

## **EXPANSION OF LAND USE FOR SUGARCANE PRODUCTION IN DEDE DIVISION, MIGORI COUNTY, KENYA**

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**Abstract:** *Increase in acreage of land put under sugarcane cultivation has been sustained globally as from 1950's through the year 2000 up to date. Expansion of acreage under sugarcane has been occurring regardless of the size of agricultural land available in these areas. This study sought to determine the extent of expansion of land use for sugarcane production. Kenya has only approximately 582,646 square kilometers of land out of which only 20% is of agricultural potential. There is therefore need to carry out a similar research in an area where there are limitations on the size of land available for Sugarcane expansion. The study adopted a descriptive research design with a sample size of 370 households drawn from a population of 9,503 households within Dede Division in Migori County. The study revealed that three quarters of the household heads (70.3%) who had given their land to an heir admitted that sugarcane was preferred by the beneficiaries followed by coffee (17.0%) and tobacco (12.7%). Before expansion of acreage under sugarcane, 27.1% of the land was set aside for maize and only 0.6% of the land was used for production of sugarcane. However, when commercialization of sugarcane started, the acreage under it increased from 0.6% to 61.2% per household. Its output increased from 1.8% to 97.8% tons. The study therefore concluded that; the allure of possible comfort from income generated through sugarcane production has contributed to the expansion of the area dedicated to it as a cash crop. This study therefore recommends that, measures be put in place by the Government to ensure that expansion of commercial sugarcane cultivation is controlled so as to boost food production.*

**Keywords:** *Land Expansion, Land Use, Sugar Cane Farming*

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### **Background Of The Study**

Table Sugarcane originated from tropical South and South East Asia. Crystallized sugar, extracted from the sucrose stored in the stems of sugarcane, was known 5000 years ago in India (Nassar, 2013). In the 7<sup>th</sup> century, the knowledge and production of sugar was transferred to China. Around the 8<sup>th</sup> century sugarcane was introduced by the Arabs to Mesopotamia, Egypt, North Africa and Spain, from where it was introduced to central and South America by Christopher Columbus. Brazil has the largest area under sugarcane cultivation in the world, being responsible for approximately one third of the global harvested area and production (Roka *et al*, 2010). For the year 2007, 6.7 million hectares were harvested with a production of 514 million tons of sugarcane. From 2000 to 2007 an impressive pace of approximately 300 thousand hectares of land was converted into sugarcane every year. She produces 739.3 million metric tons per year (Fischer *et al*, 2008). In Kenya, the total area under cane 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%. The increase was attributed to South Nyanza sugar belt as all the other zones experienced diminishing cane area (Evelyn, 2005). 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 (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 of unknown percentage (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<sup>2</sup>(10820 hectares). The total land area under small holder sugarcane farms is 59.3 km<sup>2</sup>(5930 hectares) out of which 4.1 km<sup>2</sup>(410 hectares) is large scale nuclear farm within Dede Division (Ndirangu, 2010). Therefore the current study seeks to establish the extent of expansion of land use for sugarcane production in Dede Division, Migori County.

A research study on sugarcane farmers in the Lake Victoria basin concluded that overall, most farmers engage in sugarcane farming to raise income for the education of their children, 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. Site specific differences in the benefits are also a reflection of differences in the felt needs, general community cultural orientations and education levels (Waswa et al., 2012).

Nzoia sugar-belt in Kenya, the acreage under sugarcane increased due to the introduction and promotion of mono-cultural sugarcane farming concomitant with the construction of Nzoia and Mumias sugar factories in the 1970s. The increase 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 themselves were left with very little acreage of land to share out amongst the household members; such units do not benefit from economies of scale and could not sustain the food production requirements of such households (Obuoyo, 2005).

