
Factors affecting adoption of mulching in Kibaale sub-catchment, South Central Uganda

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Abstract: Mulching is one of the major soil and water conservation measures applied for conserving soil moisture and modifying soil physical environment. The study aimed at determining the factors which influence the adoption of mulching in Kibaale sub-catchment, Uganda. 100 structured questionnaires; key informant interviews and observation were used to obtain the socio economic and institutional data. To determine the factors affecting adoption of mulching, descriptive statistics and factor analysis were used. Chi-square ($P \leq 05$) was used to establish the relationship between the identified factors and adoption. Using chi-square test, the study also identified Education level of household head, household size, accessibility to farmland and marital status as the major factors that significantly affected adoption of mulching. The community leaders should ensure that the members attain some level of education and ensure that the land owned by individuals is within their periphery of management and control.

Keywords: adoption; mulching; factor analysis; Kibaale sub-catchment; Uganda.

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1 Introduction

Globally 20 million hectares of arable land are reported to be degraded by soil erosion each year (Davidson, 1992). Land degradation varies from region to region; degraded arable land in Asia is estimated at 35% of the total agricultural land, while 45% is in South America, 74% in Central America and in Africa at 65% (CGIAR, 2003). However, people in these areas have not stopped farming; majority of the people depend on this degraded and marginal land for their livelihood with 42% of the poor compared with 32% of the moderately poor and 15% of the rich (Nachtergaele et al., 2010). Estimates in SSA show that 320 million hectares of land are affected by human induced soil degradation activities and this is estimated to cause a damage of \$26 billion annually on the continent (Lal, 1994). Furthermore, Henao and Baanante (2006) estimated that 30% (95 million hectares) of the land in eastern and central Africa is at a state of degradation which requires huge investment to become productive again.

The economic growth of any country in Africa is largely dependent on the agriculture sector (Barungi et al., 2013). The performance of the agriculture sector greatly depends on land productivity. However, Zimmermann et al. (2009) reported that in most SSA countries, agricultural productivity and production growth are low mainly because land in many areas is degraded therefore requiring quick attention.

Agriculture is a pillar in Uganda's economy contributing to food security improvement and nutrition, income enhancement, and employment. The sector contributes 42% of GDP, over 85% of export earnings, and provides employment for over 80% of the population, 90% of them live in the rural areas (Anon, 2005). Under the agriculture sector, food crop production is most predominant, contributing approximately 50% of agricultural GDP in 2002/2003, while cash crops, livestock, fisheries and forestry provided 17%, 16%, 12% and 14% respectively.

Uganda Government (2000) underscores the agriculture sector in the role of poverty eradication and therefore it has been given attention by implementing the poverty eradication action plan (PEAP). The focus under poverty eradication is conservation technologies to help raise incomes and improve livelihoods. This is through another strategy known as the plan for modernisation of agriculture (PMA); therefore mulching is inclusive to help improve soil productivity.

Kibaale sub-catchment lies within the Lake Victoria Basin (LVB) which is experiencing significant soil degradation because of high nutrient mining, leaching and soil erosion. Considering the high rate of soil degradation vis-avis the high dependence on banana as a traditional food crop in this area, food security in Kibaale sub-catchment becomes a challenge given the growing population. The high population growth rate and an equivalent food demand have resulted into human induced degradation through encroachment on the fragile lands. Human activities like cultivation on steep slopes, bottom swamps and overgrazing have taken lead in trying to meet population food demands. However, these activities do not incorporate improvement in land management. Mulching is widely used for banana land use (Nyombi, 2013; Majaliwa et al., 2012; Taulya et al., 2006; Okech et al., 2004; Rubaihayo et al., 1994; Bananuka and Rubaihayo, 1994). However, the use and adoption of mulching varies and the factors influencing the use of mulching are to be determined.

Efforts have been carried out in many countries to promote soil and water conservation measures (SWCM) in order to address soil fertility and food security challenges. However, the level of technologies adoption remains low (Mugonola et al., 2012; Akalu et al., 2012). Technology adoption is a continuous but slow process; this is emphasised by Hall and Khan (2002) who noted that adoption does not take place at the instant the costs equal to benefits but it is delayed until the benefits outweigh the costs. Rogers (1995) further explains that for an innovation to make economic contribution, it begins from understanding how it functions through awareness creation, followed by attitude change about the innovation determined by its attributes; relative advantage, complexity, trialability, compatibility and observability. These attributes can influence farmers' choices to either adopt or reject a measure. The study considered socio economic and institutional factors influencing farmers' adoption decisions irrespective of their adopter category or adoption stage.

