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HOUSEHOLD LEVEL SOCIO-ECONOMIC AND INSTITUTIONAL FACTORS THAT INFLUENCE CHANGES IN CULTIVATED AREAS: THE CASE OF RAYMOND MHLABA LOCAL MUNICIPALITY, SOUTH AFRICA

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Abstract. Understanding the detailed web of factors influencing changes in cultivated areas at the household level is critical for sustainable development in the dynamics of agricultural systems. Households, as basic units within the agricultural framework, are at the center of decision-making processes that have a direct impact on land use patterns. Hence this study estimated the socio-economic and institutional factors that are associated with changes in the area of land under cultivation and associated perceptions. The study was carried out in the Raymond Mhlaba Local Municipality, where land cultivation has drastically dropped. A total of 400 respondents were chosen randomly. Estimates of the socio-economic and institutional variables that affect changes in the area under cultivation were made using the Multinomial Logit Regression model. Descriptive results revealed that most respondents reported a decrease in the area of land they had under cultivation and few reported an increase or no change. The results further revealed mixed perceptions regarding any potential increase in the amount of land cultivated. Both negative and positive perceptions were noted. The empirical results indicate that livestock ownership and marital status are associated with a decrease in the amount of land cultivated, while the number of family members and access to extension services are related to an increase in amount of land cultivated. Institutional factors could be leveraged to promote an increase in rural cultivated land.

Keywords: rural areas, cultivated land, land use change, biodiversity, Raymond Mhlaba

INTRODUCTION

Rural farming households cultivate a variety of crops on rural arable land. Previously, rural arable land has been a strategic asset that supports rural livelihoods (Zantsi and Bester, 2019). Unfortunately, rural arable land is in short supply in the face of multiple competing options for land use (Rondhi et al., 2018). Hassan et al. (2016) described land use as human-made variation on the Earth's terrestrial surface. The literature acknowledges that people have been converting land for decades to enhance food production and other necessities (construction, mining, recreation), but the recent rate of land use has accelerated, causing unexpected changes in natural ecosystems (Rosenbloom, 2018). Changes wrought by human means have caused the most pressing ecological concerns of human populations, such as biodiversity loss, climate change, and air, soil and water pollution (Campbell et al., 2017).

Owing to the effects of significant mismanagement of land, ameliorating the negative effects of land use while maintaining essential resource production has become a priority area of study for scholars and policymakers globally (Rosenbloom, 2018). South Africa has experienced rapid and unsuitable biodiversity development, partly because of urbanisation (Campbell et al., 2017). The country is undergoing high population

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growth, rising household sizes, high levels of population movement, urban development, an increase in infrastructural facilities, increased mining pressure, and agricultural expansion and intensification, according to the state of environmental outlook report for South Africa (2016). These trends have changed land use (Tiroza, 2018), resulting in problems such as urban sprawl, poor and limited community resource access, and soil degradation, as well as environmental degradation (Campbell et al., 2017). Thus, this study examined changes in rural cultivated land and factors influencing these changes for the purpose of understanding the drivers of change in the area households have under cultivation.

While several studies do not differentiate between land use and land cover, Tiroza (2018) highlights that land cover compromises the noticeable (bio-)physical qualities of the earth's surface, whereas land use encompasses the ways in which people use the land cover (Briassoulis, 2020). The current study focused on cultivated land, the extent of which is reported to have changed in the study area. These land-use changes affect livelihoods and biodiversity and may lead to degradation (Pan and Bilsborrow, 2015). Most importantly, they happen slowly over a long period (Pan and Bilsborrow, 2015) and are generally ignored because the previous state of the land is forgotten, making it difficult to track their implications. A need therefore arises to investigate the drivers of these changes, especially at the micro level, given that the literature is dominated by analyses of macro-level land-use changes (Haines-Young, 2019). Estimating land-use changes, however, does not reveal the reasons for variations in land use across villages and wards, which are critical for policy targeting and intervention strategies (Pan et al., 2013).

Understanding the factors that condition household-level land-use changes will enhance households' capacity for self-protection and strategic policy designs (Van Rooyen et al., 2019). Most land-use change studies have been macro focused (Keenan et al., 2015). Yet analysis of micro-level land-use changes is also necessary given the heterogeneous nature of rural Africa (Xu et al., 2019), which is home to more than 70% of the population of sub-Saharan Africa (Van Rooyen et al., 2019). People in rural areas are particularly dependent on natural resources (Keenan et al., 2015) and therefore both directly and indirectly affected by land use changes.