It is important to note that the expansion in area under sugarcane has also been experienced in southern parts of Nyanza, particularly in the study area, in a study on Kenya's Sugar industry; Evelyn (2005) observed that the total area under cane 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 expansions of sugarcane acreage in South Nyanza sugar belt. South Nyanza sugar belt is an area that encompasses Dede Division which is the focus of this study. Though these studies reveal an increase in area put under sugarcane production, some of them were done many decades ago, due to time lapse, a lot of changes have occurred necessitating another study.

Literature reviewed shows that each country had a reason to focus their policy on increasing the acreage under sugarcane, however, most of them were carried out in areas that have large expansive tracts of land at their disposal for sugarcane expansion a case in point is in the Philippines where, farms with less than 10 hectares are considered small; less than 50 hectares, medium; and above 50 hectares, large for sugarcane production (Fernandez & Nuthal, 2009) while in Brazil Fischer et al. (2008) states that the current sugarcane area represents only 2.5% of the 264 million ha of agricultural land use in Brazil, of which nearly 200 million ha are pastoral lands. There exists a big contrast in terms availability of farmland in these areas and in Kenya which has approximately 582,646 square kilometers (582,646,000 hectares) comprising 97.8% land and 2.2% water surface. Only 20% of the land area can be classified as medium to high potential agricultural land and the rest of the land is arid and semi arid land (Kenya, Republic of, 2010). Considering the noted increase in

acreage under sugarcane in other parts of the world and also in Kenya, it has been noted in South Nyanza sugar belt, and bearing in mind the limited nature of prime agricultural lands in Kenya generally, there is need for an empirical investigation to determine the expansion of land use for sugarcane production. Apart from its close proximity to Sony sugar factory, Dede Division in Migori County was picked for this study due to its position as one of the leading Divisions in cane supply to Sony Sugar factory (Ndirangu, 2010).

**Specific objectives and Research Questions:**

The study objective was to determine the extent of expansion of land use for sugarcane production in Dede Division, Migori County. The study research question was; what is the extent of expansion of land use for sugarcane production in Dede Division, Migori County?

**Methodology**

The study was carried out in Dede Division located in Awendo Sub-County which is one of the Sub-Counties in Migori County. 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 at Awendo. Data was analyzed using descriptive statistics focusing on frequency distributions and percentages. Cross tabulation were 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.

**Findings And Discussions**

The study sought to determine the extent of expansion of land use for sugarcane production in Dede Division, Migori County. To determine the influence of sugarcane production on land allocation, the respondents were asked to state whether they had ever given land to an heir and to state the type of cash crops grown 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	260	70.3%	125	33.8%
Coffee	63	17.0%	134	36.1%
Tobacco	47	12.7%	111	30.1%
Total	370	100%	370	100%

Source: Field data, 2014

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 as a cash crop from the land which had been allocated to them. Coffee was cultivated by 17.0% while, at 12.7% Tobacco 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 sugarcane production has contributed to the expansion of the area dedicated to it as a cash crop. (See table 5 above). This is indeed confirmed from an excerpt obtained from key Informant Interviews conducted during the study that;

*Most of the households in North Sakwa Location have dedicated most of their land to the growing of sugarcane, even those with smaller pieces of land to satisfy the demands of the sons who want to grow Sugar cane to be economically independent. For families with many sons this has meant that most of their land is under one crop (sugarcane) there has been little efforts aimed at diversification.*

**Table 2: Influence of sugarcane production on Land allocation**

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.396 <sup>a</sup>	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 sugarcane production on land allocation 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 expansion in land size was influenced by the type of cash crop grown for the observations under the study. With 70.3% (Table 5) of the respondents growing sugarcane 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 other crops in the study area. Ndirangu (2010) in his annual report tends to support this position when he reports that during a training organized by National Accelerated Agricultural Inputs Access Program (NAAIAP) in Awendo town two thousand five hundred (2,500) farmers were invited out of which only ten (10) out of the three hundred (300) who reported for the training admitted growing either tobacco or coffee as a cash crop, all the rest were sugarcane farmers. It is true that farmers here still believe that they can live comfortably with their families on the cash returns from the crop (Sugarcane), (Ndirangu, 2010). However, the farmers do not take into account the duration that sugarcane takes from planting to maturity which is 18-22 months. It is actually difficult to spread the income between the possible payments received. This leads to inability to access adequate food until the crop is harvested and marketed (Aringo, 2008). It is this continuous growing of sugarcane 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 may become more constrained leading to low food production (Kennedy & Cogill, 1997).

