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Original Article

Effects Of Ancestral Land Size on Food Production in Dede Division, Migori County, Kenya

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Abstract

This study sought to determine the effects of ancestral land size on food production in Dede Division, Migori County, Kenya. The study adopted a descriptive research design with a sample size of 370 households drawn from a population of 9,503 households within the Division. Quantitative data was collected using household questionnaires administered to household heads. Qualitative data was obtained using key informant interviews (KII). Primary data was collected from direct observation and use of photography. Secondary data was obtained from published works, books and journals. Quantitative data was cross tabulated and the analysis presented in tables. Qualitative data was coded, compiled and integrated into the text. The study revealed that Sugarcane was the most preferred cash crop by the beneficiaries followed by tobacco (17.0%) and coffee (12.7%). The study therefore concluded that; the allure of income generated through cash crop production contributed to the expansion of the area dedicated to cash crops leading to a constriction of the land available for food crops. This study recommends that; the Government formulates a policy framework to streamline subdivision of ancestral land.

Keywords

Ancestral, Land Size, Food Production.

Article History

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1. Background Of the Study

By the 7th century, the techniques and knowledge of sugar production had reached China. In the following century, Arab traders and settlers spread sugarcane cultivation into Mesopotamia, Egypt, North Africa, and Spain. From there, Christopher Columbus later introduced the crop to Central and South America (Nassar, 2013). Between 1975 and 1986, Brazil experienced a rapid expansion in sugarcane acreage, driven almost entirely by the rising domestic demand for ethanol feedstock under its national biofuel program. On a global scale, Central America and the Caribbean held the highest proportion of cultivated land dedicated to sugarcane between 1969 and 2007, with about 7% of all farmland dedicated to the crop. During the same period, Brazil allocated approximately 4.4% of its cultivated land to sugarcane production (Fischer et al., 2008).

Fischer et al. (2008) in a study warned that in Brazil, sugarcane expansion could contribute to deforestation, biodiversity loss and widespread hunger—either directly through encroachment into unprotected native forests, fertile agricultural land or indirectly by displacing other land uses such as livestock grazing, maize plantations or soybean cultivation, which would then shift into new forested areas or be stopped altogether. Similar concerns have been identified in other regions of the world. For example, Fernandez and Nuthal (2012) noted that on June 10, 1988, sugarcane lands in Philippines were incorporated into the Comprehensive Agrarian Reform Program (CARP). This reform initiative aimed to redistribute land to those who worked in it—such as smallholder farmers, tenants, and agricultural laborers. Under CARP guidelines, a landowner could retain up to 5 hectares, while each child aged 15 or older could be allocated up to 3 hectares. The goal was to establish economically viable, owner-operated farms that would boost productivity and promote fairness among plantation owners, tenants, and workers within the sugar sector. However, despite its intentions, the program has encountered significant obstacles, particularly regarding land allocation. One of the most critical issues has been the diversion of land away from food production, undermining both the economic stability and the social welfare of affected communities.

Outgrowing is a type of contract farming with long and complex history in Africa, but has recently emerged at the Centre of global debates about agricultural commercialization. Contract farming, it is argued, provides an

opportunity for the rural poor to participate in production in commercial value chains and access markets for their produce. Contract farming is widely used by agribusiness companies to produce exports of high value crops such as sugarcane, coffee and tea; it can only benefit the rural poor in developing countries if an adequate governance and legal policy framework on land subdivision, to regulate cash crop versus food crop is in place. Kilombero Sugar Company Limited (KSCL), the largest sugar company in Tanzania, contributing almost three quarters of sugar being produced in the country illustrates these changes clearly (Sulle, 2017). In South Nyanza sugar belt where the study area is, the desire to be economically independent has led to expansion of area under sugarcane farming as farmers donate land to their sons as inheritance hence leading to land fragmentation, hence low food production (Nyangweso, 2011). In 2003, a cane variety named Co 945 occupied the largest cane surface with 30,220 hectares, representing 25% of the total area. Variety N14 came second to occupy 28,262 hectares (23%). A sizeable bulk of the area amounting to 34, 968 hectares (29%) had mixed varieties (Evelyn, 2005). Locally, Sugarcane is primarily grown by small scale farmers which exert pressure on available agricultural land (Kenya, Republic of, 2002). The total land area of Dede Division is 108.2 km^2 (10820 hectares). The total land area under small holder sugarcane farms is 59.3 km^2 (5930 hectares) out of which 4.1 km^2 (410 hectares) is large scale nuclear farm within Dede Division, added to this is the portion dedicated to Tobacco and coffee farming which combined also takes a big portion of arable land (Ndirangu, 2010). Therefore, the current study seeks to establish the effect of ancestral land size on food production in Dede Division, Migori County, Kenya.