Although there is no superior scale of land-use change analysis (Xu et al., 2019), according to the literature, there is a strong need to focus on the micro level to avoid concealing variations in local land-use changes (Van Rooyen et al., 2019). The study therefore investigated micro-level land use changes and estimated household-level factors that condition such changes. Understanding the influence of socio-economic factors on land use change will contribute to the development of sustainable land use and resource management policies. The study's objective was to address some key questions: (i) What are the changes in the area under cultivation in the study area? (ii) What are the households' perceptions of changes in the area under cultivation? (iii) What are the household level socio-economic and institutional factors that condition the changes in cultivated areas?

MATERIAL AND METHODS

Conceptual framework

Figure 1 demonstrates the conceptual framework employed in this study. The figure illustrates the linkages of underlying root causes, mediating factors, and proximate causes of land-use change among rural households.

Previous studies have categorized the underlying root causes of land-use change into bio-physical, economic, technical, demographic, institutional and cultural factors (Bosselmann, 2012). These underlying root causes are assumed to be mainly exogenous to rural households (Bosselmann, 2012). Nonetheless, they influence the proximate sources of land-use changes – that is, observable human activities (immediate actions) such as expanding cultivated areas (Geist and Lambin, 2002). Mediating factors exist between proximate causes and underlying root causes. These are the characteristics and attributes of rural households, which are capable of shaping and modifying the interactions among the underlying root drivers and the proximate causes of change in cultivated areas (Geist & Lambin, 2002; Bosselmann 2012).

Several studies have found that mediating variables influence land-use changes; these include assets and income (Pacheco, 2009), education and household demographics (Pan and Bilsborrow, 2015), land tenure and duration of stay (Pacheco, 2009), and land availability (Ponette-González, 2007). These mediating factors, as potential drivers of change, are included as explanatory variables in econometrics models. Of interest is that land-use change may pre-date the explanatory variables

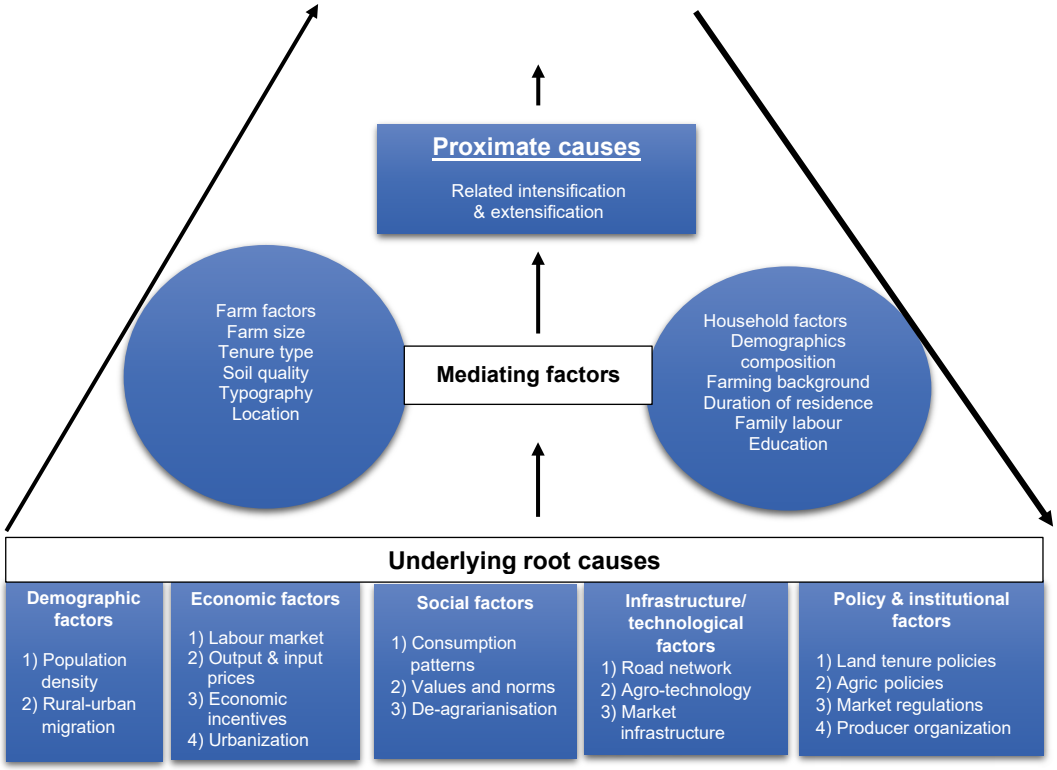

Fig. 1. Land use change conceptual framework
Source: Modified from Bosselmann (2012).