Kenya government accords high priority to the development of the sugar industry. The government policy is centered on attainment of self-sufficiency in the meeting of the country's demand for sugar, while in the long

run; the government expects to earn foreign exchange through exports. As such, Aluoka (1999) notes, that the government has allocated substantial amounts of resources for the expansion of the industry and a long term sugar development program has been evolved consisting of detailed investment proposals for rehabilitation and also expansion of existing sugar factories. Sugarcane production therefore is believed to influence land allocation other crops and the one given to sons as inheritance, (Ambwere, 2003).

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**

<b>Why is your land parcel under cropssmall?</b>	<b>Frequency</b>	<b>Percentage</b>
Given the limited land as inheritance to my sons	349	94.3
Sold some parcel to a buyer	15	4.1
Inherited small piece from my father	4	1.1
Other	2	0.5
<b>Total</b>	<b>370</b>	<b>100</b>

Source: Field data, 2014

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 sugarcane and its inevitable expansion 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. A closer look at the type of cash crops grown by the beneficiaries on their land may suggest the extent of expansion of area under such crops.

Globally, land tenure comes in different methods such as inheritance, renting, purchasing and land being offered as a gift. So far such practices have encouraged expansion of land under cash crops (Obonyo et al., 2016). While Obonyo et al., (2016) based their research on land fragmentation and implications on food security, the current study concentrated on land use for sugarcane. An observation by Sulle (2017) during a research in Kilombero Sugar Company in Tanzania 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 hence low food production. Though he did not link this directly to expansion of area under sugarcane, the results in Table 4 reinforced by key informant interviews (KII) from the study area provide a strong interrelationship between expansion of land under sugarcane growing and reduction in sizes of land under other crops hence vindicate Sulle’s observation that sugarcane expansion has led to low food production.

To determine if the size of land at the disposal of a household was considered while deciding to grow sugarcane, 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**

Size of land	Grown any cash crop?		
	Yes	No	Total
<1 acre	73.5%	26.5%	100%
1 acre	63.0%	37.0%	100%
2 acres	73.4%	26.6%	100%
3 acres	74.0%	26.0%	100%
>3 acres	84.6%	15.4%	100%

Source: Field data, 2014

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 <sup>a</sup>	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. It comes out in this study that majority of the households grow cash crops regardless of the size of the land at their disposal. This is confirmed by Egesa (2004) that households in sugarcane growing areas rarely 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 concomitant with the construction of Nzoia and Mumias sugar factories in the 1970's. This tremendous 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 uneconomical and could not

sustain the food production requirements of such households. During one of the key informant interviews an agricultural officer sought to clarify that;

*In a bid to bring under control the rapid expansion of land under growing of sugarcane, the County Government of Migori has enacted a by-law that caps the growing of sugarcane 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 sugarcane. The enforcement of this by-law has begun albeit with some resistance. 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 is 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 literature reviewed points at sugarcane expansion on the available land.

Plate 1 below shows a none contracted small holder cane with ratoon and freshly planted sugarcane.



**Plate 1 Planted cane at the foreground and ratoon cane at the middle background**

To find out the effects of sugarcane farming on food production in Dede Division, the researcher further sought to determine the acreage that was dedicated to different types of crops before and after the commercialization of 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 Sugarcane in the study area and its output in Tons**

