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Land Sub-Division and its Impact on Household Food Security. Evidence from Nyamira North Sub County, Kenya

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Abstract: ***Land is a crucial resource that human beings depend on for survival. For rural dwellers, livelihood land and life are inseparable. However, since the last three decades, farm sizes held by households in many parts of Africa and Kenya in specific have diminished tremendously as a result of successive land sub-division. Since land is an essential commodity for rural livelihoods enhancement, it is not clear how land sub-division has influenced household food security. Thus, this study sought to investigate how land sub-division has influenced household food security in Nyamira North Sub County. Through use of quantitative and qualitative research methods, the study established that culture, high population growth, poverty, and lack of government policy on land sub-division are the drivers of lad sub-division in the study area. The study also revealed that land sub-division has reduced household food production and subsequent household food insecurity. The study concluded that the practice of land sub-division has led to dwindling land sizes that have negatively impacted on food production and heightened hunger. Unless policies to guide land sub-division in terms of the minimum size of land to be sub-divided as well to change livelihood sources are formulated by the government, misery and suffering for the future generation are imminent.***

Keywords: Land subdivision, food security, households, Kenya

1. Background

Land is a fundamental resource that ensures human survival (Auya, Barasa and Sambu, 2021). For rural dwellers in many developing countries, land is the main asset that supports their livelihoods (Wickramaarachchi and Weerahewa, 2016; Molen, 2017). Having access to land is a crucial factor for survival and the promotion of human welfare (Auya, Barasa and Sambu, 2021; Obonyo, Otieno, and Ang`awa, 2016; Ntirenganya, 2012). As a significant asset, land provides people with not only food and income but also has socio-cultural functions to rural communities (Auya, Barasa and Sambu, 2021; Abdullah, et al, 2017; Ene-Obong, Onuoha, and Eme, 2017; Kebaso, 2017; Olum, et al, 2017; Mbevi,2015; Dery, 2015).

The utmost significance attached to land as a resource has seen many countries in the world embark on a land tenure system that underscores individual land ownership as opposed to communal land ownership. Individual land ownership is reinforced by land sub-division and inheritance (Museleku, Kimani, Mwangi and Syagga, 2018).The practice of land sub-division has greatly contributed to diminishing farm sizes in the world. Available statistics show that of the 525 million farms worldwide, 446 million have a size of less than 2 hectares (Molen, 2017). The statistics put the average land sizes in Asia and Africa at 1.6 hectares.In Tanzania, for example, the average land size held by households is 2 hectares while in Rwanda is 0.5 hectares (Molen, 2017). In Kenya, continued land sub-division among most Kenyan communities has resulted inthe decline of land acreage to less than one acre (Molen, 2017). However, this was not the case in the past few decades. For instance, in the 1970s, the average land acreage among households was 10 acres (Jayne et al., 2014). With such small land sizes, people are still expected to eke out a living from such land and establish homes.

Studies by Wickramaarachchi and Weerahewa (2016), Mbula (2017),Mbula (2018), Kiplimo and Ng'eno (2016), Kipkemboi (2019), and Obonyo, Otieno, and Ang`awa, (2016)have established that land sub-division is likely to contribute to food insecurity. However, with advancement in technology such as application fertilizers, chemicals etc food production is possible even in limited land. Thus, this study sought to establish how land sub-division has influenced household food security Nyamira North Sub-County.

2. Methodology

The study was undertaken in Nyamira North Sub County, Nyamira County, Kenya between July and December 2019. The basis for choosing the study area is that households in the study area have traditionally relied on their land or food. In addition, Nyamira North Sub County is among the sub counties in Kenya with highest population density. The Sub County at the time of this study had 787 persons per square kilometer (Kenya National Bureau of Statistics, 2018; County Government of Nyamira, 2018; Mbula, 2018). Furthermore, the Sub County is ranked among sub counties in Kenya with high rate of land sub-division and reduced land sizes- currently standing averagely at less than an acre(Mbula, 2017 and Kipkemboi, 2019).

The study employed embedded variant of mixed methods research design. According to Creswell, Plano Clark, et al.