(Wyman and Stein, 2010), directly or indirectly implying that the direction of causation may not be apparent (Bosselmann, 2012) and that the changes may be cyclical. Figure 1 illustrates the possible influence of proximate causes on land use changes.

Study area

The study was conducted in Raymond Mhlaba Local Municipality of the Eastern Cape Province of South Africa.

This study used a cross-sectional design to collect information focusing on rural agricultural households with access to rural land (arable and grazing). Its sampling frame included rural households with access to land (arable and grazing) in the study area, as guided by local village chairpersons.

Procedure for sampling

To ensure that precise subgroups of individuals were adequately represented in the sample, the study used random sampling with stratification. The samples were selected from a single stratum (villages within the municipality). The sample was divided into three categories based on an initial screening question. Households were asked if they had changed or maintained the area of land they were cultivating in the past 15 years, with the results recorded as follows: (a) no change group = 0; (b) those who had decreased the area of cultivated land = 1 and (c) those who had increased the area of cultivated land = 2. For respondents who had both decreased and increased the area under cultivation or vice versa during the past 15 years, the net change in the area under cultivation determined their group membership. Based on the above stratification, each group's respondents were selected randomly.

Sample size

Raymond Mhlaba Local Municipality has an estimated population of 151,379 households, 10,497 of which are agricultural households (ECSECC, 2017). Following

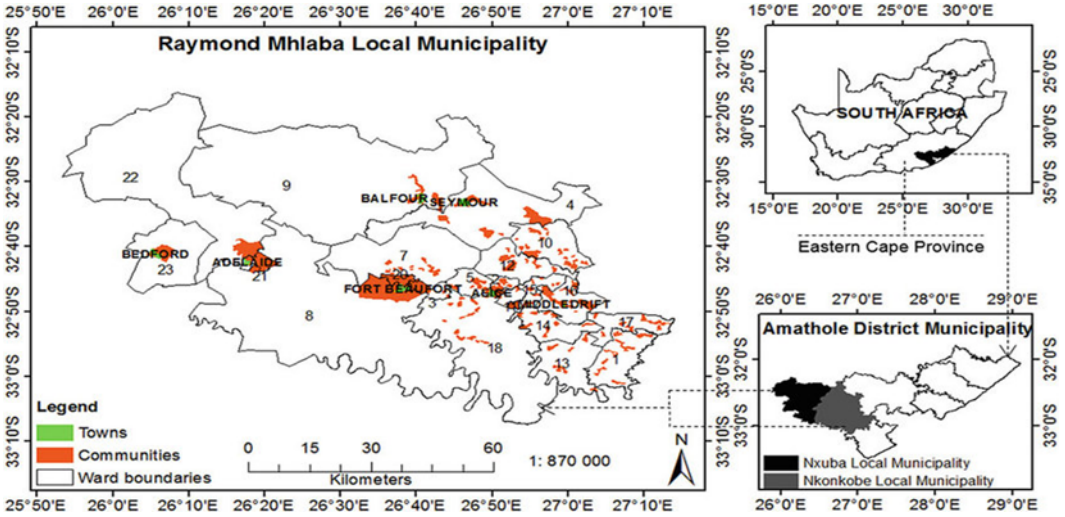

Fig. 2. South Africa, Eastern Cape Raymond Mhlaba Local Municipality
Source: Raymond Mhlaba Local Municipality, 2021.

Yamane (1967), the sample size for the study was calculated as illustrated in Equation 1.

N comprised the study area's estimated agricultural household population (10497).

$$n = \frac{10497}{1 + 10497(0.05)^2} \quad (1)$$

Therefore, a minimum of 399 respondents was required, which was rounded up to 400 respondents.