A. Statement of the Problem

Sugarcane farming in Dede Division has long operated through a contract farming model in which farmers contribute land while Sony Sugar Company handles tasks such as ploughing, providing seed cane, and transporting the harvested crop. The costs of these services are later deducted from the farmers' earnings after harvest. This arrangement has remained appealing over the years, ensuring Sony Sugar Company gets a reliable flow of cane from both contracted and independent smallholder growers. However, the strong motivation to allocate more land to sugarcane may have led to uneven land distribution, favoring sugarcane at the expense of food crops. As both contracted and non-contracted farmers strive to expand their sugarcane acreage, food production is increasingly sidelined. Since this trend is relatively new, the study aimed to empirically measure how much land under sugarcane has expanded in the Division. Although sugarcane yields slightly higher net income than many traditional cash crops, it requires a long growth period of about 18 to 22 months before farmers can earn from it. Given other financial pressures—such as healthcare and school expenses—and the limited number of salaried workers in Dede Division, managing household needs over this long period is challenging. Low food production has been experienced especially in areas where cash crops are grown as they compete for rich agricultural land with food crops leading to low food production. The high income expected from cash crops like sugarcane, tobacco and coffee exerts pressure on available arable land, despite the income from cash crops being modest, most households in Dede Division experience food shortages before their cane is ready for harvest. In its early stages, Sony Sugar Company purchased large "nuclear estates" to meet its initial crushing requirements, which led to the displacement of local residents to create space for these plantations. Many of the relocated families bought smaller parcels of land within the Division. These resettled plots are often too small to support both cash crops and subsistence farming, largely because the compensation offered was insufficient. While sugarcane production has been widely studied in other regions of Kenya, little research has focused on Dede Division, particularly on how ancestral farm size affects food production. This study was designed to address this gap.

B. Specific Objective

The study objective was to determine the effect of ancestral land size on food production in Dede Division, Migori County, Kenya.

C. Research Question

The study research question was; what is the effect of ancestral land size on food production in Dede Division, Migori County?

2. Literature Review

In a study conducted in China, Hua, (2010) looked at household livelihoods, and the rural environment in Chongqing Municipality, South West China, the study adopted a cross-sectional research design incorporating

both qualitative and quantitative approaches. The study targeted a sample of 132 respondents, drawn from a total population of 241 rural household dwellers, as determined using Krejecie and Morgan's (1970) sample size table. The results revealed a significant positive correlation between the size of land and agricultural output within the study context. In another related research, Food and Agriculture Organization (FAO) has been compiling and releasing global crop statistics since 1950. According to these records, mid-20th-century sugarcane production stood at roughly 260 million tons, grown on about 6.3 million hectares worldwide—equivalent to an average yield slightly above 40 tons per hectare. By 1980, just three decades later, global sugarcane production had risen dramatically to approximately 770 million tons, cultivated on 13.6 million hectares (FAOSTAT, 2008). This growth was accompanied by an increase in average yield to about 57 tons per hectare. Nearly another 30 years on, estimates for 2007 revealed that sugarcane output had more than doubled again, reaching about 1.525 billion tons harvested from around 21.9 million hectares (Gheler-Costa et al., 2013). Overall, between 1950 and 2007, global sugarcane production expanded nearly sixfold, while the area under cultivation grew 3.5 times. During the same period, the average global yield rose from 41.4 tons per hectare to 69.6 tons per hectare, representing a consistent annual yield improvement of nearly 1% (Fischer et al., 2008). These studies underscore the importance of sugarcane as an agricultural crop and in the mix, land becomes an important determinant as a factor of production. It is therefore important to empirically determine the influence of land size on food production, more so in the African context.

The reasons behind expansion of acreage under sugarcane globally are varied. In Brazil, the main drivers for the recent expansion of sugarcane, particularly in Sao Paulo, were market opportunities created by the international demand for sugar and ethanol (Fischer et al. 2008). Shimamura, (2016) carried out a study of indoor cultivation for the future in Florida, United States of America, the study used empirical review of literature and hence no primary data was used. The study also adopted descriptive research design with target population including 26 projects, the study discovered that conversion of pastureland into sugarcane was done explicitly to increase per acre returns from what a cow-calf enterprise could be expected to earn. The study noted that Vegetable crops like sweet corn, green beans, tomatoes and watermelons earn substantially higher per acre returns, their collective earnings however, is not sufficient to displace the current 30,360 hectares being harvested as sand land sugarcane in the study area.