2 Materials and methods

Location of the study area

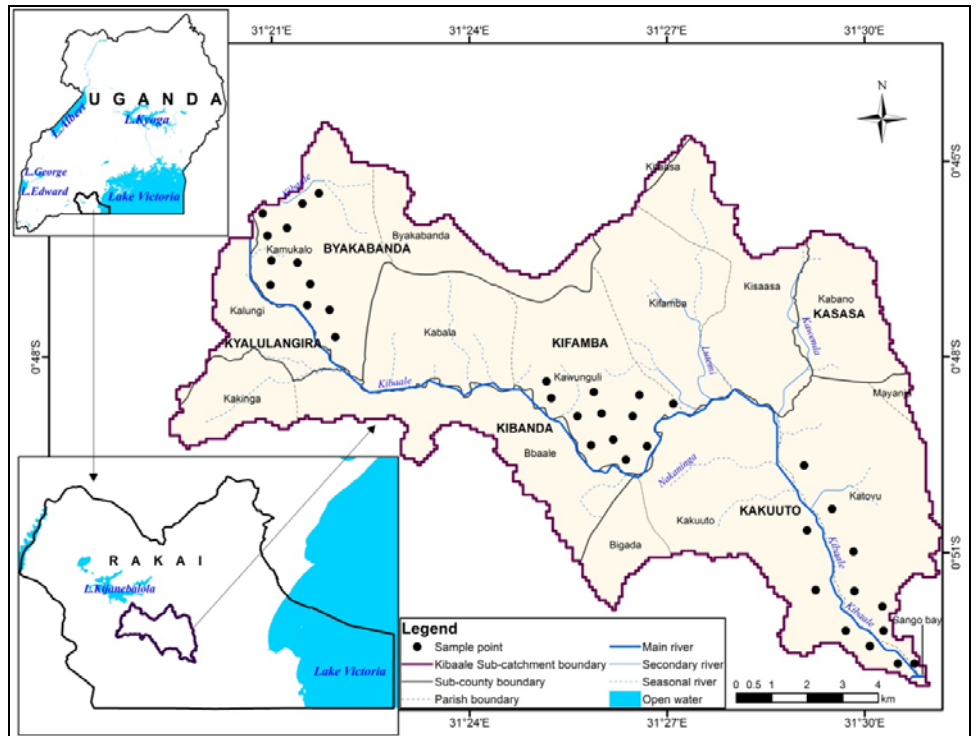
Kibaale sub-catchment is geographically located in Rakai district south central Uganda (Figure 1). Rakai district is the closest district to the LVE. The total land area of Kibaale sub-catchment is 147.3 km². Kibaale sub-catchment is part of a large catchment of Bukora which covers an area of 839.7 km² (Kakaire et al., 2015). It is drained by river Kibaale which drains from Lake Kijanebarola extending to the west towards Lake Victoria.

The rainfall is bimodal occurring generally between March to May and October to December (Uganda Government, 2000).

2.1 Soils and land use in Rakai district

According to Ssali and Isabirye (1998), fifteen soil units were identified in Rakai district based on FAO classification. However, the dominant soil units in Kibaale sub-catchment are; Regosols (41.4%), Luvisols (22%) and Planosols (16.62%). On the other hand land use in Rakai is characterised with mixed cropping alongside other land uses like grazing especially in the Lake Victoria plain. Crops grown range from perennials to annuals and pastures; bananas, coffee, beans, cassava, sweet potatoes and Irish potatoes. Agriculture is carried out at subsistence level and it employs over 90% of the people (Kyazze and Kristjanson, 2011).

Figure 1 Map of Kibaale sub-catchment (see online version for colours)



Source: Various topographic maps

2.2 Research design, population and sampling design

The research involved a household survey. The catchment has a population of 14,400 people and 3,183 households (DWD, 2010). The sample size was calculated from the formula that was used by Israel (2012).

$$n = \frac{N}{1 + N(e)^2}$$

where: n is the sample size, N is the total number of households in the catchment and e is the margin of error set at 10%.

The calculated sample size is approximated to 100 farmers. The study used a stratified simple random sampling technique because the catchment is divided into three zones; summit, middle and the lower (the three zones are already demarcated administrative boundaries). After identifying a random start point in the each of the three zones, every third household was selected to participate and in case he/she does not wish to be part or is absent, he/she is replaced with the immediate household and the interval is continued and maintained. The contribution of each zone was proportionate based on the number of the households in each of the zones (Mugenda and Mugenda, 1999). The number of households in the summit, middle and lower zones were 732, 1336 and 1115 respectively. The calculation based on proportions gives 23 respondents for the summit, 42 for the middle and 35 for the lower slopes.

2.3 Data analysis

The data from the questionnaires was coded and all the variables assigned numerical and alphabetical codes. This was followed by data entry into SPSS version 16 for analysis. The analysis involved descriptive analysis (frequencies, percentages, means, minimum values, maximum values and standard deviation). To determine the factors that affect adoption of mulching, Factor analysis (principal component) and direct Obilimin rotation was used. A non parametric test (chi-square) was also used to establish the relationship between the dependent variable (adoption of mulching) and the different independent variables.