(2003), embedded design is a mixed methods design in which one data set (quantitative or qualitative) provides a supportive, secondary role in a study. The design is based on the premises that a single data set is not sufficient in a study and that each type of question requires different types of data hence researchers have to include qualitative or quantitative data in answering a research question within a largely quantitative or qualitative study.The design was relevant in this study because of its ability to blend quantitative and qualitative data in complimentary manner. Some research questions in this study were designed to obtain quantitative data while others were designed to obtain qualitative data.

The target population of the study comprised of all 37965 households in the Sub County. Households were used in this study because land in the study area is predominantly owned by households. The household heads provided information on how land sub-division has influenced on livelihoods in the study area. The list of households in the Sub County was obtained from Nyamira North Sub County Social Development Office. The justification for using the entire households in the Sub County is that land sub-division is relatively a universal phenomenon in the Sub County (Mbula, 2017).

The sample size selection was determined by Krejcie and Morgan (1970) sample determination table which recommends a sample of 379 for a study target population of 37965 households (See Appendix I). After sample determination, stratified sampling technique was utilized to divide the Sub County into strata (wards). Stratified and systematic sampling techniques were used to select sample. In addition, the study employed purposive sampling technique to select FGDs participants and key informants for in-depth interviews. Purposive sampling was significant in limiting the sample elements to only those that are relevant to the study based on their knowledge on land sub-division and household food security in the study area.

This study utilized three data collection methods; questionnaire, focus group discussions and key informant interview. In the questionnaire method, a semi structured questionnaire was administered to 379 household heads in the Sub County. This instrument was administered by the researcher and research assistants who asked questions and recorded responses. Respondents were accorded adequate time (10 to 15 minutes) to provide well thought out answers. In addition, respondents were allowed to freely provide their views without any form of interference. The instrument was pretested in neighbouring Borabu Sub County on twenty purposively selected respondents to determine any difficulties in answering the questions and necessary changes were incorporated

The researcher also organized five Focus Groups Discussions (FGDs). Participants in focus groups discussions were purposively selected taking into account gender, regional balance, age and the length of stay in the area. Each focus group discussion comprised of six to ten participants. According to Morgan (1998a) effective focus groups discussion should comprise of six to ten participants. The discussions were conducted in quiet and conducive environments such as tea buying centres, churches, schools, and coffee farmers' societies compounds. The researcher who doubled as a moderator used a focus group discussion guide to ensure orderly discussions.Each ward had one focus group discussion.

The Key informants interview data collection method was conducted on fifteen (15) experts among them County Secretary for Agriculture (1), County Secretary for Land (1), extension officers (5), Officers from ministry of land (4) and officer from ministry of agriculture (4). They were asked questions relevant to their area of specialty and work. An interview guide was utilized in interviewing them. Interview for key informants was done by the researcher himself and it took place at their convenient place and time. The exercise lasted for two weeks.

The data collected was analyzed by quantitative and qualitative methods. Quantitative analysis involved derivation of statistical descriptions and interpretations of data by use of descriptive statistics that purely relied on numerical values. The data was presented by frequency tables. Data presentation, analysis and interpretation were in accordance with the research objectives. Statistical Package for Social Scientists (SPSS) program version 20 was adopted to generate data analysis tools.

On the other hand, qualitative data obtained was coded and analyzed using salient and recurrent themes that emerged in the data, but which related to land sub-divisions and its influence on rural livelihoods in Nyamira North Sub County. Qualitative data then became a source of interpretations of meanings, experiences, and perceptions on how land sub-division has household food securityin the study area. Qualitative data analyzed was presented by use of quotes and narratives. Before qualitative data analysis, responses from focus group discussions were translated from vernacular (Ekegusii) to English by research assistants.

3. Results

3.1 Drivers of Land Sub-division in the Study Area

The study sought to investigate the history of land sub-division in the area of study to help the researcher to understand its ramification on land sizes and food security over time. Respondents were asked whether the currently reduced land sizes could be attributed to land sub-division and the responses are displayed in table 1.