On the other hand, Rozelle & Huang, (1999) carried out a research study on supply and demand of agricultural commodities, their study looked at sugarcane and its effects in the Chinese market. Data was collected using desktop review from 98 firms. Data was analyzed using SEM-PLS to test the influence of Sugarcane in the trade, demand and supply of agricultural goods. The results showed that China is the world's third largest sugar producer after Brazil and India and that the major reason for the expansion of area under sugarcane in China is to ensure that at least 70% of sugar consumption in the country is from domestic production. During the milling years 2004/2005 and 2013/2014, the average yearly sugar production was 11.64 Metric Tons, 49.86% more than in the previous decade. Guangxi province registered the largest increase in both acreages under sugarcane and production in metric tons (MT), it produced 7.21 Metric Tons of sugar per annum on average compared to the production in recent decade, it increased by 104.25% compared to the production of 3.53 Metric Tons of sugar per annum during the 1994/1995 and 2003/2004 financial years (Li &Yang, 2015). The methodologies used in the two studies may not yield conclusive results as the data relied on is purely secondary, the current study sought to employ both qualitative and quantitative approaches with primary data as the main source of data for analysis.

Increase in acreage of land put under sugarcane cultivation has been sustained globally as from 1950's through the year 2000 up to date. Fischer et al. (2008) during research in land use dynamics and sugarcane production in Brazil noted that Brazil accounted for 75% of sugarcane production in the world. Similarities can be drawn in the Brazilian scenario and other research findings elsewhere for example in the Philippines currently, there are approximately 58,996 sugarcane farmers cultivating around 398,720 hectares of sugarcane land. Around 5 million people are employed in the industry and other sugarcane related activities. From a net importer of sugar in 1995, the country achieved self-sufficiency in 2003. The growth rate of sugarcane production was achieved mainly through the expansion of cultivated areas. Sugarcane was planted in 382,956 hectares for crop year 2007, up from 372,339 hectares in crop year 1995-96 (Roka et al. 2010). Most farmers practice mixed farming, largely because it is believed to help maintain soil fertility over time. When areas rich in biodiversity are converted into monoculture

systems—such as extensive sugarcane plantations—there is a noticeable decline in both the number and variety of species. This reduction can reach a point where many organisms are no longer able to perform their natural ecological functions, leading to biodiversity loss. This can explain the loss of some indigenous vegetables (Egesa, 2004). However, few studies have been conducted to determine the impact of the rapid expansion and commercialization of sugarcane on food crop production and eventually how this relates to land size.

Results from a study carried out in Sudan by Aynekulu et al. (2016) indicate that 52.4% of the farm sizes range from 0.04 to 3.42 hectares on average, these are inadequate for both cash crop and food crop farming. These findings agree with a previous study done by Senbeta et al. (2001) during a study of regeneration of indigenous woody species in central Ethiopia that found out that most sugarcane farms occupy extensive acres of land in areas where sugarcane is planted for commercial purpose at the constricting parcels set aside for food crops, leading to inflation of food prices. The removal of mature trees and vegetables, which serve as seed sources, may explain the extinction of some favorite local vegetable species (Senbeta et al., 2001). These studies affirm that growing of sugarcane is more detrimental to food security than was originally thought, though in a contrasting view, Lavers, (2012) who carried out a study in Awash valley in Ethiopia was of the opinion that the clearing of original vegetation for labor camp construction and firewood harvesting during the expansion of land for pasture and other agricultural crop production did more damage than sugarcane production, the study further argues that sugarcane compensates the farmer through cash payouts from the factories. This argument needs empirical verification.

Looking at smallholder farming elsewhere, the sugar industry in Swaziland (Eswatini) has seen rapid expansion since the mid-1950s. Despite being the smallest country in southern Africa, by the early 1980s it had developed the region's second-largest sugar industry after South Africa. By the 2014/2015 period, sugar processing accounted for more than 42% of the nation's GDP, and the sector continued to rely heavily on large estate-based production. Nevertheless, Swazi smallholders have long been part of the industry, transitioning from subsistence and semi-subsistence farming into commercial sugarcane production. Since the year 2000, their involvement has increased significantly, supported by major irrigation projects linked to two dams. These initiatives enabled thousands of farmers who previously depended on rain-fed farming to merge their plots into irrigated sugarcane cooperatives. Over this time, sugarcane acreage expanded by 28%, with most of the increase coming from smallholder participation. There are notable similarities between the experiences of smallholder farmers in the Philippines, Swaziland, and the South Nyanza sugar belt, where roughly 85% of all sugarcane is supplied by small-scale growers (Evelyn, 2005). However, the key difference is that expansion in the Philippines and Swaziland is largely driven by government-led initiatives such as CARP and cooperative development (Fernandez & Nuthal, 2012). This highlights the importance of examining a region where smallholder growth in sugarcane farming occurs independently of direct Government policy influences. Dede Division offers such a case, making it a suitable location for this type of investigation due to the strong presence of smallholder sugarcane farms