3 Results and discussions

3.1 Training and adoption level of mulching

Results reveal that 46% received training compared to 54% who did not receive any training about mulching (Figure 2). The training was able to translate into adoption in which 62% of the attendees adopted what was trained while 38% did not adopt (Figure 3). The high adoption level that was found among the farmers was a traditional practice and therefore not ruling out the need for reinforcement in terms of correct use and application of mulching materials. The training in which farmers are part is not necessarily an indicator of adoption because from the results, some farmers (4.3%) were last trained as far back as four years ago (48 months and above) and some during colonial times as noted by some respondents. This is compared to others (28.3%) who received training within the last twelve months (one year ago), 19.6% within the last 24 months (two years ago) and 47.8% within the last 36 months (three years ago) as seen from Figure 5. The farmers in Kibaale sub-catchment appreciate any innovations aimed at conserving their soils and water. This is evidenced in the high rate of adoption (62%) coupled with the benefits they stand to gain from mulching (Figure 4). Mulching has a number of benefits in this area; increase in yields (11.2%), water retention (12.4%), soil physical improvement (9%), increase in soil fertility (52.8%), increase in soil fertility and control of weeds (14.6%) (Figure 4). When subjected to chi square test, it was found that

training on mulching was independent of adoption of mulching in the catchment ($\chi^2 = 0.640, d.f = 1, P = 0.424$).

Figure 2 Training in mulching (see online version for colours)

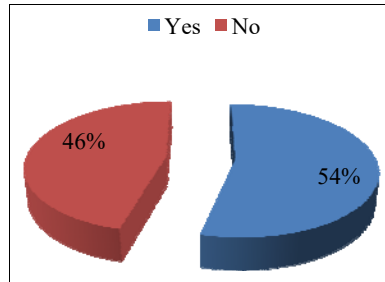


Figure 3 Adoption level of mulching (see online version for colours)

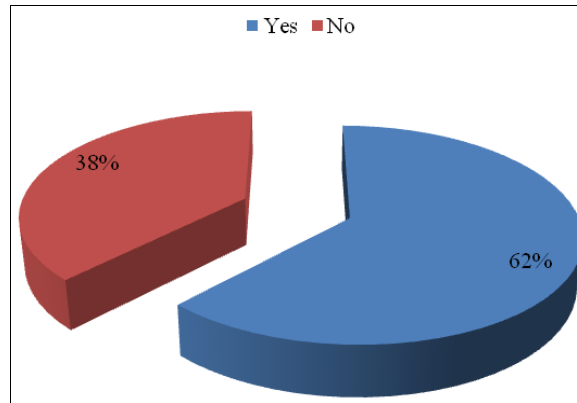


Figure 4 Advantages of mulching (see online version for colours)

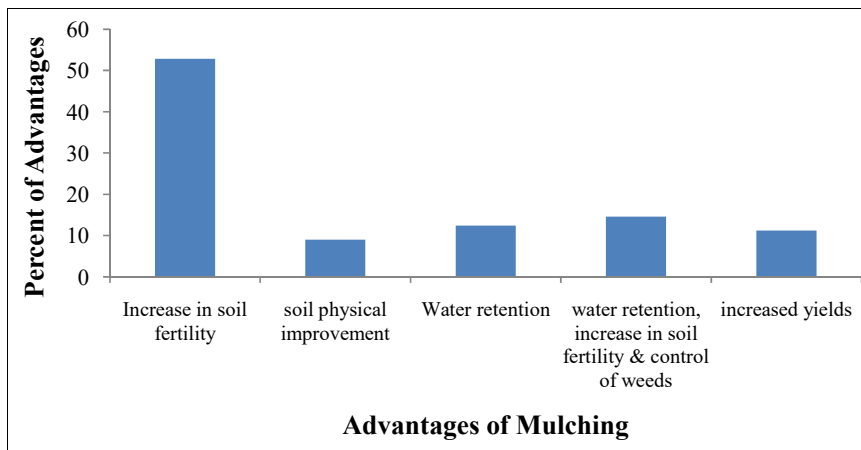
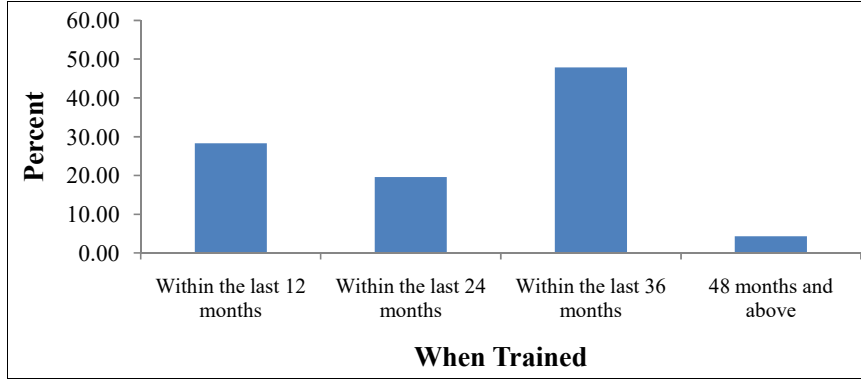