<b>Crop</b>	<b>Acreage before cane introduction</b>	<b>% acreage</b>	<b>Output in tons</b>	<b>% output</b>	<b>Acreage after cane introduction</b>	<b>% acreage</b>	<b>Output in tons</b>	<b>% output</b>
<b>Tobacco</b>	2.0	13	1.1	9.4	1.4	9	0.69	0.2
<b>Groundnuts</b>	0.8	5.2	0.70	6	0.3	1.9	0.41	0.1
<b>Cassava</b>	2.1	13.5	1.17	10	0.6	3.9	0.45	0.2
<b>Millet</b>	2.3	14.8	1.08	9.2	0.8	5.2	0.81	0.3
<b>Beans</b>	1.2	7.7	1.35	11.5	0.3	1.9	0.45	0.2
<b>Potatoes</b>	1.2	7.7	0.72	6.1	0.2	1.3	0.36	0.1
<b>Fruits</b>	0.8	5.2	1.0	8.5	0.1	0.7	0.98	0.4
<b>Rice</b>	Nil	Nil	Nil	Nil	0.1	0.7	0.52	0.2
<b>Coffee</b>	0.8	5.2	0.80	6.8	0.3	1.9	0.36	0.1
<b>Maize</b>	4.2	27.1	3.6	30.7	1.9	12.3	1.17	0.4
<b>Sugarcane</b>	0.1	0.6	0.20	1.8	9.5	61.2	270	97.8
<b>Totals</b>	<b>15.5</b>	<b>100</b>	<b>11.72</b>	<b>100</b>	<b>15.5</b>	<b>100</b>	<b>276.2</b>	<b>100</b>

Source: Field data, 2014

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 13% 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 27.1%, Groundnuts 5.2%, Cassava 13.5%, Beans 7.7%, Millets 14.8% and Fruits 5.2% of the land. This trend changed after commercialization of sugarcane 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%, the other cash crops were also now less favored with Tobacco having only a paltry 9% of the land, coffee had 1.9%, meanwhile Sugarcane had expanded and was now taking a whopping 61.2% of the land. It was now commercialized and its tonnage had increased to 270 which is 97.8% of all the household farm tonnage. In a bid to increase food supply, the 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 realized from the dry land rice is only 0.52 tons.

From the data above, it is evident that acreage under sugarcane has expanded and those under other cash crops have drastically reduced. Sugarcane takes a higher proportion of acreage than Maize, Tobacco and even coffee combined. In actual sense sugarcane takes more than half the total acreage in the study area. A report on the sugar industry made by Evelyn (2005) noted that the total area under cane 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 expansions of sugarcane acreage in South Nyanza sugar belt. South Nyanza sugar belt is an area that encompasses Dede Division which is the focus of this study. She further makes a very important observation, that overall, the sugar industry recorded an improvement in cane yields of 9.6% with 72.25 tons per hectare in the first quarter of 2004 up from 65.93 tons per hectare in the same period in 2003. Further, she notes that Mumias, Nzoia and Sony sugar zones realized improved cane yields. Other studies done in sugarcane growing areas confirm that sugarcane farmers have significantly smaller percentages of their land under food crops compared with non sugarcane growing farmers (Kennedy & Cogill, 1997). From the foregoing it is indeed true that as more land acreage is put under sugarcane, production increases, however, land under other crops notably food crops is reduced leading to actual decrease in total amounts harvested. Aringo (2008) in his research carried out in Uriri Division, also tends to support this when he stated that an estimated 130,000 families in the Lake Victoria basin were engaged in the sugar industry with a further 50,000 people employed directly by the factories. As a result of sugarcane influence, farmers in these areas have tended to move into sugarcane cultivation leading to its expansion.

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 their own sugarcane 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.*

The net effect of the pressure is that most of these parcels regardless of size are put under sugarcane growing, hence leading to its 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 the sugarcane as argued by Omolo & Odongo (2004) that commercial production of sugarcane is still undergoing a crisis and the main beneficiaries are milling factories, the main losers being farmers who are impoverished as they neglect other crops and concentrate on expanding the area under sugarcane crop. Sony Sugar Company was established in 1979 and from then onwards promotion of sugarcane as a commercial crop in the area has been sustained resulting in large acres of land being put under the crop

To find out the extent of the reduction in land sizes among the households before and after commercialization of 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
<b>Total</b>	<b>370</b>	<b>100</b>	<b>370</b>	<b>100</b>

Source: Field data, 2014

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 sugarcane. Among the Luo in Kenya access to land has been the major source of livelihoods for small and medium farmers. 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 sugarcane growing communities are closely tied to sugarcane growing itself 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 favour 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 sugarcane production expanding and possibly contributing to diminishing land size dedicated to other crops.