Analysis

Multinomial logit regression was used to estimate the socio-economic and institutional factors that influence changes in the area households have under cultivation within the study area. The dependent variables were as follows: base (reference) category, no change group = (0); those who had decreased the area of land under cultivation = (1); and those who had increased the area of land under cultivation = (2). Following Gujarati (1992), the Multinomial Logit Regression model was specified as illustrated in Equation 2.

$$\text{Logit}(P_i) = \ln(P_i/(1 - P_i)) = \alpha + \beta_1 X_1 + \ldots + \beta_n X_n + U_t \quad (2)$$

where:

$\ln(P_i/(1 - P_i))$ = logit for land-use change choices

(P_i) = not participating in cultivated land changes (no change group = 0)

$(1 - P_i)$ = participating in cultivated land changes (either negatively – those that have decreased their cultivated land = 1 – or positively – those that have increased their cultivated land = 2).

β = coefficient

X = covariates

U_t = error term

The likelihood that a household might select one category over another was limited to a value between 0 and 1 ($0 \leq (P_i) \leq 1$). The model, therefore, assessed the odds of negative participation (decrease in cultivated land) versus not participating (no change in cultivated land); and positive participation (increase in cultivated land) versus not participating (no change in cultivated land). Following Gujarati (1992), Logit(P_i) therefore ranged from negative infinity to positive infinity.

RESULTS

This section presents the results of the study focusing on the basic sample statistics (Table 1), reported changes in the area under cultivation (Fig. 3), farmers' perceptions (Fig. 4) and factors that influence these changes (Table 3).

A group of 400 participants was randomly chosen, with the mean age of the household heads being 61.68. The basic sample statistics also show that in the study area, females outnumbered males in the sample under

Table 1. Basic sample statistics summary

Variable	Frequency	Percentage
1	2	3
Gender		
Male	195	48.75
Female	205	51.25
Marital status		
Single	212	53
Married	188	47
Employment status		
Unemployed	310	77.50
Formally employed	55	13.75
Self-employed	35	8.75
Education level		
Uneducated	60	15
Primary level	159	39.75
Secondary level	161	40.25
Tertiary level	20	5
Land ownership		
Yes	232	58
No	168	42
Access to agricultural technology		
Yes	66	16.50
No	334	83.50
Access to extension services		
Yes	103	25.75
No	297	74.25
Association membership		
Yes	69	17.25
No	331	82.75
Access to mobile phone		
Yes	373	93.25
No	27	6.75
Access to radio/TV		
Yes	370	92.50
No	30	7.50
Access to formal markets		
Yes	63	15.75
No	337	84.25
Livestock ownership		
Yes	297	74.25
No	103	25.75
Access to forest produce		
Yes	123	30.75
No	277	69.25
Access to informal credit		
Yes	59	14.75
No	341	85.25

Table 1 – cont.

Variable	Mean	Min	Max
Age	61.68	30	89
Average monthly income	2843.1	200	2000
No. of family members	5.80	1	18

consideration. The mean average household size was 5.80 members for the study area, with a minimum of 1 and a maximum of 18 family members. Most participants were married and depended on social grants in the study area. Participants had been educated up to