Table 1 Total variance explained

Component	Initial Eigenvalues		Extraction Sums of Squared Loadings		Sums of Squared Loadings	
	Total	% of Variance	Total	% of Variance	Cumulative %	Total
Gender	2.564	15.082	2.564	15.082	15.082	2.050
Age	2.091	12.301	2.091	12.301	27.383	1.441
Marital status	1.607	9.456	1.607	9.456	36.839	1.467
Education level	1.410	8.297	1.410	8.297	45.136	1.809
Household size	1.296	7.625	1.296	7.625	52.760	1.595
Occupation of household head	1.116	6.564	1.116	6.564	59.324	1.720
Accessibility to land	1.025	6.028	1.025	6.028	65.352	1.659
Access to land	.929	5.463			70.815	
Years in farming	.874	5.140			75.955	
Slope of parcel	.766	4.506			80.461	
Extension access	.713	4.192			84.652	
Land ownership	.615	3.616			88.269	
Membership to group	.544	3.199			91.468	
Number of parcels	.454	2.668			94.136	
Knowledge about mulching	.352	2.068			96.204	
Training in mulching	.332	1.952			98.156	
Land use	.313	1.844			100.000	

Note: Extraction method: Principal component analysis.

Figure 5 Year of training in mulching (see online version for colours)



This study deviates from findings by Barungi et al. (2013); Alufah et al. (2012); Makokha et al. (2001) who found a positive relationship between adoption of SWCMs and training about soil and water conservation.

Principal components analysis revealed the presence of seven components with eigenvalues exceeding 1, explaining 15.1%, 12.3%, 9.5%, 8.3%, 7.6%, 6.6% and 6% of the variance respectively (Table 1). The seven component solution explained a total of 65.35% of the variance. Therefore, the analysis retained gender, age of the household head, marital status, education level of household head, household size, occupation of the household head and accessibility to land as the only factors affecting adoption mulching in Kibaale sub-catchment. Therefore further statistical tests using chi square were done on the seven extracted factors.

3.2 Gender

The sample population consists of 41% female and 59% male (Figure 6). The high dominance of male respondents could be related to the belief that the head of the family is always answerable to any visitors at home and the women answer in the men’s absence. Although majority of the respondents were males, females are largely involved in the use and management of resources like water, forests, soils and wood fuel compared to their male counterparts. 41% female sample representation and 21.4% female adopters (Table 2) explain the assertion that women are gradually taking over the management of resources.

Figure 6 Composition by sex (see online version for colours)

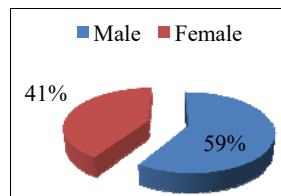


Table 2 Adoption of mulching disaggregated by gender

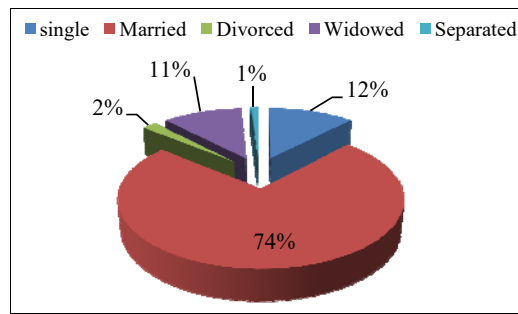
		GENDER			Total
		Male	Female		
Did you adopt	Yes	Count	22	6	28
		Expected count	19.9	8.1	28.0
		% within did you adopt	78.6%	21.4%	100.0%
		% within gender	68.8%	46.2%	62.2%
		% of total	48.9%	13.3%	62.2%
	No	Count	10	7	17
		Expected count	12.1	4.9	17.0
		% within did you adopt	58.8%	41.2%	100.0%
		% within gender	31.2%	53.8%	37.8%
		% of total	22.2%	15.6%	37.8%
Total	Count	32	13	45	
	Expected Count	32.0	13.0	45.0	
	% within did you adopt	71.1%	28.9%	100.0%	
	% within gender	100.0%	100.0%	100.0%	
	% of total	71.1%	28.9%	100.0%	

As seen from Table 2, out of the 100 farmers, 28 (62.2%) adopted what was trained about mulching; from that 22 (78.6%) were males compared to only six (21.4%) who were females. This is an implication that males were better adopters than the females. Conversely, out of the 17 (37.8%) farmers who did not adopt, ten (58.8%) were males while seven (41.2%) were females. The Chi square test proved that gender of the household head is independent of adoption of mulching ($\chi^2 = 3.24$, $d.f = 1$, $p = 0.72$). Yatich (2005) contradicts with the findings in a study on 'the role of communities in the management of headwater resources in Kenya' where he observed that in order to achieve enhanced water resources management, gender balance must be maximised with the integration of the indigenous knowledge of the people. This is supported by Koskey (2005) who underscored the value of indigenous knowledge and cultural values in sustainable management of soil resources in headwater areas in Kenya. This can be explained based on the assumption that in traditional societies, people had distinct roles to play and this is equally emphasised under gender main streaming (Petra, 2012). Petra (2012) reported about how women are underrepresented in decision making process but little or nothing is said about the overrepresentation of the men which is likely to have an effect in adoption of innovations as well as management of resources.