Table 1: Land Sub-division and Reduced Land Sizes in the Study Area

Is land sub-division associated with reduced land sizes in Nyamira North Sub County?	Frequency	Percentage
Yes	371	98
No	8	2
Total	379	100

As shown in table 1, 98% asserted that land sub-division is associated with reduced land sizes in the study area while 2% attributed reduced land sizes to other factors other than

land sub-division. Based on the data, it is evident that reduced land sizes in the study area are triggered by land sub-division (98% responses) and that other factors (2%) have minimal contribution to reduced land acreage in the study area. The finding is in agreement with the Mbula (2017) and Kipkemboi (2019) that reduced land sizes in the whole of Nyamira and Kisii counties is attributed to land sub-division.

The finding was also crossed checked during focus group discussions where participants in all the five focus group discussions held contended that land sub-division and inheritance were the basis of dwindling land sizes in the study area. Similarly, interviews with land officers revealed the same information. Thus, land sub-division is the main factor contributing to reduced land sizes in Nyamira North Sub County.

After establishing that land sub-division is the focal contributing factor to reduced land sizes in the study area, the study sought to investigate whether culture is the only factor influencing land sub-division in the study area. This is because Mbula (2017), Kipkemboi (2019), Molen (2017) and Jayne et al (2012) have documented that cultural norms and values are behind continuous land sub-division and inheritance in Africa. The culture advocates for land inheritance by men and that this happens from one generation to the other. Thus, the study sought to establish whether culture is the only factor influencing land sub-division in Nyamira North Sub County as pointed out by the literature above. The responses are shown in table 2.

Table 2: Factors Influencing Land Sub-division in the Study Area

Is culture the only factor Influencing Land Sub-Division in Nyamira North Sub County?	Frequency	Percentage
Yes	245	65
No	134	35
Total	**379**	**100**

Source: Field Data, 2019

As depicted in table 2, 245 (65%) of respondents said that culture is the only factor influencing land sub-division in the study area while 134 (35%) reported that culture is not the only factor behind land sub-division in the study area. The data shows that indeed culture (65%) is the main reason behind uncontrolled land sub-division in the study area. According to the culture of people in the study area, parents are supposed to sub-divide land for their children, preferably sons, to provide them with living space and realize other social meanings of land including continuity of generation and social identity. This finding agrees with Mbula (2017), Kipkemboi (2019), Molen (2017), and Jayne et al (2012) who have documented that cultural norms and values are behind continuous land sun division and inheritance in Africa.

Respondents (35%) reported that culture is not the sole factor influencing land sub-division in the study area. This category of respondents was asked to document and elaborate on the factors, other than culture, influencing land sub-division in the study area. Fifty-two (52%) of these respondents said that high population growth rate, forty-one (41%) reported poverty while seven (7%) of the respondents said that lack of government policy on land sub-division are the factors other than culture that influence land sub-division in the study area.

The 52% responses that high population is behind land sub-division in the study area was attributed to the prevailing social meaning of land that are attached to land in Africa. Thus, if every individual, in this case men, needs a place to call home, it means that land will be sub-divided and inherited in line with the community's cultural requirement. During interviews, a key informant had this to say:

> *"The high population growth rate has tremendously contributed to land sub-division in this sub-county. Households have stuck to culture, hence sub-divide land for their children and after some time the available land has shrunk, Man, 48-year-old".*

The sentiments of the forty-eight-year-old key informant depict how exponential population growth rate coupled with adherence to culture on land sub-division by respondents has resulted in reduced land sizes.Analyzing population statistics in the study area, the study agreed with the views of the forty-eight years oldkey informant because the total population in the County is close to thirty-thousand people with a density of 787 persons per kilometer square (Kenya National Bureau of Statistics, 2019). With a high population, land sub-division and declining land sizes are inevitable.

