

Socio-demographic Determinants of Soil Erosion Levels among the Farming Households in Nyakach Sub-county, Kenya

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Abstract: Soil degradation is a world-wide problem facing humanity today. In Nyakach Sub-county the problem has persisted over the years. This study set out to assess the influence of socio-demographic characteristics of farmers on soil erosion levels. Data from 384 respondents, collected using questionnaire and interview, were analyzed by descriptive statistics and multinomial logistic regression. Results revealed that household headship was male-dominated (64.6%), 45.8% of the respondents had primary level of education, 65.6% were married, 52.3% treated farming as their main occupation and 26% lived below poverty line. Some 52.1% of the respondents were aged 36 to 64 years, 47.4% of the households had 6 to 10 persons, and 85.4% had 0 to 4 dependents. About 78.6% owned less than 4 hectares of land, 99.5% had freehold tenure, 52.1% had lived on the same land for 1 to 20 years, and 48.7% cropped between 60 and 79% of their land. Sex ($\chi^2 = 18.445$), marital status ($\chi^2 = 22.389$), main occupation ($\chi^2 = 21.591$), income of the household head ($\chi^2 = 30.085$), age ($\chi^2 = 24.136$), household population ($\chi^2 = 13.038$) and number of dependents ($\chi^2 = 13.321$) significantly influenced erosion levels in the Plateau but not in the Plain and Scarp. Land ownership ($\chi^2 = 368.63$) significantly influenced erosion levels in the Plain but not in the Plateau and Scarp. The study concluded that socio-demographic characteristics influenced soil degradation but the magnitude depended on the physiographic unit. It was recommended that physiography should be considered when planning soil conservation measures.

Index terms: Socio-demographic, soil degradation, physiographic units

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I. INTRODUCTION

The foundation of sustainable social and economic development in African countries is greatly dependent on soil. This is because a majority of the people depend on soil either directly or indirectly for their livelihood. The role of soil in supporting food and agriculture is the most fundamental because it preserves and advances human life. Despite its significance, soil resource base is being threatened by rapid soil degradation. Many parts of Kenya (the Sabaki River catchment since early 18th Century, Central Kenya from the early 20th Century, Machakos and Baringo areas since the 1920s and Nyakach as early as 1800s) have experienced human-induced soil degradation over the years. Despite soil conservation efforts by the colonial government (Amanda, 2007) and later on by the independent government through NSWCP and other agencies (Mutisya *et al.*, 2010), soil degradation in Nyakach Sub-county has advanced over the years (Yamane *et al.*, 2015; Mwaura, 2010; Barring, 1988).

Many studies have been conducted to look at causes of soil degradation that include human activities and physical factors. However, effects of socio-demographic characteristics of farming households on soil degradation are yet to be appreciated. This inspired the research aimed to: (i) assess the impact of social characteristics of farmers on the level of soil degradation, and (ii) establish the effect of demographic characteristics on the level of soil degradation. The study was guided by two questions: First, what is the impact of farmers' social characteristics on the level of erosion? Second, what is the effect of farmers' demographic characteristics on the level of erosion?

II. LITERATURE REVIEW

Patriarchal land ownership and inheritance among the Luo community dispossess women of their right to own land (Villarreal, 2006) thus favouring men over women in household headship. Aoyagi *et al.* (2011) and FAO (2012) note that women lag behind men in land ownership in many regions of the world. Bayard *et al.* (2006) found a significant relationship between sex and rock walling in Haiti. Likewise Gebremariam (2012) found a significant association between sex and soil conservation in Ethiopia.

Formal education enhances soil conservation knowledge which in turn lowers soil erosion (Seenga, 2014). NCPD (2013) found that in the age-group 15-19, about 15.4% of females were already married compared to only 3.2% of males. Early marriages lead to high household populations. Marriage brings children who then increase family labour for farm work (Abu *et al.*, 2011). Whereas Gebremariam (2012) found a significant association between marital status and soil conservation in Ethiopia ($\chi^2 = 23.85$ significant at $p < .01$), both Bayard *et al.* (2006) and Leta (2008) found no significant relationship. Households have ways of adopting to increasing populations, including adopting soil conservation (Ashoori *et al.*, 2016).