3.3 Marital status

The results of the study indicate that out of the respondents interviewed, 12% were single, 74% married, 2% divorced, 11% widowed and 1% separated (Figure 7). The high number of widows (11%) and single parents (12%) can be associated with the high HIV prevalence in this area (Nalugoda et al., 1997). When subjected to chi square test, marital status was found to have an influence on adoption of mulching ($\chi^2 = 187.3, df = 4, p = 0.000$). The influence of marital status on adoption can be explained by the high level of cohesion between family members to agree on key decisions related to adoption of an innovation. Members of the same family especially the married can easily come to a consensus over decisions because of the unity among family members. Rhee and Kim (2004) supported the strength of family ties in the diffusion process of an innovation in which in their study on ‘The adoption and use of internet in South Korea’ was more influenced by family support than other factors. The researchers explained that if some family members use or adopt the innovation, the other members of the family are likely to use it as well.

Figure 7 Marital status of the households (see online version for colours)



3.4 Household size

The use and application of mulching materials is labourious; therefore, it is believed that large household size can provide enough labour force to assist in implementing related activities. The lack of labour was among the two major factors that inhibited adoption of mulching contributing to 33.3% (Figure 17); therefore underscoring its importance. On average each household has six members (Table 3). The chi square test indicated a significant relationship between Household size and adoption of mulching ($\chi^2 = 64.8, df = 15, P = 0.00$).

Table 3 Descriptive statistics

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Sum</i>	<i>Mean</i>	<i>Std. deviation</i>
Household size	100	1.00	16.00	639.00	6.3900	3.06131
Valid N (listwise)	100					

This agrees with findings by Alufah et al. (2012); Fungo et al. (2011); Keil (2001). Keil (2001) recognises that household size is a sole supplier of agricultural labour force therefore it influences farmers’ decision to adopt SWCMs. Chilot and Hassan (2013)

findings deviated from the latter; their findings show negative but significant relationship between household size and adoption of SWCM.

3.5 Access to land

From the results of the study as shown in Table 4, the farmers move as far as 5,000 m (5 km) to access their gardens to farm and the average distance for parcel 2 is 1,185 m (1.2 km) and 1,613 m (1.6 km) for parcel 3 while parcel 1 is 0 m . The 0 m distance of parcel implies that most of parcel one plots are within the homestead premises. Plots close to homes receive more attention in terms of management compared to those far away from home (Chilot and Hassan, 2013; Kessler, 2006; Ertiro, 2006). This can be explained by the fact that there is less chance of losing such land close to home during redistribution. The closeness of the plots to the homesteads also acts as a motivation for the farmers to adopt and invest in SWCMs. This can be associated to the fact that the farmers are assured of safety and ease of management of their crops grown because of the close proximity and ease of supervision and monitoring. Chi square test proves the above statement by showing that farmers adoption of mulching is dependent on accessibility of the farm land ($\chi^2 = 96.04, d.f = 1, P = 0.00$)

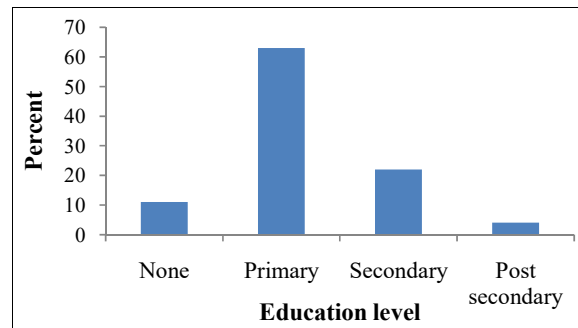
Table 4 Distance from home

Distance	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Distance from home, parcel 1	100	.00	.00	.00	.00	.00000
Distance from home, parcel 2	67	.50	5,000.00	79,413.00	1,185.27	1,037.98585
Distance from home, parcel 3	23	.70	5,000.00	37,110.70	1,613.51	1,302.29977
Valid N (listwise)	23					

3.6 Level of education

From Figure 8, results show that majority (63%) of the respondents attained primary level as their highest level of education compared to 11% for none, 22% for Secondary and 4% attaining post secondary level.

Figure 8 Education levels of the household head (see online version for colours)

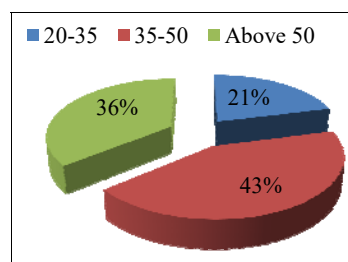


The highly educated farmers were expected to be better adopters of mulching in the catchment than less educated ones. Educated farmers were presumed to have exposure to new practices and innovations, and are more receptive to new ideas and more willing to adopt since they are assumed to be aware of the benefits accruing from mulching. When subjected to chi square test, education was found to be influencing adoption of mulching ($\chi^2 = 83.6$, $d.f = 3$, $P = 0.000$). A number of studies also support the positive relationship (Long, 2003; Traorè et al., 1998). However, a study by Bekele (1998) deviates from the latter where findings showed that education is negatively related to adoption of SWM although the relationship was insignificant.

