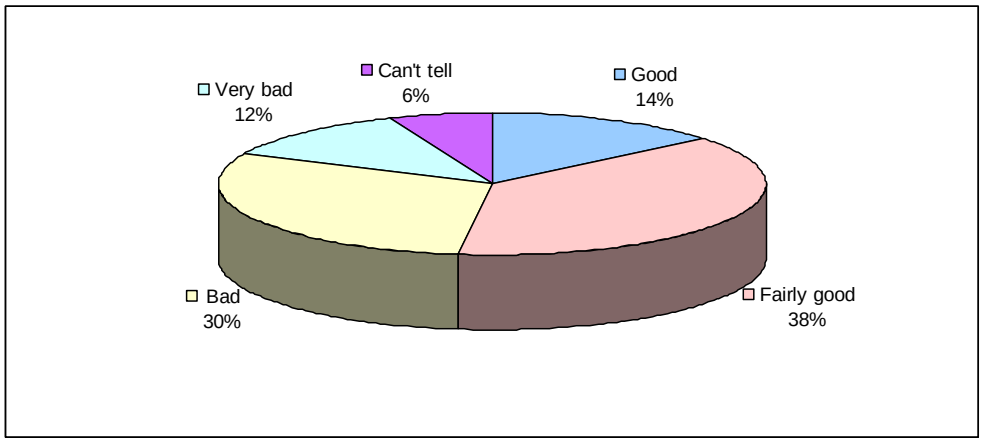

Figure 45 – Rating for the delivery of safe water service

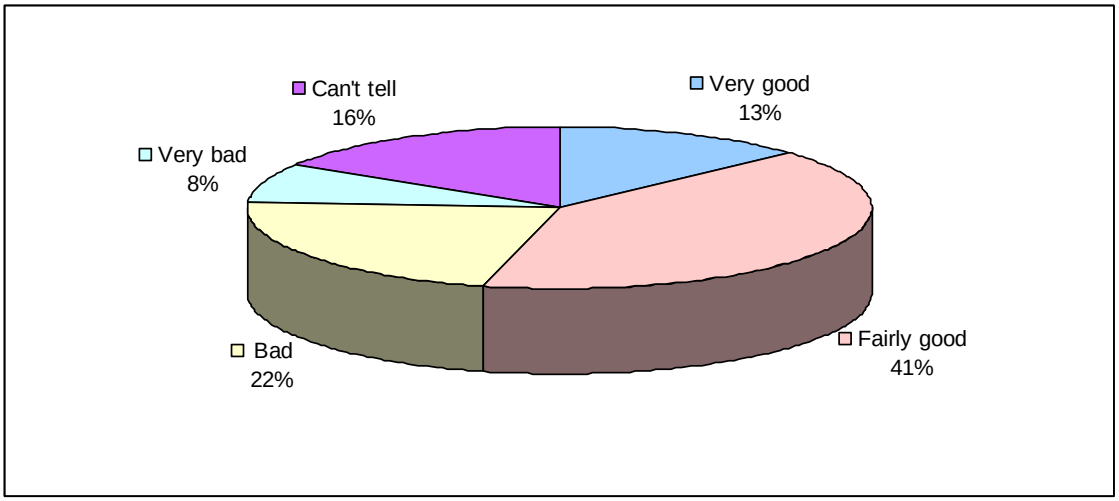

Figure 46 – Rating for the delivery of safe water programmes in their community

In Figure 47, the number of houses per 250 metre square grid-square who answered that safe water provision in their community was “Bad” or “Very bad” has been mapped. From looking at the map, it is clear that a substantial number of households falling within the 1-kilometre catchment area of a working improved water source still feel that safe water is not being provided for in their community.

