CHALLENGES FACING SMALLHOLDER SUGARCANE FARMERS IN KWALE COUNTY.

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DECLARATION

I declare that this project is my original work and has not been submitted to any other university for award of any degree.

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LIST OF ABBREVIATIONS
KSB: Kenya Sugar Board
GDP: Gross Domestic Product
NAS: National Adaptation Strategy
MAFAP: Monitoring African Food and Agricultural Policies
COMESA: Common Market for Eastern and Southern Africa
KSI: Kenya Sugar Industry
KISCOL: Kwale International Sugar Company Limited
1.0 INTRODUCTION

1.1 Background information

Sugarcane growing in Kenya plays a very important role in the country’s economy. The sub-sector’s contribution to the economy is as important as that of the crops like tea, coffee, horticulture and maize. The sugar sub-sector contributes about 15% of the agricultural gross domestic product (GDP). Agriculture is the mainstay of the Kenya’s economy, supporting at least 25% of Kenyan population. This population relies directly or indirectly on the sub-sector for their livelihoods (KSB, 2010).

Sugarcane production has been improving over the years in Kenya. This has been attributed mainly to the increase of total land brought under cane production. Total area under cane production in Kenya as at March 2013 was 206,809 hectares. The country projects more areas to be under cane production and the yields are projected to increase as a result. Estimated area and yields by 2014 is 224,925 hectares and 100 tonnes per hectare respectively (KSB, 2010).

The sugarcane growing is comprised of both the smallholder farmers as well as the nucleus estates commissioned by the sugar factories. The smallholder farmers supply 92% of the sugar milled in the country and the rest is provided by the nucleus estates (KSB, 2010). The smallholder farmers comprise about 85% of the cane growers in the country (GoK, 2007).

The roles of the sugar industry in Kenya are tremendous, with more potential of the sub-sector to greatly contribute to the nation’s economy. These economic contributions of the sector do call for studies, policies and research to ensure the sector remains competitive in the economy (Monitoring African Food and Agricultural Policies (MAFAP), 2013).

With reference to a report of the government of Kenya (2007), the sugar industry employs about 40,000 workers in the factories and directly over 6,000 workers in the jaggeries, which are over 600 in the country.
The smallholder farmers supported by the industry are approximately 250,000 and over 6 million Kenyans have their livelihoods depending directly or indirectly on the industry (KSB, 2010).

Kenya saves an estimated Ksh. 20 billion annually through domestic production of sugar. The government also gets revenues from the industry through taxation on top the 15% of the
Agricultural GDP contributed by the sub-sector (KSB, 2010).

Although consumption of sugar in the country exceeds production, the deficit is supplemented by imports from countries in the Common Market for Eastern and Southern Africa (COMESA) trade bloc. The sugar sub-sector has led to the existence of eleven (11) operational sugar mills in the country (MAFAP, 2013). These industries help the country in solving the problem of high unemployment of its citizens. The are 600 jaggeries in the country (NAS, 2007).

Sugarcane has various by-products which are useful in the energy and industry sectors of a country. Bagasse is used in power co-generation while molasses is a component in the production of various industrial products like beverages and pharmaceuticals (Clainos and Ledwin, 2011).

Like any other industry, the sugar sub-sector is faced by various challenges. Some of these challenges have been there while others crop up when dynamics in the industry change. According to KSB (2010), the challenges which are hampering the performance of sugar industry in Kenya are high cane production costs in the country as compared to other sugar producing countries in the region, failure of the particular stakeholders to upgrade the milling factories to match with new technology requirements, underfunding of the industry, inadequate research and extension services to support the industry and the threats of the Kenyan sugar industry due to the liberalization of trade under COMESA protocols.

A major area of concern in the sugar industry is the level of productivity which determines the level of profitability, distinctively between the sugar mills and the out growers (who are mainly the smallholder farmers). Various studies have been done to establish the profit determinants in the sugar industry. Other studies touch on the issues which influence performance in the industry, like management practices. According to Everlyn (2013), managerial practices in the cane industry have more of negative impacts on the industry. It is observed that bureaucratic systems of the smallholder farmers who operate on contractual basis are very lengthy and this tends to demotivate the farmers from engaging into cane farming.
According to Economic Governance Reform (2005), a destructive political economy has contributed to woes of the sugar industry. There has been a lot of corruption and resource mismanagement which has greatly ruined the sector.