3.7 Age

The ages of most respondents were between 35–50 years (43%) compared to other age categories of 20–35 (21%) and above 50 years (36%) (Figure 9). Age is one of the controversial social factors affecting adoption in which some studies support the notion that older people are more likely to adopt the SWCMs because of their experience in farming and having benefited from them before than the young people (Wagayehu and Lars, 2003). On the contrary, it is also possible that because of the measures being so demanding in terms of labour and time, the older people may not easily adopt because they are not likely to get involved in long term investments. In this study, age is among the seven factors that were isolated from the majority using factor analysis as affecting adoption of mulching. The results from the study show that majority of the farmers (79%) were above 35 years (Figure 9). This is an implication that the young energetic group has been left out from agriculture. The youth could assist in labourious work related to SWCMs thus threatening agricultural productivity. This study indicated no significant association between age and adoption of mulching ($\chi^2 = 7.580$, $d.f = 2$, $P = 0.23$). This is in agreement with Long (2003) findings who reported negative association between age and adoption of soil and water conservation technologies. On the other hand, findings by Alufah et al. (2012) indicated a positive relationship between adoption of SWCM and age.

Figure 9 Age categories of the household head (see online version for colours)



3.8 Off farm income

From the results, only 26% of the people interviewed in Kibaale sub-catchment are involved in off farm activities compared to 74% who are not (Figure 10). This implies that majority of the people are fully dependent on agriculture as the sole source of income for their families. The 26% are involved in different small scale businesses; shop

operators 37%, mechanic 19%, civil service 18%, tailoring 11%, crafts 7%, fishermen 4% and rentals 4% (Figure 11). Although the proportion of people involved in non agricultural activities is relatively small, their involvement helps to spread out the risk so that in case agricultural crops do not do well, there is always an alternative source of income. The small portion of people involved in off farm activities can also imply that people are realising the need to invest in other options rather than only depend on agriculture for their livelihood. Alufah et al. (2012) and Kessler (2006) found a negative association between adoption of SWCM and involvement in off farm activities. This study also supports the findings where there is no significant relationship between adoption of mulching and involvement in off farm activities ($\chi^2 = 19.519, d.f = 7, P = 0.07$)

Figure 10 Proportion involved in off farm activities (see online version for colours)

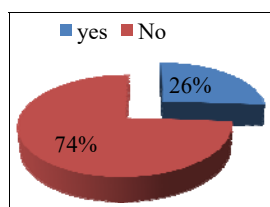
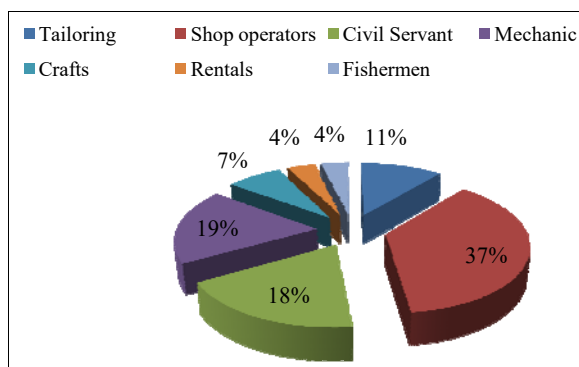


Figure 11 Off farm activities (see online version for colours)



3.9 Access to and source of information

The results revealed that 65% of the farmers cannot access information when they need it compared to 35% who can access it (Table 6). Although it is indicated that 35% of the farmers had access to information, accessibility still remains limited; only eight (23%) of the farmers are able to access the information often (seasonally and almost monthly) while 27 (77%) rarely (after a year and longer) obtain agricultural related information (Figure 12). The available sources of information included; Extension agent accessed by 20.2%, Non Governmental organisation (3%), farmer group (9.1%), fellow farmers (56.6%), Radio (2%) and none (9.1%) (Table 7). From the information sources, it is evident that 65.7% of the farmers do not have a reliable source of information; therefore the farmers are still dependant on rudimentary techniques to carry out farming. In this

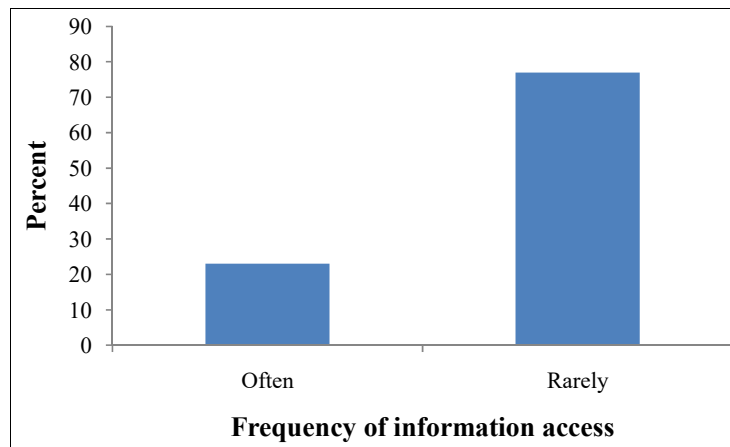
study, rudimentary techniques meant seeking information from someone who is not an authority in the field of agriculture and therefore there is no evidence of proof of correctness of the information provided. When subjected to chi square test, it indicates that adoption is dependent on access to extension and source of information ($\chi^2 = 9.00$, $d.f = 1$, $P = 0.003$; $\chi^2 = 125.9$, $d.f = 5$, $P = 0.000$) respectively.