A study conducted in Nzoia sugar belt by Obuoyo, (2005) concluded that the area devoted to sugarcane cultivation expanded significantly following the introduction and vigorous promotion of monoculture sugarcane farming, which coincided with the establishment of the Nzoia and Mumias sugar factories in the 1970s. it further noted that this expansion had far-reaching implications for land ownership patterns. Many farmers were enticed into selling large portions of their land for immediate financial gain, while others opted to lease their parcels to sugarcane investors at prices below the prevailing market value. As a result, these households were left with only small remnants of their original land, insufficient for equitable subdivision among family members. Such diminished land units not only fall short of achieving economies of scale but also fail to meet the food production needs of the households involved. Similarly, a research study on farming practices in the Lake Victoria basin by Waswa et al. (2012) concluded that most farmers engage in cash crop farming to raise income for the education of their children and acquisition of additional property, notably, land and construction of permanent houses now that grass that was used for thatching houses has been eliminated through conversion of land to farming. Though these studies examine sugarcane cultivation across different regions—for example, Aynekulu et al. (2016) conducted work in Sudan, while Obuoyo (2005) examined the situation in Kenya and Senbeta et al. (2001) conducted theirs in Ethiopia, each study has differing results.

These findings however, show that intense land disturbance, including the clearing of mature trees that serve as seed sources, disrupts natural regeneration processes and promotes monoculture systems, which in turn support the growth of large-scale sugarcane plantations instead of food crops. This trend results in extensive areas being converted to sugarcane cultivation at the expense of food crops. However, despite the valuable insights offered by these studies, none of them specifically measure or document the exact degree to which ancestral land use has converted to commercial sugarcane production and the attendant effects, this means that the actual extent of land size comminution and complexities of its use remains unknown. These examples highlight the stark contrast between such countries—where expansive tracts of land are readily available—and Kenya, whose total land area is approximately 582,646 square kilometers (58,264,600 hectares), of which 97.8% is land and 2.2% is water (Republic of Kenya, 2013). Notably, only 20% of Kenya's land is classified as having medium to high agricultural potential, with the remainder falling under arid and semi-arid zones. Despite these constraints, Kenya has, like many other countries, experienced a steady increase in acreage under sugarcane cultivation. This trend is particularly evident in the South Nyanza sugar belt. Given the scarcity of prime agricultural land, it becomes essential to undertake an empirical assessment to understand patterns and drivers of land-use expansion for sugarcane production. Dede Division in Migori County was selected as the focal area for this study not only because of its close proximity to Sony Sugar Company but also due to its reputation as one of the top contributors of cane to the factory (Ndirangu, 2010).