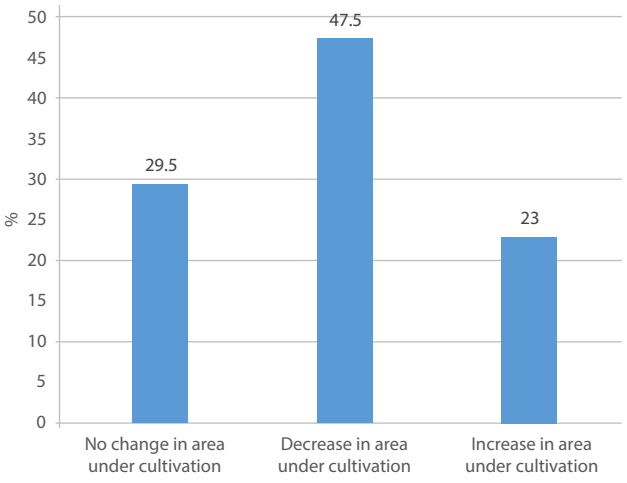

Fig. 3. Reported changes in the area under cultivation

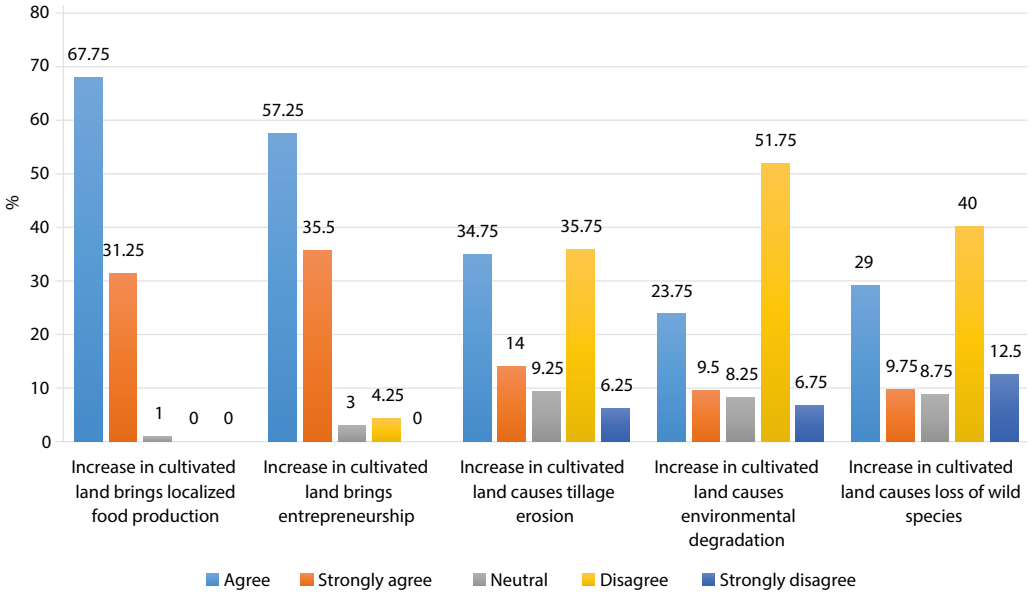

Fig. 4. Shared perceptions of an increase in cultivated land

secondary level in the study area. The basic sample statistics also reveal that most of the participants were unemployed, had access to land but no access to credit or extension services, and were not members of any farming associations. The results further indicate that most respondents had mobile phone and radio/TV access but no internet access. Also, the majority had no access to formal markets. Most of the respondents owned livestock and had no access to forest produce.

Reported changes in area under cultivation

This section presents reported changes in the area under cultivation as summarized in Fig. 3.

Five major perceptions of respondents in the research area are discussed in this section.

The final model's likelihood ratio test (LR), compared to one in which all variable coefficients are null (0), yields a significant Chi-square value (62.41: .000). This means that the final model performed better than the null hypothesis. The multinomial logit regression linked the decision to decrease (1), increase (2), or not to change the area under cultivation (0) to the socio-economic and institutional factors influencing these preferences in communities. No change in cultivation area (0) was used as the reference category. The results are interpreted as follows.

Table 2. Classification table for the multinomial logit regression model

Observed	Predict			
	no change of area under cultivation (0)	decreased area under cultivation (1)	increased area under cultivation (2)	percent correct (%)
No change of area under cultivation (0)	32	74	12	27.1
Decreased area under cultivation (1)	18	157	15	82.6
Increased area under cultivation (2)	9	57	26	28.3
Overall percentage (%)	14.8%	72.0%	13.3%	53.8

Table 3. Multinomial logit regression estimates for determinants of change in the area under cultivation

Variable	Decreased area under cultivation ($Y = 1$)			Increased area under cultivation ($Y = 2$)		
	Coef	dy/dx	P>|z|	Coef	dy/dx	P>|z|
Access to forest produce	.600034	.0559074	0.355	.8701901*	.0827401	0.074
Livestock ownership	.970303***	.2056801	0.002	.341186	–.0470451	0.378
Access to informal credit	–.9553719	–.107282	0.179	–1.216596	–.1030819	0.133
Access to formal markets	–.3200333	–.080833	0.335	.0076275	.0359018	0.572
Access to radio/TV	–.7917911	–.0968264	0.392	–.9351091	–.0730173	0.386
Access to mobile phone	–.1463987	.0387768	0.743	–.6970374	–.1024203	0.229
Member of agricultural association	.4273875	–.0105105	0.892	1.085252**	.1378948	0.013
Access to extension services	.5476528	.042541	0.527	.8726972*	.0888299	0.079
Number of family members	–.0194322	–.0125433	0.100	.0710691**	.0141582	0.018
Education level	–.0379684	.0063286	0.861	–.1463006	–.0207139	0.499
Marital status	.1937903*	.04045922	0.054	.0726418	–.0086325	0.635
Access to agricultural technology	.1494532	.0471702	0.546	–.0906892	–.0315469	0.629
Employment status	–.0297179	–.0406654	0.365	.3073465	.0553546	0.106
Intercept	.04309564			.1105189		