Table 5 Access to information

	<i>Frequency</i>	<i>Percent</i>
Yes	35	35
No	65	65

Table 6 Sources of information

<i>Source of information</i>	<i>Frequency</i>	<i>Percent</i>
Extension agent	20	20.2
N.G.O	3	3.0
Farmer group	9	9.1
Fellow farmers	56	56.6
none	9	9.1
Radio	2	2.0
Total	99	100.0
Missing System	1	
Total	100	

Figure 12 Frequency of information access (see online version for colours)**Table 7** Membership to groups or organisation

	<i>Frequency</i>	<i>Percent</i>
Yes	32	32.0
No	68	68.0
Total	100	100.0

The findings underscore the value of information access through extension agents as the main and most reliable source of the information. Similar findings were found by Fungo et al. (2011); Mugonola et al. (2012); Makokha et al. (2001). The use of extension agents is very crucial because adoption of some of the SWCMs is influenced by farmers' contact with extension agents (Doss and Morris, 2001); therefore underscoring the value of obtaining information from reliable sources like government extension agents.

3.10 Membership to group or association

Although there are a number of benefits associated with being in a group (Figure 13), 68% of the farmers in the catchment are not in a group compared to 38% who belong to the group (Table 8). The farmers that do not belong to a particular group or association have reasons; selfish interests and corruption tendencies in the groups (35.3%), not interested (42.6%), old age (16.2%), lack of trust (4.4%) and not aware of any groups in the catchment (1.5%) (Table 9). On the other hand, farmers that belong to groups have had benefits; trainings (29%), loans and trainings (22.6%), inputs (6.5%), loans and inputs (3.2%) and loans, trainings and inputs (38.7%) (Figure 13). The results from chi square test indicate that adoption depends on involvement of the farmers in groups and associations ($\chi^2 = 12.960, d.f = 1, P = 0.00$).

Figure 13 Benefits of being in a group or association (see online version for colours)

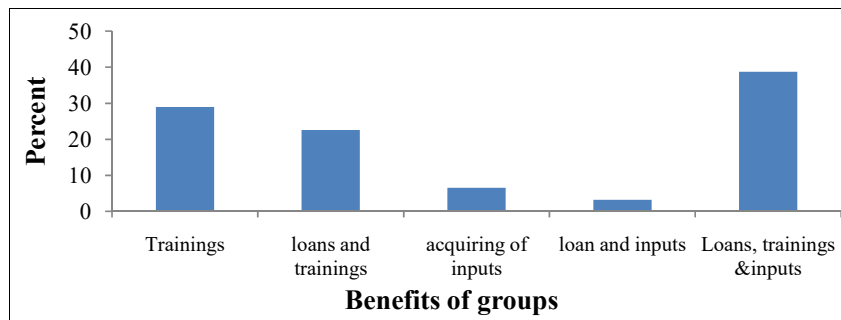


Table 8 Why not members of groups or associations

<i>Reasons</i>	<i>Frequency</i>	<i>Percent</i>
Selfish interests and corruption tendencies	24	35.3
Not interested	29	42.6
Old age	11	16.2
Lack of trust	3	4.4
Not aware of any groups	1	1.5
Total	68	100.0

Table 9 Investment in SWCM

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Sum</i>	<i>Mean</i>
Amount invested	28	5,000.00	400,000.00	3,125,000.00	111,607.14
Valid N (listwise)	28				

Participation in groups and associations are considered as avenues for most reliable sources of agricultural information since training institutions like those identified in this study (N.G.Os, NAADs) avail information through groups. This is supported by findings of Barungi et al. (2013) and Traorè (1998). Traorè (1998) findings show that involvement in groups increases availability of information. In this study, world vision is the commonest non-government organisation providing agricultural information and trainings.

3.11 Access to credit

From Table 9, 30% of the farmers had access to credit compared to 70% who did not. Although 30% of the farmers interviewed access credit, 93.3% use their savings to carry out agricultural activities, 3.3% used their local saving schemes while 3.3% obtained from National Agricultural Advisory Services (NAADS) (Table 10). The findings from the study reveal that farmers do not access loans from banks yet such money is expected to assist them to purchase inputs and invest in soil conservation technologies. The maximum and minimum money accessed by farmers is four hundred thousand Uganda shillings and five thousand Uganda shillings respectively. The total amount of money accessed by 28 farmers was three million, one hundred twenty five thousand Uganda shillings and on average each farmer accessed one hundred eleven thousand six hundred and seven Uganda shillings (Table 9). From the findings, it seems like although the government is advocating for the need to increase agricultural production through intensification, the farmers have not yet believed to invest large sums of money in agriculture particularly in mulching. However on the other hand, chi square test confirmed that adoption of mulching depends on access to credit ($\chi^2 = 48.6$, $df = 2$, $P = 0.000$). This finding is in agreement with Alufah et al. (2012); Nkonya (2002); Dadi et al. (2001).