A significant relationship between age and soil conservation was found by Ashoori *et al.* (2016), Lesch and Wachenheim (2014), Nadhomi *et al.* (2013) and Gebremariam (2012). Mirzabaev *et al.* (2016) found a significant relationship between the number of dependents and land management. However, Kalineza *et al.* (1999) did not find any significant relationship between physically fit adults and adoption of soil conservation in Tanzania.

As noted by Kalineza *et al.* (1999), the relationship between farm size and soil conservation may be positive or negative. However, Gebremariam (2012) obtained a negative but significant relationship between farm size and soil conservation in Ethiopia. Patriarchal and inheritance system of land acquisition practiced in Nyakach is the cause of freehold tenure (Ochieng', 2014). Freehold tenure attracts vigorous conservation by the household (Haugerud, 2001).

Nadhomi *et al.* (2013) regressed length of time for accessing a land parcel on adoption of soil and water conservation in Nabajuzi Watershed of Lake Victoria Basin in Uganda but found a non-significant relationship. Occupation of the household head may not directly influence soil erosion as the money earned may be invested on other activities apart from soil conservation (Chiputwa *et al.*, 2011). In contrast, Coulibaly *et al.* (2016) in their study in Malawi found a significant relationship between household head's main occupation and adoption of agroforestry.

Small scale farmers experience financial constraints that may limit their engagement in soil conservation thus resulting in high levels of soil erosion (Willy & Holm-Muller, 2013). High poverty levels also lead to high mortality rates and hence more cases of widowed household heads (Odima, 2014). High poverty rates in Sub-county may be a reason for soil degradation since poverty is associated with land degradation (Nkonya *et al.*, 2008). Bayard *et al.* (2006), Nadhomi *et al.* (2013) and Gebremariam (2012) found a significant relationship between income and soil conservation. However, Gebremariam (2012) found the relationship to be non-significant. Leta (2008) found a significant relationship between size of cultivated land and food security. Lesch and Wachenheim (2014) note that area planted has inconsistent contribution to adoption of conservation.

Nadhomi *et al.* (2013) and Ashoori *et al.* (2016) found a significant relationship between family size and soil conservation. On the contrary, Deresa and Legesse (2015), Leta (2008), Rezvanfar *et al.* (2009) and Karidjo *et al.* (2018) found no significant association with soil conservation. Leta (2008) and Mirzabaev *et al.* (2016) obtained a significant relationship between dependency ratio and soil conservation. As Kimaro *et al.* (2015) state, occupation influences attitude towards farming. Significant role of non-farm occupation was obtained by Chawanote and Barrett (2013) in Thailand, Amarasekara *et al.* (2009) and Aheeyar (2000). Seenga (2014) whose study conducted in Tanzania shows that topography of the farmland has a significant but weak and positive relationship with adoption of soil conservation measures.

III. RESEARCH METHODOLOGY

The research was conducted in Nyakach Sub-county, Kisumu County in western Kenya between longitudes 34°45'E and 35°00' E and latitudes 0°15'S and 0°30'S (Kenya, 1982). Figure 1 shows the area.