Number of observations = 400
Log likelihood = –389.50161
LR Chi^2 (26) = 62.41
Prob > Chi^2 = 0.0001
Base category = No Change of Area under Cultivation (0)
Pseudo R^2 = 0.0742

***, ** and * indicates significance at 0.01, 0.05 and 0.1 probability level respectively.

Increased area under cultivation (1)

A positive significant coefficient for any variable implies that a positive change or increase in that variable is likely to encourage or promote respondents from the base/reference category (0) to consider increasing the area they have under cultivation. A significant negative coefficient for any variable implies that a positive change or increase in that variable is likely to discourage or negatively influence respondents from the base/reference category (0) to consider increasing the area they have under cultivation – thus promoting a decrease in the area under cultivation.

Decreased area under cultivation (2)

A positive significant coefficient for any variable implies that a positive change or increase in that variable is likely to encourage or promote respondents from the base/reference category (0) to consider decreasing the area they have under cultivation. A significant negative coefficient for any variable implies that a positive change or increase in that variable is likely to discourage or negatively influence respondents from the base/reference category (0) to consider decreasing the area they have under cultivation.

DISCUSSION

The results in Fig. 3 (above) show that many participants (47.5%) reported a decrease in the area under cultivation, noting the following reasons: a high level of drought, no fence around arable fields to deter livestock, and household members who were all too old to be

working in the fields. A few respondents (23%) reported an increased area under cultivation, noting the following reasons: producing vegetables for own consumption and producing crops to avoid buying them from formal markets. Almost 30% of the respondents reported no change to the area under cultivation. Thus, a general decrease in the area under cultivation was noted across the entire study area. These findings support previous studies that also reported a general decline in cultivated areas in rural regions because of dependence on government and low interest in agriculture among the youth (Bisht et al., 2020).

Perceptions of changes in area under cultivation

This section presents the shared perceptions of changes in the area under cultivation in the study area as illustrated in Fig. 4 above.

An increase in cultivated land supports localised food production

The results indicate that the majority of respondents (99%) perceive an increase in cultivated land to be a strategy that enhances localised food production. This significantly addresses problems with food availability, especially in rural areas. These findings are in line with suggestions by Oluwatayo (2019), who noted that access to healthy and affordable local food is difficult for rural residents, with many rural areas considered food deserts because they lack food retailers. Financial restrictions or other factors, such as transportation challenges, may hinder access to food in rural areas; thus, rural residents must take land cultivation seriously and produce their own fresh produce.

An increase in cultivated land fosters entrepreneurship

The results indicate that the vast majority of participants (93%) believed that an increase in cultivated land brings entrepreneurship opportunities. Farming is one of the possible rural business opportunities available to most of the rural population. Pan et al., 2024 noted that agricultural industries are complex and interconnected, and the impact of innovative entrepreneurship activities in rural areas on economic growth is difficult to identify. An increase in the area under cultivation would imply an opportunity for entrepreneurship through the commercialisation of various farming activities (i.e., the production of cash crops). These results align with those of Zhu et al. (2022), who noted that, with the rise in entrepreneurial activity worldwide, entrepreneurship is an important means of improving agricultural economic performance and encouraging rural economic growth.

An increase in cultivated land causes tillage erosion

The vast majority (49%) of the participants believed that an increase in the amount of land used for cultivation caused tillage erosion. Respondents noted the lack of resources and information on correct land cultivation practices as the main cause of tillage erosion. Le Roux and Smith (2014) noted that soil erosion is a major environmental issue facing South Africa's water and land resources. Although soil erosion is a natural process, it is often accelerated by human activities (Le Roux and Smith, 2014). Thus, the perception was that an increase in inappropriate land cultivation activities (stream bank cultivation, cultivating along a slope) is likely to increase tillage erosion as the area under cultivation increases. Interestingly, a significant number (42%) of the respondents did not believe that an increase in the amount of land under cultivation caused tillage erosion. They argued that land cultivation does not cause tillage erosion but poorly implemented in land cultivation does, giving the examples of stream bank cultivation and cultivating along the slopes of a field.