Table 10 Sources of credit

<i>Source of credit</i>	<i>Frequency</i>	<i>Percent</i>
Savings	28	93.3
Local saving scheme	1	3.3
NAADS	1	3.3
Total	30	100.0

3.12 Farm size

The average farm size for the respondents in the catchment was 1.59 hectares with a minimum size of 0.20 and maximum of 24.28 hectares (Table 11). The size of the farm affects adoption of SWCM in different ways. Farmers with large farm sizes are likely to allocate some of their land to SWCMs (Amsalu and de Graaff, 2007). Conversely, it is also possible that large farm sizes require a lot of labour and high capital investment to apply SWCMs, therefore it may limit adoption as earlier identified in this study that lack of labour was one of the factors that limited adoption of mulching in the catchment (Figure 15). However, when chi square test was run, farm size was found to influence adoption of mulching ($\chi^2 = 130.18$, $df = 16$, $P = 0.000$). This finding is in agreement with a number of studies (Amsalu and de Graaff, 2007; Wagayehu and Lars, 2003).

Alufah et al. (2012) also found out a significant negative association between adoption of SWCMs and farm size. The current study attributed the negative relationship to the large population in the catchment which could have led to land fragmentation. Land fragmentation is a hindrance to investment in SWCMs because it becomes uneconomical and less profiting (Bett, 2004).

Table 11 Farm size

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Sum</i>	<i>Mean</i>	<i>Std. deviation</i>
Amount of land	100	.20	24.28	158.84	1.59	2.70
Valid N(listwise)	100					

Figure 14 Reasons for preference of mulching materials (see online version for colours)

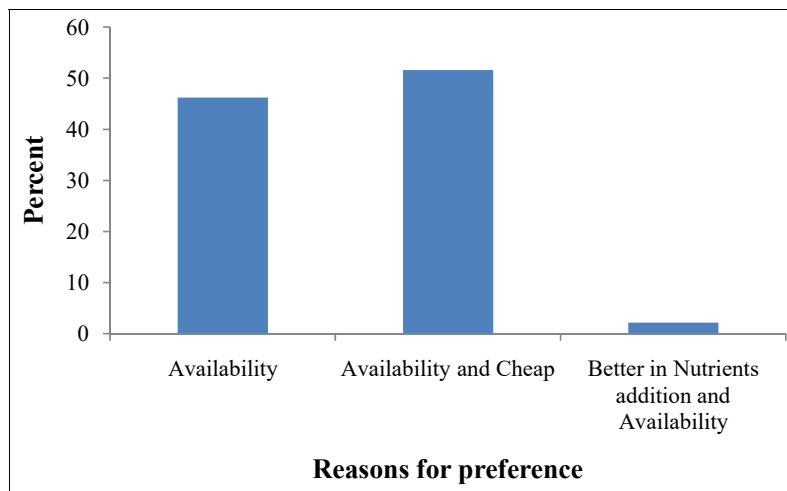
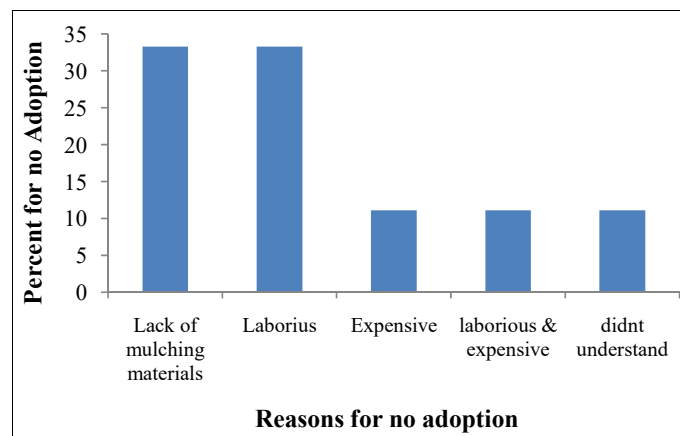


Figure 15 Reasons for no adoption of mulching (see online version for colours)



4 Conclusions

The study demonstrated that:

Farmers' adoption of mulching in Kibaale sub-catchment is driven majorly by social factors; education level, household size, accessibility to the farm land and marital status. Therefore for any technological adoption in Kibaale sub catchment, those social factors should be given priority. Based on the findings, the following implications were drawn. The community leaders should ensure that the community attains at least a minimum level of education to ease adoption of technologies and related technological information in Kibaale sub-catchment, community leaders should sensitise the people about having manageable number of family members that are within their expenditure and therefore are able to cater for their basic needs and wants while on the other hand the family members play their roles as assigned by the household head, community members should ensure that land owned is within their areas of accessibility for sustainable management and utilisation and mulching should also be enhanced through sensitisation and training of all stakeholders in the catchment at all levels (village, parish, sub county, county and district) and it should appreciate the demand driven approach (bottom up approach)

Statement of competing interests

The contents of this paper are a product of research done jointly by the above authors. This paper has not been published elsewhere, and the authors take responsibility jointly over the information provided therein.

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