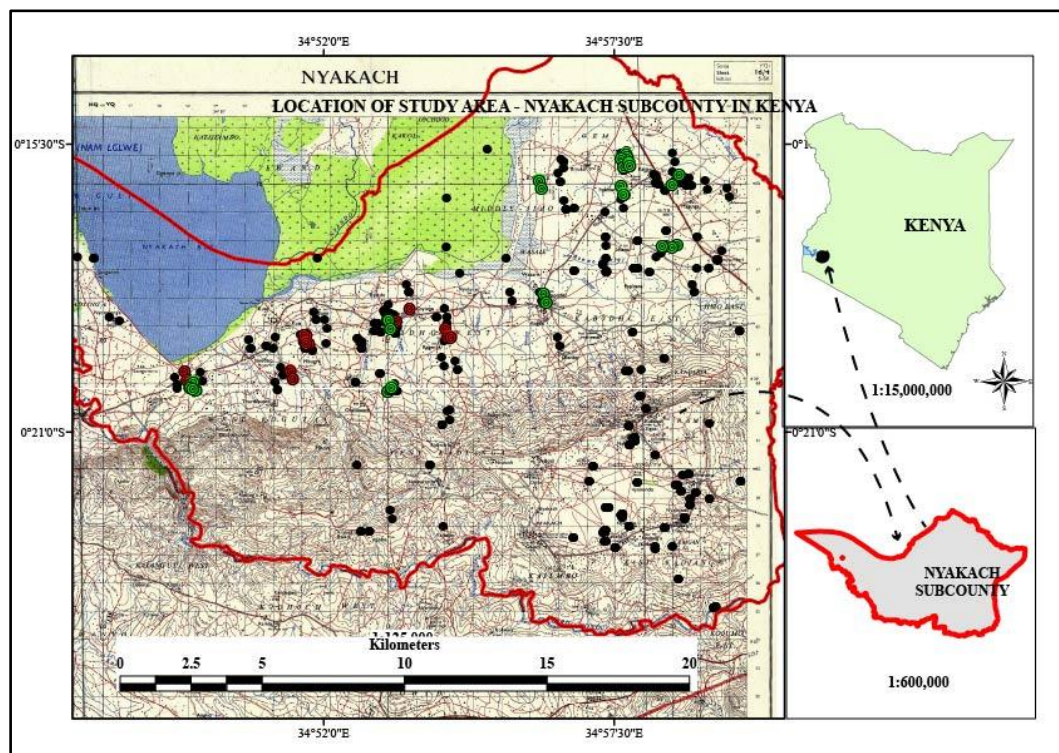


Figure 1: Location of the Study Area – Nyakach Sub-county in Kenya
Source: Modified from Kenya (1982)

The study adopted a cross-sectional survey design to collect data from 399 household heads (out of a target population of 27,988 households according to CGK, 2013) using a questionnaire, interview and observation. Survey approaches allow a detailed and quantitative analysis of individual, household or firm level practices (Robbins, 2010). Vector grids of 1 km square were created using UTM zone of East Africa. The vector grids were overlaid with digitized topographic map of the study area. Seven vector grids were purposively selected from each of the three physiographic units to give a total of 21. A list of homesteads in each vector grid was prepared and simple random sampling was then used to select 19 households from each vector grid.

Socio-demographic characteristics of the respondents studied comprised of sex, age, education, marital status, farm size, population of the household, number of dependents, land ownership, years occupying the land, main occupation of the household head, and income of the household head. These variables were subjected to exploratory data analysis to establish their normality using skewness, normal Q-Q plot, detrended Q-Q plot, box plot, histogram and Shapiro-Wilk's W test based on SPSS programme. All the variables were normally distributed, or nearly so, in the three physiographic units (except farm size in the Plain and the Plateau). Data on farm size in the Plain and Plateau was therefore transformed using logarithmic transformation because it had a severe right skew (DeCoster, 2001). The variables were then subjected to descriptive statistics (frequencies, percentages and mean), Man-Whitney U test and multinomial logistic regression analysis. All these were conducted using SPSS programme.

A MLR model is a form of regression where the DV is binary or dichotomous and the IVs are continuous, categorical, or both. It is best used when there is evidence of departure from multivariate normality and other assumptions. However, in MLR hypotheses on significance of IVs cannot be tested in the same way as in linear regression. Instead the log likelihood ratio statistic. The difference in likelihood followed a chi-squaredistribution X^2 . The results were presented in tabulated format. Multinomial logistic regression is given by Al-Jazzar (2012) as:

$$\text{logit}[\pi(x)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

Where p = the probability of the level of erosion; $(p/1-p)$ = odds of the level of erosion; β_0 = constant; X_i = vector of selected socio-demographic characteristics; β_i = parameter estimate for the i^{th} socio-demographic characteristic.

IV. RESULTS AND DISCUSSIONS

Frequencies, percentages and means of each category of the various socio-demographic characteristics are tabulated in Table 1. The Table reveals that there were more male household heads (64.6%) compared to females (35.4%). Gender disparity in household headship has been caused by traditional patriarchal land ownership and inheritance patterns in Nyakach Sub-county, like in other parts of Luo region, which dispossess women of the right to own and gain control of land resource (Villarreal, 2006). It was found that 51 out of the 99 (i.e. 51.5%) widowed household heads were women. This implies that women took control of land only upon the demise of their spouses because Luo customary laws bequeath men with complete control of family resources (Chabeda, 2008). This finding is consistent with the findings of Aoyagi *et al.* (2011) and FAO (2012) who argue that women provide the bulk of agricultural labour in many parts of the world but lag behind men in the ownership of land resources.