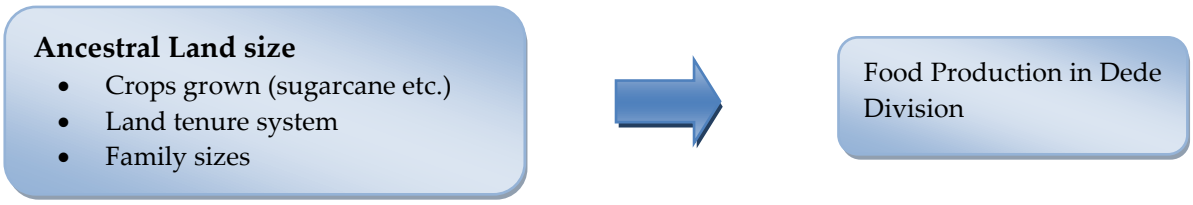

Fig-1: Conceptual Framework

3. Methodology

The study was carried out in Dede Division located in Awendo Sub-County which is one of the Sub-Counties in Migori County, Kenya. The study adopted descriptive research design. According to the Kenya national bureau of statistics (2009), Dede Division had a total population of 45,152 having 9, 503 households from which Krejcie &Morgan's (1970) table was used to determine the sample size of 333 households. Random sampling technique was used to select the respondents who included small scale farmers. The key informants included chiefs, assistant chiefs, and Sub County Agricultural Officers, KESREF officials at Opapo sugar research station and Sony sugar company head of agriculture.Primary data was collected using household questionnaires to 370 respondents from Dede Division. Statistics on the size of the land under sugarcane was obtained from the Agriculture Department of Sony Sugar Company. Secondary data was collected from KESREF offices at Opapo, Sub County Agricultural Officers at Rongo and Awendo and Sony Sugar Company. Data was analyzed using descriptive statistics focusing on frequency distributions and percentages. Cross tabulation was used to explore the relationship between key variables in the research questions of this study and the significance of the relationship suggested by the cross-tabulation tables were confirmed by use of the chi-square statistics.

4. Findings

The study sought to determine the effects of ancestral land size on food production in Dede Division, Migori County. To determine the influence of cash crop production on land subdivision, the respondents were asked to state whether they had ever given land to an heir and to state the type of cash crops preferred by the heirs on the pieces of land inherited. Data collected was cross tabulated and the results analyzed are presented in Table 1.

Table 1: Influence Of Sugarcane Production on Land Allocation

Type of cash crop	Ever given land to heir			
	Yes		No	
Sugarcane	258	70.3%	127	33.8%
Coffee	62	12.7%	111	30.1%

Tobacco	50	17.0%	132	36.1%
Total	370	100%	370	100%

Source: Field data, 2023

About three quarters of the household heads (70.3%) who had ever given their land to their heirs had sugarcane being grown by the beneficiaries from the land which had been allocated to them. Tobacco was cultivated by 17.0% while, at 12.7% Coffee was the least in preference as a cash crop by those who had received their portion of land. Within the percentage of the households who reported not to have ever given their land to heirs only 36.1% and 30.1% grew Coffee and Tobacco respectively. On the other hand, households which reported not to have given land to their heirs but were growing sugarcane were only 33.8%. There is some indication that the allure of possible comfort to be derived from income generated through cash crop production has contributed to the expansion of the area dedicated to cash crop farming. (See table 1 above).

Table 2: Influence Of Cash Crop Farming on Land Subdivision

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.396[a]	2	.006
Likelihood Ratio	10.513	2	.005
N of Valid Cases	370		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 27.65.			

The data on influence of cash crop farming on land subdivision was run in a Pearson chi-square test for level of significance where the p value of the Pearson chi-square test was 0.006 that is ($p < 0.05$). This implies that there is a high probability that the reduction in land size was influenced by the type of cash crop grown for the observations under the study. With 70.3% (Table 2) of the respondents growing sugarcane as a cash crop on the inherited land, it is indeed the main driving factor behind the expansion in area dedicated to it and decrease in land size dedicated to food crops.

To find out why most households did not have adequate land for which to grow both cash crops and food crops, they were asked to state why the total acreage at their disposal was small. The data collected under the question was analyzed and presented in Table 3.

Table 3: Reasons For Diminishing Land Holdings for Crops in the Study Area

Why is your land parcel under crops small?	Frequency	Percentage
Given the limited land as inheritance to my sons	340	94.3
Sold some parcel to a buyer	19	4.1
Inherited small piece from my father	9	1.1
Other	2	0.5
Total	370	100

Source: Field data, 2023

Findings from this research showed that those household heads who gave their land as inheritance to their sons stood at 94.3% of the entire sampled households, 4.1% sold their parcels to a buyer, only 1.1% indicated that they received the small pieces from their fathers, 0.5% of the households have small land pieces due to reasons other than the ones listed above for example some have leased their land. This sudden surge in interest on cash crops has a most probable link to reduction in land acreage for other crops especially food crops since majority of the households interviewed agreed to having given part of their land to siblings as inheritance.

To determine if the size of land at the disposal of a household was considered while deciding to grow cash crops, the researcher sampled households with less than one acre, those having one acre up to those with more than three acres and asked them to state whether they grew any cash crop. The results obtained were cross tabulated and the analysis is presented in Table 4.

Table 4: Size Of Land and Decision to Grow Cash Crops

Grown any cash crop?			
Size of land	**Yes**	**No**	**Total**
<1acre	70.5%	29.5%	100%
1 acre	65.0%	39.0%	100%
2 acres	72.4%	27.6%	100%
3 acres	72.0%	28.0%	100%
>3acres	82.6%	17.4%	100%

Source: Field data, 2023

Most households sampled for this study in all the categories of land acreage responded positively to growing cash crops in varying percentages. The smallest percentage of those households who responded positively to growing a cash crop was in the category of one acre at 63%, the highest was 84.6% for those with more than three acres of land. A similar trend is noted for those respondents who reported not growing any cash crop with the biggest percentage being those households with one acre at 37% and those with more than three acres being at 15.4%. This is shown in table 5.