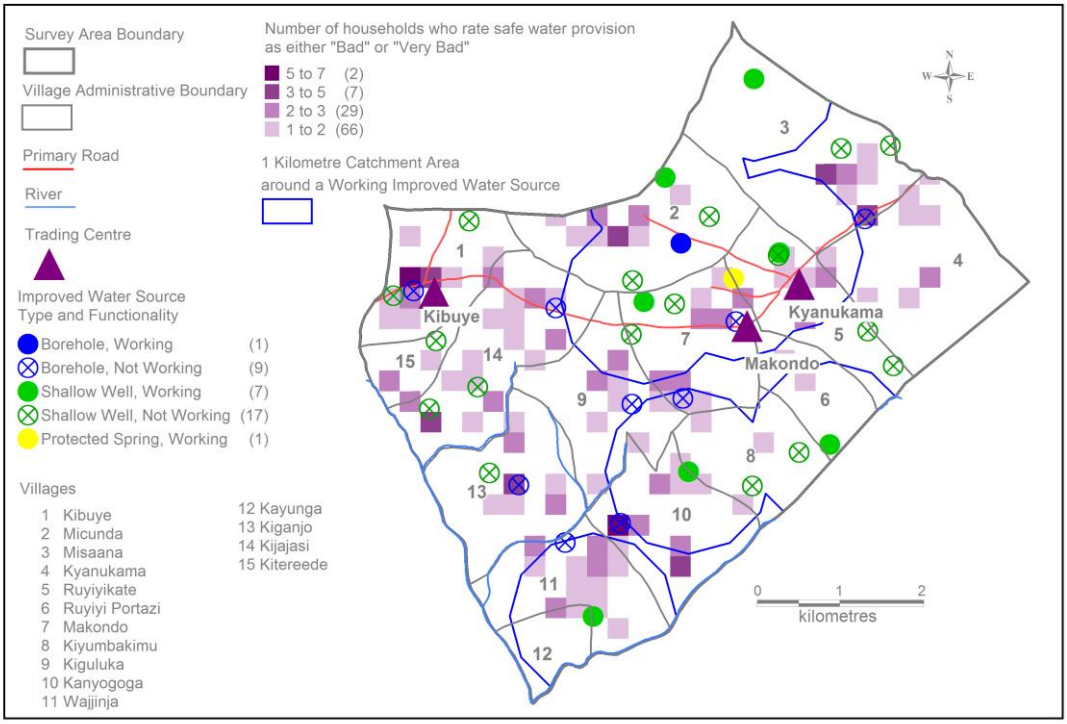

Figure 47 – Map of those who rated “Bad” or “Very bad” to the provision of safe water in their community

People who rate these services as “Bad” and “Very bad” mainly justify their opinion by referring to the lengthy response time in case of a breakdown. Those who rate these services as

"good" and "very good" mention that the reduction in the water-borne diseases is the most important reason for their rating (see Table 15).

Table 15 – Rating the safe water service delivery and reasons for doing so

	Good	Fairly good	Bad	Very bad	Can't tell
Breakdowns take long to be repaired	4.1%	29.5%	56.8%	54.4%	0.0%
Water user committees inactive/inexistent	0.0%	13.0%	19.1%	17.6%	0.0%
Mandatory monthly financial contributions	2.7%	2.9%	4.9%	1.5%	0.0%
Conflict in management of the source	0.0%	2.4%	2.5%	7.4%	0.0%
Breakdowns are always repaired in time	33.8%	24.2%	1.2%	0.0%	0.0%
Reduction in waterborne diseases	64.9%	49.3%	1.9%	4.4%	0.0%
Participation of water users in service delivery	32.4%	20.8%	20.4%	14.7%	38.5%
Conflicts over water use are common	0.0%	1.9%	5.6%	2.9%	7.7%
Takes a short time to collect water	14.9%	12.1%	1.9%	2.9%	0.0%
Alternative water sources	16.2%	12.6%	4.3%	4.4%	30.8%
Water User Committee not transparent in fees collected	2.7%	7.7%	11.7%	17.6%	23.1%
Total number of respondents	74 (100%)	207 (100%)	162 (100%)	68 (100%)	13 (100%)

*Total number of respondents for the two questions is 524

Those who are happy with the water delivery programmes in their community mentioned that they appreciate the fact that they are involved throughout the planning services and in the decision-making process (see Table 16).