Table 1 also shows that the majority of household heads belonged to the age bracket 36-64 (52.1%). This is followed by the youth in the age group 18-35 (26%) and then the elderly above 64 (20.1%). Children below 18 years who headed households were only 1.8%. The average age of household head of 44.5 years obtained by National Council for Population and Development, NCPD (2013) lend support to the mean age of 50 found by this study.

Table 1: Socio-demographic Characteristics of Household Heads (n = 384)

Characteristics	Frequency	%	Characteristics	Frequency	%
Sex			Land Ownership		
Male	248	64.6	Freehold	382	99.5
Female	136	35.4	Communal	001	0.3
Age			Rental	001	0.3
< 18	007	1.8	Years Occupying the Land		
18-35	100	26.0	1-20	200	52.1
36-64	200	52.1	21-40	133	34.6
> 64	077	20.1	41-60	050	13.0
Mean		50.0	61-80	001	0.3
Education			Mean		23.73
None	043	11.2	Main Occupation		
Primary	176	45.8	Public	067	17.4
Secondary	112	29.2	Private	061	15.9
Post-secondary	053	13.8	Farming	201	52.3
Marital Status			Business	052	13.5
Single	021	5.5	Politics	003	0.8
Married	252	65.6	Income in KShs per Month		
Divorced	011	2.9	< 1499	042	10.9
Widowed	099	25.8	1500-2999	057	14.8
Separated	001	0.3	3000-4499	079	20.6
Population of Household			4500-5999	053	13.8
1-5	177	46.1	6000-7499	047	12.2
6-10	182	47.4	> 7499	106	27.6
11-15	022	5.7	Mean		5014.62
16-20	003	0.8	Cropped Land		
Mean		6.02	.40-.59	039	10.2
Number of Dependents			.60-.79	187	48.7
0-4	328	85.4	.80-.99	158	41.1
5-9	054	14.1	Mean		0.74
10-14	002	0.5	Physiographic Units		
Mean		2.81	Plain	126	32.8
Farm Size in acres			Plateau	130	33.9
0-3.9	302	78.6	Scarp	128	33.3
4.0-7.9	075	19.5			
8.0-11.9	005	1.3			
12-15.9	002	0.5			
Mean		2.94			

Source: Researcher (2018)

Figures in Table 1 suggest that majority of household heads were people in their fifties or more. The small number of youthful household heads means that the local farming community may suffer lack of innovativeness, vision and energy abundantly found in the youth. Interviews with the household heads revealed three reasons why youths are locked out of household headship. First, the local culture does not allow sons or daughters to take charge of family affairs when their parents are still alive. Second, younger people are held up in education. Third, younger people are out of the locality in search of formal employment. Concerning the domination of household headship by elderly people the interviewees had the following to say: Those who are employed in the civil service tend to move closer home to take full charge of farming activities as their retirement age of 60 years approaches.

The majority of household heads (45.8%) had acquired primary level of education (Table 1). A number of household heads (29.2%) had attained secondary school level and only 13.8% of them had attained post-secondary level. A number of the household heads (11.2%) had no formal education. About 55.8% of those who had no formal education were above 64 years of age. A high number of household heads (88.8%) had at least acquired some formal education. Formal education is expected to enhance knowledge of soil conservation technique which in turn lowers soil degradation (Seenga, 2014). This finding on secondary level of education is confirmed by Nyakundi *et al.* (2010) who obtained 24.5% completion rate. However, their figures for other levels are substantially different. This difference may be due to the fact they conducted their research in the whole of the former Nyando District which by then comprised Nyakach, Nyando, and Muhoroni divisions.