**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 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 0.1acres (0.6%) to 9.5 acres (61.2%) this resulted in increase of output of sugarcane from 0.20 tons (1.8%) to 270 tons (97.8%). This study therefore revealed that sugarcane farming has taken more than half of the total land area in the study area at the expense of food crops.

**Conclusions**

In view of the findings of this research, the following conclusions can be arrived at; in terms of the extent of expansion of land use for sugarcane production, the phenomenal increase in acreage of land area under commercial sugarcane has led to increase in sugarcane output, this increase in output has not necessarily translated into adequate food to the household. Consequently this study has demonstrated that the expansion

of sugarcane growing has led to constriction of land available for food crop production as the cash crop is given more land and attention at the expense of other activities. Some respondents, especially those who reached upper primary have moved to nearby towns and have turned to trade, artisanship and casual employment as a coping strategy to sustain their families.

### Recommendations

The National Government should institute measures to ensure that households with one acre of land and below should only use a quarter of it for sugarcane growing. This can be done through proper legislation of laws governing land inheritance, lease and disposal.

### References

- Adelino, M., Schoar, A., & Severino, F. (2016). *Loan originations and defaults in the mortgage crisis: The role of the middle class. The Review of Financial Studies*, 29(7), 1635-1670.
- Evelyn, N. (2005). *Kenya's sugar industry: A report by Export processing zone authority. Web www.epzakenya.com.*
- FAOSTAT. (2008). *Food Production. Available at: http://faostat.fao.org.*
- Fernandez, M. D. P. & Nuthall, P. L. (2009). *Technical efficiency in the production of sugarcane in central Negros area, Philippines: An application of data envelopment analysis. J.Issaas Vol. 15 No.1:77-90.*
- Fischer, G., Teixeira, E., Hizsnyik, E.T., & Velthuizen, H.V. (2008). *Land use dynamics and sugarcane production in Brazil. Luxemburg, Austria. Pp 29-45.*
- Li, Y.R. & Yang, L.T. (2015). *Sugarcane agriculture and sugar industry in China. https://www.research gate.net/publication/268156933.*
- Nassar, A.M.; & Moreira, M. (2013). *Evidences on Sugarcane Expansion and Agricultural Land Use Changes in Brazil. Institute for the International Trade Negotiation: Brighton, UK, 2013. 20. Dale, V.H.; Keith, L.*
- Ndirangu, W. (2010). *Annual Agricultural Report for 2010 for Awendo/Rongo Districts-DAO/SCAO Awendo/Rongo sub counties.*
- Nyangweso, G.O. (2011). *An Investigation of the Effects of Land Subdivisions on Sugarcane Production: A Case of Land Holdings within Sony Sugar Company Zone, Kenya. A research Project submitted to the Graduate School in Partial Fulfillment for the Requirements of The Masters Degree in Business Administration of Kisii University College. Egerton University.*
- Obuoyo, J.A. (2005). *The role of traditional crops in promoting food production in the dry Siaya district, Kenya. Unpublished thesis (M.A.), Maseno University.*
- Roka, F. M., Baucum, L. E., Rice, R. W., & Alvarez, J. (2010). *Comparing costs and returns for sugarcane production on Sand and Muck soils of southern Florida, 2008-2009. A Journal of American Society of Sugar Cane Technologists, Vol. 30.*
- Senbeta, F., & Teketay, D. (2001). *Regeneration of indigenous woody species under the canopies of tree plantations in Central Ethiopia. Trop. Ecol. 2001, 42, 175-185.*