Table 16 – Rating the safe water delivery programmes and reasons for doing so

	Good	Fairly good	Bad	Very bad	Can't tell
Not involved at all	1.4%	5.4%	37.5%	33.3%	39.1%
Only involve few members of the community	13.9%	21.2%	28.3%	23.1%	4.7%
Involved throughout all planning meetings	70.8%	59.9%	11.7%	20.5%	20.3%
Our views are considered in all decision making	72.2%	63.5%	3.3%	5.1%	10.9%
Water user meetings not held	1.4%	7.2%	43.3%	46.2%	29.7%
Total number of respondents	72 (100%)	222 (100%)	120 (100%)	39 (100%)	64 (100%)

* Total number of respondents for the two questions is 517.

When asked about the financial contribution made by their household towards the operation, maintenance and repair of their water source, 20% of respondents mentioned that they

had never made such a contribution. 22% of respondents have made a financial contribution in the last few months, while a further 22% have made a payment in this respect in the last year (see Figure 48).

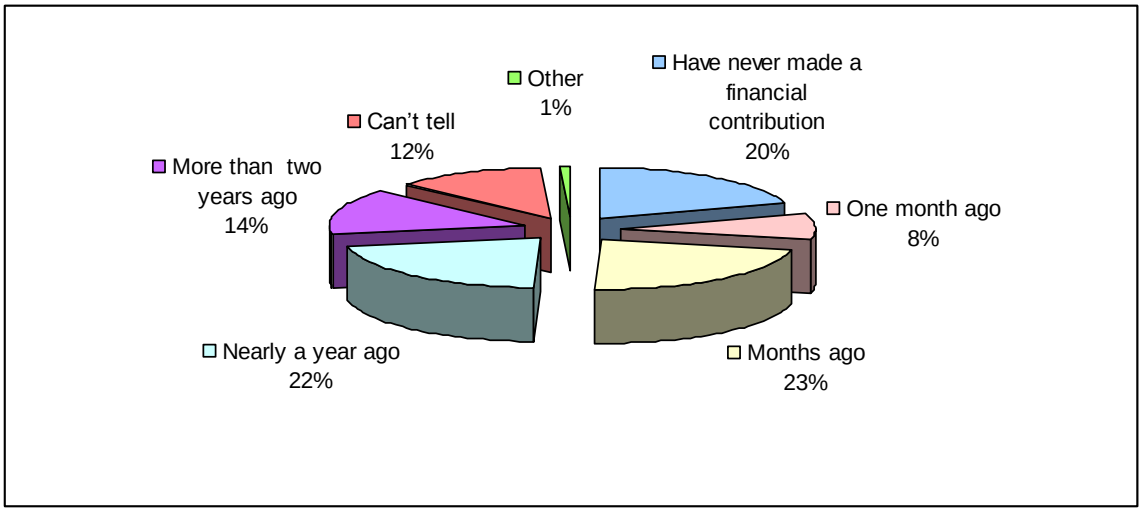

Figure 48 – The last time when the household made a financial contribution towards the operation, maintenance or repair of your water source.

Conclusions

This report presented findings from a survey carried out in all 15 villages of the Makondo Parish, Lwengo District, Uganda during September and November 2011.

The opening section of the report provides a broad overview of the key aims and major themes of the survey as well as the main challenges involved in the process of data collection (***Introduction***). The report then sets out to present several important issues related to survey sampling as well as the preparation of data for statistical and GIS analysis (***Methodology***). This section reveals that while in total, 606 households participated in the survey (equating to approximately 35% of the households in the survey area), following the process of removing the problematic, erroneous cases (such as those having missing or incorrect GPS co-ordinates) from the database, a total number of 547 respondents (households) remained in the sample.

Given the nature of the survey's questions and the type of information collected, many of the advanced statistical procedures were not an option for this report. Hence a number of frequency tables and cross-tabulations were produced in order to produce a broad view of the profile of respondents to the survey from a wide range of perspectives: socio-demographic, economic (poverty), health and access to water being the main relevant variables considered.