An increase in cultivated land causes environmental degradation

The results show that most of the respondents (59%) did not consider an increase in cultivated land to cause environmental degradation (deforestation and pollution). Based on their indigenous knowledge, the respondents argued that they have certain ways of practising cultivation (contour farming, fallowing and planting cover crops) to avoid environmental degradation. However, some respondents (33%) believed that an increase in cultivated land caused environmental degradation because of mono-cropping, which was the dominant production system in the research area. Growth in cultivated land would therefore imply increased monocropping, which could harm soil quality, susceptibility to pests, destruction of nutrients in the soil, soil degradation, soil erosion, and groundwater pollution.

An increase in cultivated land causes a loss of wild species

Most of the respondents (53%) did not believe that an increase in cultivated land causes a loss of wild species. They argued that when they cultivate their fields, wild animal species such as rabbit, deer and raccoons are attracted by the cultivated crops, which provide extra palatable forage for them. On the other hand, a significant number of the respondents (39%) believed that an increase in cultivated land causes a loss of wild species, mainly because agricultural expansion could destroy some of the habitat of terrestrial animal species (Pan et al., 2013).

Factors that influence changes in the area under cultivation

This section summarizes the results of the multinomial logit regression on factors influencing changes in area under cultivation. The application of the model to the outcomes of this study is shown in Table 2. The results shows that 32 of the 118 respondents who did not change the area of land they were cultivating (27.1%) were correctly classified, 157 out of 190 respondents who decreased the area of land they were cultivating (82.6%) were correctly classified, and 26 out of 92 respondents who increased the area of land they were cultivating (28.3%) were correctly classified. Overall, 53.8% of the case scenarios were classified correctly, as demonstrated by Table 2.

Access to forest produce

The results shows that a positive unit change in access to forest produce is associated with an 83% probability of increasing the area under cultivation, *ceteris paribus*. An increase in access to forest produce is more likely to encourage rural households to consider increasing the area under cultivation with reference to the base category [No Change of Area under Cultivation (0)]. These findings suggest that households who have not changed the area they have under cultivation are more likely to consider increasing it as their access to forest produce increases. These findings support previous studies which have argued that as households acquire unlimited access to forest produce (wood, timber and charcoal) they cause deforestation, opening up spaces that are then used to expand cultivated areas (Bragagnolo et al., 2017). This incentivises rural dwellers to increase the area under cultivation.

Livestock ownership

According to the model results, a positive unit change in livestock farming is associated with a 21% chance of decreasing the area under cultivation, if other independent variables remain constant. An increase in livestock ownership is more likely to encourage rural households to consider decreasing the area under cultivation with reference to the base category [No Change of Area under Cultivation (0)]. The following factors were suggested in the study area as possible triggers of this correlation: First, respondents attributed the revealed association to climate change, which caused most households to switch from crop production to livestock production, which is more tolerant of climate change and variability (Javed et al., 2020). Second, respondents noted the increased need for grazing land for livestock farmers as a possible reason for reducing the area under cultivation. The complementary benefits of cultivating maize as stock feed were deemed irrelevant in the study area, given poor yields recorded from rain-fed maize production. Also, the complementary benefits of draught power were irrelevant in the study area, which relied on tractors for cultivation.

Membership of an agricultural association

According to the findings, a positive unit change in agricultural association membership is associated with a 14% probability of increasing the area under cultivation, *ceteris paribus.* Membership of a farming association is likely to encourage respondents from the base category [No Change of Area under Cultivation (0)] to consider increasing their area under cultivation. Agricultural associations provide social networks for farmers to share various production and market information. The collective action associated with agricultural associations encourages agricultural production and lowers several agricultural risks (Hamad et al., 2019). The benefits associated with agricultural associations may promote an increase in the area under cultivation as association members acquire access to formal markets for the sale of produce and bulk purchase of inputs at reduced prices. They are also more likely to obtain inputs in time before the start of the production season and to acquire new technologies (Kassie et al., 2013).