More than half of the household heads (65.6%) in the study area are married (Table 1). Some 25.8% of the household heads were widowed and 5.5% were single. Divorce cases were a meager 2.9% while only 0.5% had separated. Interviews revealed that while the widowed household heads face numerous cultural and financial constraints, married couples complement each other. Persons in agriculturally potential areas are more economically progressive and healthy (WHO, 2015). High poverty levels in agriculturally poor regions lead to high mortality rates and hence more cases of widowed household heads (Odima, 2014). According to interviewees, marriage remains a social obligation and the widowed are expected to re-marry or to be “inherited” if they are females. Females are expected to marry earlier than males. A study by the National Council of Population and Development (NCPD, 2013) found that in the age-group 15-19, about 15.4% of females were already married compared to only 3.2% of males.

Most households had population of 1-5 and 6-10 persons, 46.1% and 47.4% respectively (Table 1). Only 6.5% of the households had a population more than 10 persons. High household population creates pressure on soil resource which may be a driving force in soil degradation. However, households have ways of adopting to their populations other than destructive exploitation of soil resource, including adopting soil conservation (Ashooriet *al.*, 2016). But Rezvanfare *et al.* (2009) find no significant effect of household population on adoption of soil conservation measures. The current study found a significant correlation between household population and erosion level in the Plateau.

Most of the households had 0-4 dependents (85.4%). Very few households (0.5%) had over 9 dependents (Table 1). As the number of dependents in a household increases the demand for food increases and hence more demand on soil resource. This would ultimately lead to higher erosion level. Households had other means of meeting their needs, including formal and informal employment. In contrast, Mirzabaev *et al.* (2016) found a significant relationship between the number of dependents and land management. However, Kalineza *et al.* (1999) did not find any significant relationship between physically fit adults and adoption of soil conservation in Tanzania. This study found a significant relationship between the number of dependents and erosion level in the Plateau.

Over three quarters of the households (78.6%) own less than 4 hectares of land (Table 1). Only 19.5% of the households owned between 4 and 7.9 hectares. Nearly 98.1% of the households engage in small scale farming and therefore experience financial constraints that may limit their engagement in soil conservation resulting in high erosion levels (Willy & Holm-Muller, 2013). Kalineza *et al.* (1999) note that the relationship between farm size and soil conservation may be positive or negative. However, Gebremariam (2012) obtained a negative but significant relationship between farm size and soil conservation in Ethiopia. In this study farm size had positive but non-significant association with erosion level.

Nearly all households (99.5%) had freehold tenure (Table 1). Only a mere 0.3% of land was under communal and rental ownership. Patriarchal and inheritance system of land acquisition practiced in Nyakach is the cause of freehold system (Ochieng', 2014). For close to four decades the Government has encouraged all communities in Kenya to embrace freehold tenure making it to take root in Nyakach. This is expected to attract more vigorous conservation by the household (Haugerud, 2001). In this study land ownership significantly associated with erosion level in the Plain. The Plateau and Scarp did not lend themselves to MLR because all the households practised freehold tenure.

Over half of the respondents (52.1%) had lived in their respective lands for 1-20 years (Table 1). About 34.6% of them had lived on the same land for 21-40 years while 13% had occupied their lands for 41-60 years.

Only 0.3% of the household heads had lived on their lands for over 60 years. The tradition of passing on land to the sons ensured that most household heads had stayed in their farms from childhood. It is expected that the longer a household head occupies a piece of land the more he/she learns to deal with the challenges of soil degradation on the land. Nadhomi *et al.* (2013) regressed length of time for accessing a parcel on adoption of soil conservation in Nabajuzi Watershed of Lake Victoria Basin in Uganda and found a non-significant relationship.

Table 1 reveals that 52.3% of the household heads considered farming as their main occupation. A substantial number of household heads are employed in public service, private sector and business (17.4%, 15.9% and 13.5% respectively). Only 0.8% were engaged in politics as the main occupation. Farming has become a major source of income among rural households as opportunities for formal employment dwindle. Occupation of the household head did not directly influence soil erosion as the money earned was invested in other activities other than soil conservation (Chiputwa *et al.*, 2011). Coulibaly *et al.* (2016) found a significant relationship between household head's main occupation and adoption of agroforestry for food security in Malawi with a probit estimate of -0.694 significant at 1%.