The following two sections (***Survey Location*** and ***Profile of Respondents and Households***) provide a brief overview of the Lwengo district and also construct the profile of the survey participants (gender, education levels, ethnicity, and religious affiliation) and of households included in the sample (size of the household, leadership of the household and its correlation with gender and marital status). The report notes that there is a significant mismatch between village identity and official village boundaries, and this fact could have a tangible impact on water management governance and local political rule on the ground, as well as having the potential to raise a number of planning issues in the area in the future.

The next five sections of the report reflect each of main themes discussed in the survey, namely household poverty, access to water, the link between access to safe water and health, water usage in the household and, last but not least, services and programmes for delivering safe water.

The ***Household Poverty*** section examines the various indicators of poverty among household members, including their main source of income, money earned, dwelling type, and number of meals eaten. The section highlights that for most of

the respondents the main source of income is agriculture (62% crop farming and 20% mixed farming), and also that 85% of households earn less than 50,000 UGX. Furthermore even in the case of the very few households with a high level of income (over 200,000 UGX), it was evident that these tend to be very large sized households, thus suggesting that the relative income per household member may still be low.

The following section (***Access to Water***) discusses various issues relating to water access in the survey area including the type of water sources used, access to working improved sources in the vicinity, transportation, and cost of water. Interestingly, almost all participants are located within a 1 kilometre radius of an improved water source but, due to the poor functionality and lack of maintenance on some of these, several improved water sources remain idle and useless to the community. The report points out that about 40% of all participants to the survey use an unprotected source as their main source of water. A further 26% use mainly a shallow well, while 20% use a borehole/deep well. A small number of respondents also use rain water (9%) and protected spring (5%) as their main water source. Water quality, its proximity to the household and the ability to obtain the necessary quantity of water from that particular source appear to be the top three reasons for choosing a particular water source.

The ***Health and Water*** section discusses the responses to various health-related questions posed in the survey, including types of disease suffered, cost to the household of these diseases, and steps taken to mitigate against water-related disease. The survey finds that 88% of respondents mention that their main strategy for ensuring that the water they use in the household is safe is to boil it. A considerable number of respondents also indicate that they ensure that water is kept in well-cleaned containers (57%) and that they clean these containers regularly (46%). Of the total number of households included in the survey it appears that 76% experienced malaria, 42% had at least one family member who suffered from stomach aches, while the incidence of diarrhoea is also notable (37% of households). However the general perception of participants in the survey is that the trend in prevalence of diseases in the household is decreasing.

This following section of the report (***Household Water Usage***) looks briefly at the decision making process around water-use in the household. A total of 87% of respondents mention that they are always satisfied with the way water is used in their household, with a further 7% highlighting that they are somewhat satisfied. In 77% of the situations, adult females in the household are making the

decisions in relation to how the water is allocated. Only in 11% of households is this decision made democratically, involving all household members.

The last section (***Safe Water Services and Programmes***) assesses household perceptions around safe water provision in their locality and their involvement in securing these services. It emerges that the majority of respondents (96%) rate the provision of clean and safe water as a top priority. Moreover, participants rate the delivery of safe water services in their community as either fairly good (38%) or good (14%). Furthermore, almost 54% of respondents rate the delivery of safe water programmes in their community as fairly good or good.

The results presented in the report contribute to a much needed understanding of the key aspects linked to access to water in Uganda, while at the same time raise a number of important questions which need to be answered through further research. For example, at the policy level, leveraging community capacity to participate in safe water service delivery programmes is not only essential for improving the sustainability of safe water services but also directly impacts on household well-being (e.g. perceived reduction in water-borne diseases), and may also serve as an incentive for community willingness to contribute to the operation and maintenance of safe water supply facilities.

Furthermore, while communities may potentially be able to support policies and programmes that demand their direct involvement or contribution to sustainable safe water service delivery, this potential may remain untapped due to reasons that may prevent service providers from identifying/recognising and developing/exploiting such community based potential. Communities may be willing and able to make their contributions to operation and maintenance of their water supply infrastructure but may lack the necessary incentives or motivation to do so.