Furthermore, poverty (41%) was featured as a factor contributing to land sub-division in the study area. This was confirmed during focus group discussions where some participants felt that high poverty levels are to blame on the intensive and continuous land sub-division in the study area. Poverty has forced households to sub-divide their parcels of land for sale. Households especially those along the roads, shopping centres, and those around higher academic institutions like technical training institutes, have found it economical to sub-divide land and sell for purposes of development of the real estate, a lucrative business in the area at the moment. During focus group discussion, a participant had this to say:

> *"Poverty has forced many households to sell land. Households along Chabera-Ikonge road, those around market centres like Ikonge, Magwagwa, Ekerenyo among other markets have sub-divided land into plots to sell to investors to build commercial houses. In addition, households around Technical Training Institutes like EkeruboGietai, Gitwebe among other technical training institutes have divided the land into plots for sale", 47 years old man.)*

The sentiments of the forty-seven years old focus group discussion participant point out the land tenure and land-use changes in the study area. Perceptions and social meanings that households have historically attached to land especially continuity of generation and collective identity and wellbeing are slowly fading out. This is because poverty is taking a centre stage in land sub-division where households are sub-dividing land into plots for financial gains.

Lastly, lack of government policy on land emerged as another factor influencing land sub-division according to 7% of respondents who felt that culture isn't the only factor influencing land sub-division in the study area. Lack of land sub-division policy in place to guide land sub-division has resulted in continued land sub-division in the study area. If there was a policy outlining the minimum land sizes to be sub-divided and the conditions under which land sub-division should take place, the high rate of land sub-division in the study area won't occur. This finding was confirmed by forty-five key informants from the Land Department who argued that the Minimum and Maximum Land Holding Bill 2015 could have truly solved the problem of land sub-division in Kenya but it failed to get parliament's approval. Thus, land sub-division will continue to be a challenge in Kenya unless the government does something.

3.2 Ways in Which Land Sub-division has Affected Household Food Production in the Study Area

The study sought to investigate the ways in which land sub-division has contributed to reduced food production in the study area. Findings are shown in table 3.

Table 3: Ways in Which Land Sub-division has Affected Household Food Production in the Study Area

Ways in Which Reduced Land sizes have Contributed to Reduced Food Production	Frequency	Percentage
Two Planting seasons	227	60
Limited crop variety	98	26
Non-application of organic manure	31	8
Total	**379**	**100**

Source: Field Data, 2019

From table 3, 250 (66%) two planting seasons, 98 (26%) limited crop variety and 31 (8%) pointed out that non-application of organic manure are the ways in which reduced land sizes have contributed to reduced food production in the study area. Based on the findings, two crop planting seasons (60%) majorly contribute to reduced food production.

The two crop planting seasons (66%) have reduced farm productivity in the Sub County. The study established that, traditionally, the households in the study area had one planting season, that is between February and July. However, this was during the time when the land was adequate but with the current land situation, households are compelled by circumstances to plant twice a year to at least produce more for household consumption. The two planting seasons have led to the exhaustion of soil fertility which with time has negatively affected food production. During key informant interviews, an agricultural extension officer argued that *"the two planting seasons has negatively affected food production in Nyamira North Sub County since the soil is not given time to regenerate".* These sentiments were not divergent from findings of focus group discussions that established that, with the emergence of two planting seasons, farmers are not reaping much because of reduced soil fertility due to continuous use. During focus group discussions a participant said that:

> *"Planting twice a year has really messed us. Soils never get time to regenerate hence a decline in soil fertility. The quantity of crops produced has reduced compared to when planting season was one. This has resulted in hunger in households", (Male, 62 years).*

From this narration, it is evident that reduced land sizes due to uncontrolled land sub-division and inheritance have resulted in households having two planting seasons a year to boost their food security levels. This is likely to reduce food production and heighten hunger due to the overutilization of the soil.

In addition, the study established that the quality of seeds grown is poor. During focus group discussions and key informant interviews, it was reported that most households in the study area don't plant hybrid maize seeds instead maize grains for the previous season are used as seeds.A focus group participant said that:

> *"Most households plant early maturing varieties known as mogagori and ekebure. Households use maize from the previous harvest as seeds for next season" (Female, 53 years).*

This indicates why the area is experiencing reduced food productivity. This is because for production to be high, farmers need to plant hybrid seeds that fit their ecological zone this use of poor-quality seeds will only subject households to constant hunger. This information was also confirmed by an agricultural expert that most households have lost faith in high-quality inputs sold in agricultural stores partly because of rogue traders who package ordinary maize seeds and sell to unsuspecting farmers hence some have developed a cold foot for the seeds sold. In addition, the study established that the cost of hybrid seeds is high for some households.