Clainos and Ledwin (2011) observed that the productivity of sugarcane is going down despite its vital contribution to the Zimbabwe’s economy. This is contributed by failure of the farmers to plough out old crop, lack of operational equipment by the farmers, limited training to farmers on farming practices, unavailability of farm inputs and high transport and haulage charges. All these challenges to farmers emanate from limited access to finance and credit facilities. Clowes et al. (1998) observed that loading and transportation of sugarcane contribute to a high percentage of the capital and running costs.

According to Waswa et al. (2012), who was studying the relationship between contract sugarcane farming, poverty and environmental management in the Kenyan Lake Victoria basin, established that the differences in income distribution between the sugar companies and the farmers was related to ethical, managerial and political factors. The observation is that net income was highly lowered by company-driven deductions which the farmers could not control. This was a skewed sharing of income in which the sugar companies retained about 60% of the gross income leaving the farmers with only 40% of the gross income which translate to low profits once they make deductions of their production and related costs.

Mandla and Masuku (2012), in Swaziland established that sugarcane profitability is anchored on good husbandry practices of the cane crop, like timely weeding, fertilization and irrigation. They concluded that profit in sugarcane farming was determined by size of the farm, costs of inputs like labour and fertilizer and experience in farming. Labour related issues (Mbuyazwe and Barnabas, 2012) in addition to distance of the farm to the mill and technique of fertilizer application were observed as the factors influencing the sugarcane yields, hence profitability of the cane to Swaziland farmers.

1.2 Problem statement

The sugar sub-sector in Kenya is an integral part of the economy, contributing about 15% of the agricultural GDP. The industry is mainly supported by the smallholder farmers who supply about 92% of the sugar milled in the country (KSB, 2010). According to KSB (2009), the sugar industry
is faced with various challenges which range from high costs of production, inadequate funding, trade liberalization and poor factory conditions. These challenges are generally for the sugar industry in wholesome.

According to NAS (2007), although the smallholder farmers are realizing some profits from the sector, there are various challenges impacting on their returns. Poor cane farming practices, high plot divisions within the cane growing areas, reliance on unpredictable rain and high production costs are the major challenges. Various studies have been done on the determinants of profitability in sugarcane farming. According to Masuku (2011), in Swaziland, smallholder farmers’ returns from cane farming is dependent on farm experience on sugarcane production, the amount one harvests per hectare and the distance of the farm to the sugar milling

Despite the farmers being in the cane growing sector for long and acquired vast experience in the farming, they are still faced by the problem of low productivity (Clainos, et al., 2011). Managerial practices influencing the sugar industry has been done with a case of Mumias Sugar Company in Kakamega County (Everlyn, 2013). Studies related to productivity or profitability determinants in sugarcane farming in Kenya are biased in relation to study areas, mostly done in the western region of the country. It is on this notion that I undertake to study the determinants of productivity level in sugarcane growing with a case of sugarcane farmers in Kwale county. The economic research problem in this study is to identify the challenges that contribute to low productivity by smallholder cane farmers in Kenya so that the relevant stakeholders in the sugar industry can help in addressing the issues for the farmers to realize their full potential in the cane business.

1.3 The purpose of the study

The purpose of this study was to identify the factors which determine productivity levels in sugarcane growing by smallholder farmers of sugarcane in Kwale County.

The specific objective was

i. To assess the challenges faced by sugarcane smallholder farmers in Kwale county.
1.4 Justification of the study

The information from this study will be used by various stakeholders. The energy sector in most African countries, Kenya inclusive, are developing countries with high demand for electricity and fuel. This can be boosted if the challenges facing the sugar industry are addressed and more sugar produced in the country as the deficit caused by high consumption of sugar than the production capacity will be solved. The by-products from sugar cane can be used for electricity and ethanol generation (Clainos et al. 2011).

The information from the research will be essential to various stakeholders in the sugar industry. First, the Kenya Sugar Board will use the findings from the research to formulate policies to ensure the industry is competitive in the region. Second, this information will be useful to the government of Kenya in making policies to ensure the interests of smallholder farmers is safeguarded and finally the farmers will use this information to identify areas they can avoid so as to realize good returns from the cane growing industry.

1.5 Study area

This study was done in Kwale County in the Kenyan coastal region. The area experiences the various conditions favourable for sugarcane growing: high temperatures from 20-27 degree Celsius throughout the year, with the dry sunny conditions promoting sugar accumulation and high rainfall from 1200-1500mm. These conditions together with the deep fertile soils are favourable for the growth of cane crop.