Some 27.6% of household heads earned over *USD*74.99 per month. Table 1 shows that there was large variation of income among the households (10.9% earned less than *USD*14.99, 14.8% earned *USD*15-29.99, 20.6% earned *USD*30-44.99, 13.8% earned *USD*45-59.99, and 12.2% earned *USD*60-74.99). Nearly 26% of the household heads lived below the poverty line (*USD* 1.25 per day). This poverty rate is not very different from the rural figure of 49.7% obtained by NCPD (2013) and 43.37% by World Factbook quoted by Kiragu (2013).

The high poverty rate in the Sub-county may be a reason for soil degradation since poverty is associated with land degradation (Nkonya *et al.*, 2008). Theoretically, those with high monthly incomes should invest more in soil conservation and therefore register low erosion levels. Bayard *et al.* (2006) found a significant relationship between income and soil conservation in Haiti. However, Gebremariam (2012) found the relationship to be non-significant. The implication of these inconsistencies is that household head income may also be used to finance non-agricultural activities.

Some 48.7% of the households had cropped 0.60-0.79 of their farm area, 4.1% cropped 0.80-0.99 and 10.2% cropped 0.40-0.59 (Table 1). This implies that over 89% of the households cultivated more than half of their parcels. High population is forcing farmers to expand land under cultivation which is in turn raising the levels of soil degradation. Leta (2008) found a significant relationship between size of cultivated land and food security. Lesch and Wachenheim (2014) note that area planted has inconsistent contribution to adoption of conservation. This study did not find any significant association between proportion of cropped land and erosion level.

Seenga (2014) who conducted a study in Tanzania shows that topography of the farmland has a significant but weak and positive relationship with adoption of soil conservation. Likelihood ratio tests based on multinomial logistic regression analysis were used to test the association between socio-demographic factors and erosion level in three physiographic units – the Plain, Plateau and Scarp. It was also used to establish whether farmers' views on soil erosion were determined by their socio-demographic characteristics. The results are summarized in Table 2 which shows Likelihood ratio Chi-square, p-value and significance.

None of the socio-demographic variables investigated had a strong association with erosion level in the Scarp as all the p-values were greater than 0.05. All the variables did not have strong associations in the Plain except land ownership, which was not computed for the Plateau and Scarp because all the parcels were privately owned. Save for education, farm size, number of years of land occupation and proportion of cropped land, all the other socio-demographic variables were strong in the Plateau.

Sex was strongly associated with the outcome of the households' views on erosion level ($p = .000, p \leq .001$) in the Plateau. Most household heads were males who were also decision makers on matters concerning agriculture, had better access to information and credit, and were energetically superior. Male-headed households were therefore inclined to perform better in soil conservation than their female counterparts. This is supported by Bayard *et al.* (2006) and Gebremariam (2012) who found significant associations between sex and soil conservation activities in Haiti and Ethiopia respectively.

Table 2 shows that age of household head was strongly associated with erosion levels in the Plateau ($p = .004, p \leq .005$). Age of a farmer determines experience and capital availability for agriculture. Accumulated wealth increases with the number of years up to retirement age of 65 when retirees lose regular income. A significant association between age and conservation measures was found by Ashoori *et al.* (2016), Lesch and Wachenheim (2014), Nadhomi *et al.* (2013) and Gebremariam (2012).

Table 2: Multinomial Logistic Regression Analysis of Socio-demographic Characteristics (n = 384)

Variable	PLAIN(n = 126)			PLATEAU (n = 130)			SCARP(n = 128)		
	χ^2	p	Sig.	χ^2	p	Sig.	χ^2	p	Sig.
1. Sex	3.055	.549	ns	18.445	.000	***	5.115	.276	ns
2. Age	5.170	.952	ns	24.136	.004	**	8.044	.782	ns
3. Education	6.112	.910	ns	15.602	.076	ns	13.328	.346	ns
4. Marital status	8.698	.925	ns	22.389	.008	**	8.844	.716	ns
5. Population	.001	1.000	ns	13.038	.005	**	1.081	.897	ns
6. No. of dependents	-	-	-	13.231	.004	**	4.079	.395	ns
7. Farm size	.952	.917	ns	2.234	.525	ns	.526	.971	ns
8. Land ownership	368.630	.000	***	.000	-	-	.000	-	-
9. No. of years of land occupation	5.067	.281	ns	.932	.818	ns	1.341	.854	ns
10. Main occupation	-	-	-	21.591	.042	*	9.141	.691	ns
11. Income	10.543	.837	ns	30.085	.012	*	14.746	.791	ns
12. Cropped land	3.874	.423	ns	2.182	.535	ns	.443	.979	ns