Table 5: Size Of Land on Decision to Grow Cash Crops

Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	8.835[a]	4	.065
Likelihood Ratio	9.029	4	.060
N of Valid Cases	357		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.61.			

The p value of the Pearson chi-square test was 0.065 that is ($p < 0.05$). This implies that there is a very small probability that the size of land owned is considered when growing a cash crop since all households were growing a cash crop regardless of the size of the land acreage.

To find out the effects of land size on food production in Dede Division, the researcher further sought to determine the acreage that was dedicated to different types of food crops before and after the introduction of cash crops like sugarcane. The respondents were asked to state the acreage dedicated to the selected crops and their yields in tons before and after introduction of commercial sugarcane in the study area. The results were analyzed and presented in Table 6.

Table 6: Acreage Under Individual Crops Before and After the Introduction of Commercial Cash Crops in The Study Area and Its Output in Tons

Crop	Acreage before cash crops introduction	% acreage	Output in tons	% output	Acreage after cash crops introduction	% acreage	Output in tons	% output
Tobacco		12	1.1	9.4	4.4	11	50.69	24.2
Groundnuts	1.6	6.2	0.70	6	0.3	1.9	0.41	1.1
Cassava	2.1	13.5	1.17	10	0.6	3.9	0.45	1.2
Millets	2.3	14.8	1.08	9.2	0.8	5.2	0.81	1.3
Beans	1.7	9.7	1.35	11.5	0.3	1.9	0.45	0.2
Potatoes	1.7	8.7	0.72	6.1	0.2	1.3	0.36	1.1
Fruits	0.8	5.2	1.0	8.5	0.1	0.7	0.98	0.4
Rice	0.0	0.0	0.0	0.0	0.1	0.7	0.52	0.2
Coffee	0.8	5.2	0.80	6.8	2.3	2.9	50.36	22.1
Maize	2.0	24.1	3.6	30.7	1.9	12.3	1.17	0.4
Sugarcane	0.3	0.6	0.20	1.8	4.5	31.2	170	47.8

Totals	15.5	100	11.72	100	15.5	100	276.2	100

Source: Field data, 2023

Data collected from the field shows that before commercialization of sugarcane, the main cash crops which were cultivated in the study area were Tobacco and Coffee which were given about 12% of the acres of land per household and 5.2% of the acres respectively, the rest was left for food crops and a small percentage of 0.6% acres of the land was left for sugarcane mostly used for brewing of traditional beer and also chewing, the total production was about 0.20 tons which is about 1.8% of the total tonnage of crops produced by the households. Maize had the largest acreage at 24.1%, Groundnuts 5.2%, Cassava 13.5%, Beans 9.7%, Millets 14.8% and Fruits 5.2% of the land. This trend changed after increased subdivision of land where acreage for Maize was reduced to 12.3%, beans 1.9%, groundnuts 1.9%, cassava 3.9%, millets 5.2%, and fruits 0.7%, cash crops were also now more favored with Tobacco having 24.2% of the land, coffee had 22.1%, and Sugarcane now had 47.8 % of the land acreage under it. It was now commercialized and its tonnage had increased to 170 which is 47.8 % of all the household farm tonnage. In a bid to increase food supply, the County Government, through a non-governmental organization called Njaa Marufuku introduced and started to promote the growing of dry-land rice in the area, this effort has been too little too late as the total tonnage realize from the dry land rice is only 0.52 tons.

From the data above, it is evident that acreage under cash crops has grown and those under food crops have reduced.

To find out the extent of the reduction in land sizes among the households before and after commercialization of the formerly traditional crops of tobacco and sugarcane, the researcher analyzed the data collected from the field. Those households who owned 5 acres and below, those with 5 to 10 acres and those who had above 10 acres were all analyzed. The results of the analysis are shown on Table 7.

Table 7: Land Ownership Before and After Commercialization of Sugarcane

Size of land	Frequency before	Frequency		
		%	after	%
5 acres and below	83	22	311	84
6-10 acres	50	14	30	8
Above 10 acres	229	62	18	5
Don't know	5	1	8	2
Non responsive	3	1	3	1
Total	370	100	370	100

Source: Field data, 2023

Most households interviewed during this research acknowledged that currently, they do not own large pieces of land as the ones their parents or grandparents owned before commercialization of sugarcane started. About 22.4% of the households sampled had five acres and below, 13.5% owned between 6-10 acres and 61.9% had ten acres and above, 2.2% of the households could not remember the acreages owned before commercialization of tobacco and sugarcane.