Access to extension services

The results also indicate that a unit change in access to extension services is associated with a 9% probability

of increasing the area under cultivation, other independent variables being constant. Increasing access to extension services is likely to encourage respondents from the base category [No Change of Area under Cultivation (0)] to consider increasing the area they have under cultivation. Agricultural extension services help farmers obtain knowledge on technologies, markets, inputs and finance, and improve their farming and managerial skills (Danso-Abbeam et al., 2018; Hamad et al., 2019). These variables promote increased production, which may push rural farmhouses to consider increasing the area they have under production.

Number of family members

The results also reveal that a positive unit change in the number of family members is associated with a 14% probability of increasing the area under cultivation, *ceteris paribus*. A large number of family members is most likely to impact respondents from the base reference category positively [No Change of Area under Cultivation (0)] to consider increasing the area they have under cultivation. Two reasons were suggested by respondents in the study area: First, crop production (the area under cultivation) in the study area is conducted manually, requiring labour, as is typical throughout Africa. Family labour, therefore, plays a significant role in crop production activities (ploughing, planting, weeding, fumigation, fertiliser application, harvesting, grading). Increasing the area under cultivation would mean an increase in these activities, which would call for more labour (Masten, 2018; Foguesatto et al., 2020). Second, agriculture (crop production inclusive) and natural resources are significant livelihood activities for rural households in the study area. Therefore, large family sizes would force them to increase the area they had under cultivation to defend their livelihoods (commonly referred to as "more mouths to feed").

Marital status

The model results show that a unit change in marital status from being single to married is associated with a 4% probability of decreasing the area under cultivation, *ceteris paribus*. A change from being single to married is likely to encourage respondents from the base reference category [No Change of Area under Cultivation (0)] to consider decreasing the area they have under cultivation. These findings contradict past studies that revealed a positive correlation between marital status and an increase in agricultural land area because of access to more resources and less mobility associated with married household heads (Ngeywo et al., 2015; Badstue et al., 2020; Osanya et al., 2020). These previous findings may be more applicable in areas where cropping activities are the dominant livelihoods, which is not the case in the research area. In fact, cropping activities have been declining in the research area. Participants from the research area noted that married people are more likely to focus on more rewarding non-cropping activities, while single people may consider less rewarding cropping activities (having fewer mouths to feed). The labour benefits associated with married people may be meaningfully invested in more rewarding non-cropping activities than in trying to expand the area under rain-fed crop cultivation.

CONCLUSION AND RECOMMENDATIONS

According to the study, there has been an overall decrease in the area under cultivation in the studied region. Mixed perceptions were noted with regard to increases in cultivated land, with some residents believing that an increase in cultivated land would increase local food production and entrepreneurship, which positively influences livelihoods among rural households. However, negative perceptions related to a perceived increase in tillage erosion as the area under cultivation increases were noted. These were mainly thought to be triggered by inappropriate tillage practices. The study further concludes that a decrease in cultivated land is influenced by livestock ownership and marital status, while an increase in cultivated land is influenced by access to forest produce, the number of family members, agricultural association membership and access to extension services. The decline in the amount of land used for cultivation in rural areas presents a huge temptation to more rural households to convert land to lucrative alternative land-use options with high direct returns (such as sale on the property market), regardless of the associated environmental implications. Thus, the study argues that the observed changes in the area under cultivation reflect a rational choice on the part of rural land owners, who are seeking to maximize their assets, subject to various constraints. Crop cultivation now has to compete with other land-use options. If left to the free forces of supply and demand, the observed changes in the area under cultivation will continue. It is worth understanding the triggers in greater depth to address potential conflicts of

interest, such an increase in environmental degradation versus potential livelihood gains.

To promote an increase in the amount of land under cultivation in rural areas, the following activities should be considered: Membership in farming organizations and access to extension services should be increased, as they may promote an increase in the amount of land dedicated to crop cultivation. These variables provide the social capital necessary to drive production, since they boost access to new technological skills, managerial skills, and markets. The training provided by rural farming organisations enables both skills transfer and improved access to markets, which may enhance rural agricultural productivity. Improved access to extension services (i.e., improved farmer-to-extension officer ratio and contact frequency) will also strengthen rural agricultural productivity. Making rural arable land more productive may discourage the current conversion of rural land into other land-use options, with direct benefits for landowners. This could be achieved through an intensification of extension services, a drive to increase membership of agricultural associations and more radio/TV programmes dedicated to farmers' education.

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