Furthermore, the study established that limited crop variety (28%) is associated with reduced food production. The study found out that in the past when land acreage in the study area was big, households would plant a variety of crops that could supplement available food (maize) consumption. Households would plant sweet potatoes, bananas, sorghum, and millet. This greatly boosted household food security. But with the current land situation, households are unable to plant variety of crops complicating the food security situation. During focus group discussions, a participant had this to say:

> *"We are no longer able to plant a variety of crops. We only plant maize and vegetables for consumption. It is not like in the past where we planted sweet potatoes, cassava, sorghum, millet and plenty of bananas that supplemented ugali because reduced land sizes and even soil fertility" (Male, 72 years).*

This is a clear indication that reduced land sizes in the study area have limited the types of crops grown on farms. Currently, households are majorly growing maize and vegetables while foods grown in the past including potatoes, sorghum etc are no longer on the list of crops grown in the

study area. With this state of affairs, it is likely that hunger will be the norm in households.

The study also established that the non-application of organic manure in farming (8%) has contributed to reduced farm productivity in the study area. During focus group discussions, participants were in agreement that in the past when land sizes were big, households used manure in farm production processes. They argued that households would site a cowshed rotationally in various parts of the farm. This ensured the distribution of manure on the farm which led to high yields. The participants however faulted the excessive use of artificial fertilizer as the genesis of farm production woes in the area. They have negative perceptions towards excessive use of fertilizer that they say has led to soil acidity and reduced farm production. A participant had this o say:

> *"The origin of reduced farm productivity is when households began using artificial fertilizers in production processes" (Male, 74 years).*

This is a demonstration that reduced land productivity is also attributed to the use of inorganic fertilizers. This is due to the likelihood of soil acidity from continuous use of fertilizers and this may have an influence on household food production.

3.3 Land Sub-division and Household Food Security Situation in the Study Area

Since land sub-division has resulted to reduced land sizes held by household to less than an acre. Of the 379 respondents, 370 (98%) reported that diminishing land sizes resulting from continuous land sub-division have negatively influnced food production exposing households to dire food insecurity while 9 (2%) were of the opinion that reduced land sizes has had no impact on food production. These findings clearly show that land sub division has led to reduced land sizes that have in turn had a negative impact on household food security situation in the study area. During focus group discussion, participant unanimously agreed that diminishing land acreage in Nyamira North Sub County has resulted in low food production, that has in turn led to household food insecurity. This finding was confirmed during key informant interviews where an agricultural officer who argued that land sub-division has contributed to serious household food insecurity in the study area. He had this to say:

> *"This region has been a food basket in the former Nyanza province. In 1990s, households in this area produced a lot of food! Actually, almost all households produced about 25 bags of maize, most preferent food here. But now as we speak, households barely produce two bags per harvest. From my official statistics, general food production in this Sub County has reduced by 70% from 1980s and now 2019. This has led to serious household food insecurity in this area." (Agricultural Extension Officer, 53 years).*

This is evident that food produced by households has reduced by 70 percent since 1980s and 2019 leading to households' food insecurity. This finding agrees with Mbula (2017) and Catholic Church's Jesuit Hakimani Centre (2017) that households in the area of study are currently characterized by hunger resulting from uncontrolled land sub-division and inheritance

4. Conclusion and Recommendations

Land sub-division is a practice that has resulted in reduced land sizes in most parts of the developing countries. Although culture is perceived to be the leading factor influencing land sub-division, high population growth, poverty, and lack of government policy on land sub-division are among other factor fueling the practice in an areas like Nyamira North Sub County. Reduced land sizes occasioned by continuous land sub-division has resulted in reduced household food production and subsequent household food insecurity. Unless policies to guide land subdivision in terms of the minimum size of land to be sub-divided as well to change livelihood sources are formulated by the government and other stakeholders, misery and suffering for the future generation are imminent.

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