5. Discussion

With 70.3% of the respondents growing sugarcane as a cash crop on the inherited land, it is indeed the main driving factor behind the expansion in area dedicated to it and decrease in land size dedicated to food crops. This study finding is in conformity with Ndirangu (2010) annual report which documented that during a training organized by National Accelerated Agricultural Inputs Access Program (NAAIAP) in Kolenya Market, Dede Division, one thousand (1,000) farmers were invited out of which only ten (10) out of the three hundred (300) who reported for the training admitted to dedicating the entire portion of their land to food crops, all the rest were cash crop farmers. It is true that farmers here still believe that they can live comfortably with their families on the cash returns from the cash crops. However, the farmers do not take into account the duration that the cash crops take to mature for instance sugarcane takes 18-22 months from planting to maturity. It is actually impossible to spread the income between the possible payments received. This leads to inability to use the funds derived from the sales to

access adequate food until the next crop is harvested and marketed (Aringo, 2008). It is this continuous growing of cash crops that has put pressure on available arable land, and in the longer term, with the current rates of population growth and migration into the area, land size is becoming smaller leading to low food production (Kennedy & Cogill, 1997).

The finding also concurs with Aluoka (1999) observation that, significant public resources have been directed toward expanding the cultivation of cash crops and that a comprehensive, long-term sugar development programme has been formulated, outlining substantial investment plans for rehabilitating and expanding existing sugar factories, as well as for advancing their privatization. Consequently, the prioritization of cash crop production is believed to affect how households allocate land—both in terms of shifting land away from food crops like maize and millet, and in the parcels traditionally distributed to sons as inheritance (Ambwere, 2003).

Both Obonyo et al. (2016) study on land fragmentation and implications on food security and its effects ancestral land size on food production and an observation by Sulle (2017) during a research in Kilombero Sugar Company in Tanzania are in agreement with the current study as they showed that the lucrative prices of sugarcane from the company and the previously reliable market have encouraged out growers to put most of their farmland into sugarcane as a cash crop hence reduction in the land sizes. Though the studies did not link these directly to expansion of area under sugarcane, key informant interviews (KII) reinforce the results from the study area as they provide strong interrelationships between expansion of land under sugarcane growing and reduction in sizes of land under food crops hence vindicate Sulle's observation that cash crop expansion has led to low food production.

It comes out in this study that majority of the households grow cash crops regardless of the size of the land at their disposal, several studies further confirm this; Egesa (2004) opines that households in sugarcane growing areas seldom consider growing food crops on their farms as a priority. Obuoyo (2005) during a study in Nzoia sugar-belt had similar findings where the acreage under sugarcane expanded due to the introduction and promotion of mono-cultural sugarcane production associated with the construction of Nzoia and Mumias sugar factories in the 1970's. This incredible expansion in sugarcane acreage consequently led to reduced land holdings or ownerships because most of the farmers were lured into selling their vast lands out for monetary gain, with another lot leasing out their lands to investors in sugarcane at prices below prevailing market rates. As a result, they are left with very little acreage of land to share out amongst the household members; such small units also shared out were profligate and could not sustain the food production requirements of such households. During one of the key informants interviews an agricultural officer sought to clarify that;

In a bid to bring under control the rapid expansion of land under growing of cash crops, opinion leaders in the County Government of Migori have suggested that a by-law be enacted that caps the growing of cash crops for farmers who own more than one-acre parcels of land only. This in essence means that those with smaller parcels either have to lease land elsewhere or stop growing cash crops. The debate surrounding this by law is bound to be intense and the suggestion, though good might not see the light of the day. There are also plans to promote growing of food crops through provision of seed subsidy. All these are geared towards improving food crop production.

This might be a good control measure; however, its implementation might prove to be a big challenge to the County government as the farmers are lured by the drive to get cash to send their children to school and meet other household obligations. All these literatures reviewed points at pressure being exerted on the available land.