NOTE: ns = not significant; * = significant at $p \leq .05$; ** = significant at $p \leq .005$

*** = significant at $p \leq .001$

Source: Researcher (2018)

Marital status was strongly associated with erosion level in the Plateau ($p = 0.008$, $p = .005$). This implies that couples complemented one another in farm work. Marriage provided children who supplemented farm labour as argued by Abu et al.(2011). While Gebremariam (2012) found a significant association between marital status and soil conservation in Ethiopia ($\chi^2 = 23.85$ at $p < .01$), both Bayard *et al.* (2006) and Leta (2008) found no significant relationship. This inconsistency is reflected in this study in which marital status was significant in the Plateau but not in the Plain and Scarp.

Household population was strongly associated with erosion level in the Plateau ($p = 0.005$). The higher the household population the greater the demand on soil resource. In the absence of soil conservation, greater demand on soil leads to deterioration of soil quality. Some households ameliorate the negative effects of population on soil by adopting conservation practices. The relationship between household population and erosion level can either be negative or positive. Nadhomi *et al.* (2013) and Ashoori *et al.* (2016) found a significant relationship between family size and soil conservation. Nevertheless, Deresa and Legesse (2015), Leta (2008) and Karidjo *et al.* (2018) found no significant association. This inconsistency may be due to differences in landscapes.

Number of dependents in a household had a strong association with erosion level in the Plateau ($p = .004$, $p \leq .005$). As the number of dependents increases the pressure on land also escalates. More land has to be put into use to cater for increased demand. As the pressure on land increases, quality deteriorates, hence a positive correlation. When a large number of dependents forces households to adopt sustainable means of farm production, the relationship becomes negative. This concurs with Leta (2008) and Mirzabaev *et al.* (2016) who obtained a significant relationship between dependency ratio and conservation practices.

Table 2 reveals that main occupation of the household head was strongly associated with erosion level in the Plateau ($p = .042$, $p \leq .05$). Occupation determines financial ability of a farmer and hence investment in agriculture. As Kimaro *et al.* (2015) state, occupation influences attitude towards farming and determines time set aside for farm work. Those fully occupied in farming are more likely to adopt various ways of improving soil productivity. Significant role of non-farm occupation was obtained by Chawanote and Barrett (2013) during their study in Thailand.

Income of the household head was strongly associated with erosion level ($p \leq .05$). It was hypothesized that higher income led to greater investment in soil conservation and hence lower erosion level. Farmers with extra capital invest more in agriculture than those who are financially constrained. This is supported by Amarasekara *et al.* (2009), Aheeyar (2000), Bayard *et al.* (2006), Nadhomi *et al.* (2013) and Gebremariam (2012).

I. CONCLUSION

Results show that males dominated household heads at 64.6% due to patriarchal land tenure, with women taking full control only after the demise of their husbands. Household headship was also dominated by the elderly, denying the youth an opportunity to exercise their talents. Some 57% of decision makers had basic education or no formal education, reducing quality acquired through higher education. Little is expected in terms of soil conservation from the 26% household heads who lived below poverty line.

Sex, age, marital status, household population, number of dependents, land ownership, main occupation and income bore strong association with erosion level in the Plateau. The same variables had weak insignificant association with erosion level in the Plain and Scarp. This suggests that the strength of the association between socio-demographic characteristics and erosion level was dependent upon physiography of each region.

Mitigating erosion in Nyakach Sub-county must focus on both long-term and short-term approaches. Long-term approach should include: (i) modifying patriarchal system to give women more say on land matters, (ii) changing traditional practice to give the youth more say on land, (iii) changing attitude of the highly educated to bring their knowledge skills down to rural villages, and (iv) reducing poverty levels. Short-term approach should be based on aggressive implementation of appropriate soil conservation activities.

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