In a sharp contrast a report on the Agriculture sector made by Evelyn (2005) noted that the total area under cash crops as at the end of the first quarter of 2004 was 107,622 hectares compared to 106,313 hectares in the same period in 2003, representing an increase of 1.2%, she attributed the increase to expansion and promotion of tobacco farming as a lucrative venture by Mastermind tobacco company in the sugarcane dominated region of South Nyanza sugar belt, which encompasses Dede Division which is the focus of this study. She further makes a very important observation, that overall, the Tobacco industry recorded an improvement in yields of 9.6% with 52.25 tons per hectare in the first quarter of 2004 up from 60.93 tons per hectare in the same period in 2003. It is important to note though, that, other studies done in sugarcane and tobacco growing areas confirm that the

farmers have significantly smaller percentages of their land under food crops compared with those farmers growing tea for example (Kennedy & Cogill, 1997). From the foregoing it is indeed true that as more land acreage is put under cash crops, production increases, however, land under other crops notably food crops is reduced leading to actual decrease in total amounts harvested. The bottom-line is that as a result of these cash crop influences, farmers in these areas have tended to move into commercial cultivation leading to further reduction in sizes of land under food crops.

During a Key Informant Interview (KII), the following sentiments were expressed by an informant;

Most pressure to subdivide land comes from children especially sons. Some of the sons are not even of mature age but they feel that their parents own big parcels of land and deny them economic independence hence they demand that they are given their portions so as to grow cash crops hence leading to further expansion of area put under sugarcane crop. Some lease or sell their inherited land and move to nearby market centers and towns as squatters.

The net effect of the pressure is that most of these parcels regardless of size are put under cash crops growing, hence leading to their expansion and inevitably a reduction in area under other crops especially food crops. Similar observations were made in other studies carried out in other parts of the world for instance Ogbu (1993) in a study carried out in Nigeria found out that traditional agricultural systems on ancestral land in many parts of tropical Africa were for the most part adequate to satisfy consumption needs. However, this notion changes when modern commercial farming is introduced in an area demand for land rises, this therefore means that the traditional pressure to own land is secondary since the real catalyst is the desire to be economically independent by growing a cash crop. The demand most probably leads to expansion of the land under cash crops as argued by Omolo & Odongo (2004) that commercial production of cash crops is still undergoing a crisis and the main beneficiaries are middlemen, the main losers being farmers who are impoverished as they neglect other crops and concentrate on expanding the area under cash crops.

The results of this study resonate well with the cultural observations among the Luo in Kenya, access to land has been the major source of livelihoods for small and medium farmers in Luoland. But access to land is governed by the tenure arrangements such as land inheritance, leasing or renting, purchasing which in turn results into land fragmentation (Obonyo et al., 2016). The assertion above suggests that livelihood is an allure of access to land, livelihoods among cash crop growing communities are closely tied to sugarcane growing majorly as Kilel (1993) shows in her analysis in Belgut Division, that, there are two types of farming systems in the Division, namely food crop and cash crop farming falling under the control of women and men respectively. Analysis on the allocation of land holdings between different crops shows that with the introduction of sugarcane as a commercial crop, acreage under it has increased as the men tilt land allocation to crops in their favor to produce sugarcane. The situation in Belgut compares well with the one prevailing in Dede Division as statistics collected from the field indicates a pattern of land use that point at cash crop production expanding and possibly contributing to diminishing land size dedicated to food crops.

6. Summary of Findings

Before the acceleration in expansion of area under sugarcane, maize, which is a major staple food in the study area had 27.1% of the land area on average per household set aside for its cultivation, however, when sugarcane and tobacco growing was commercialized, the size of acreage set aside for maize reduced by more than half to 12.3%. The rest of the food crops also had the amount of acreage set aside for their cultivation drastically reduced. It should also be noted that area under sugarcane expanded from 2.5 acres (12.6%) to 8.9 acres (72%) this resulted in increase of output of the cash crop from 1.3 tons (12.6%) to 170 tons (47.8%) for sugarcane alone. This study therefore revealed that cash crop farming has taken more than half of the total land area in the study area at the expense of food crops.

7. Conclusion

In view of the finding of this research, the following conclusion can be arrived at; in terms of effects of ancestral land size on food production in Dede Division, Migori County the phenomenal increase in acreage of

land area under cash crops has led to increase in cash crops output, this increase in output has not necessarily translated into adequate food to the household. Consequently, this study has empirically demonstrated that the expansion of cash crop growing has led to constriction of land available for food crop production leading to shortage of staple food, notably maize. Some dwellers have moved to nearby towns and have turned to trade, artisanship and casual employment as a coping strategy to sustain their families.

Recommendation

Both the National and County Government should come up with a policy framework to ensure that households with only one acre of ancestral land and below should only use a quarter of it for cash crop growing. This can be done through proper legislation of laws governing land inheritance, lease and disposal.

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