The Kwale sugar growing zone is isolated in the coastal region, a factor which can make the farmers here have other distinct challenges when studied in comparison with the cane growing zones of the western part of the country. The study area was Ramisi Location in Kwale county. The residents of Ramisi also grows other crops like maize and sorghum as food crops. Other economic activities undertaken by residence of Ramisi include trading, fishing and handicraft such as weaving, carpentry and pottery.
1.6 Organization of the project

The rest of the project is arranged in the following manner: chapter 2 outlays the review of relevant literature materials justifying the cause to low yields of sugarcane to growers. Chapter 3 provides the overview of the methodology used in this study. Chapter 4 provides the results of this study. Chapter 5 outlines the conclusions in relation to this study and the last part of this study provides the list of references used in the study.
2.0 REVIEW OF LITERATURE

2.1 Empirical studies

Farming is both a lucrative and a risk venture. It’s very expensive in terms of time requirement, costs of inputs, environmental uncertainty and logistical costs. The situations could be different depending on the type of crop; food crop or cash crop. Farmers engage in sugarcane farming for commercial purpose, and use the income to finance education of their children, acquire more property in other sectors and enable them live a decent life (Waswa et al. 2012). Sometime these goals are not always met due to low returns to farmers from the cane.

Sugarcane growing is a major player in the economy, especially for developing states. In Kenya, it contributes about 15% of the agricultural GDP (KSB, 2010). It accounts for 59% of the agricultural output in Swaziland (Swaziland Sugar Association, 2011). Despite its enormous contribution to the economies, the sugar industry has been in the decline in most of the producing countries. Since the industry is largely made of the smallholder farmers, poor performance in the industry means low incomes both to the milling companies and to the outgrowers, a reason why majority of the smallholder farmers are poor due to low returns from cane farming. The smallholder farmers are most of the time harvesting low yields than they expected or targeted hence the question, “what factors could be affecting the productivity of the smallholder farmers?”

According to Masuku (2011), profitability of cane farming is determined by yield per hectare, sucrose content in the sugarcane, the farmer’s experience in farming and the distance between the farm and the mill.

Mbuyazwe and Barnabas (2012), in Swaziland observed that large scale farmers get the highest level of yields, with the medium and small scale farmers coming second and third respectively. They were mainly studying the relationship between the amount of cane harvested in relation to farm size. They found out that sugarcane yields were influenced by three variables: distance from the farm to the mill, hand application fertilizer man days and strength of labour. Distance from the mill had an effect on the yield as they found out that yield reduced by 0.44 ton per hectare for every 1kilometre change in distance between the mill and the farm. Management
practices in the farm and production inputs were also important determinants of the level of cane yields.

Mandla and Masuku (2012) in Swaziland observed that profitability in sugarcane is realized through good and proper crop husbandry practices like observing time in weeding, applying fertilizers and irrigating the crops. They observed that the size of the farm, costs of labour and fertilizers and experience in farming in terms of time the farmer had in farming have a critical role on the amount of harvest hence influencing the profitability to cane growers.

Wasswa et al. (2012), in Kenya sought to establish the relationship between contract sugarcane farming, poverty and environmental management. They established that the sugar companies benefited more than the farmers, as the companies retained 60% of the gross income per unit ton of the sugarcane delivered by farmers. The disparities in income distribution were found to be related to ethical, managerial and political factors. Wasswa et al. (2012), established that although sugarcane farming would rise farmers’ income and help reduce the level of poverty, Western and Nyanza provinces are still the poorest regions in Kenya; with 1.8 million and 2.4 million people considered poor in Western and Nyanza provinces respectively (Kenya National Bureau of Statistics, 2010). The factors eating into farmers income from cane farming cause this situation of farmers being poor despite coming from the rich Kenya sugar belt.

Clainos et al. (2011) observed that the sugarcane industry in Zimbabwe was declining despite its critical role in the country’s economy. The low productivity levels were attributed to failures of the farmers to destroy old cane crop from the field, little training to the farmers on good farming practices and unavailability of farm inputs.

Studies done in Kenya to establish what factors influence productivity of sugarcane farming looked mostly into managerial practices (Everlyn, 2013) and the levels of income distribution between the sugarcane farmers and sugar mills (Wasswa et al. 2012). These studies were done on the western region of the country, mostly Western and Nyanza provinces. No research has been done focusing on farmers who engage in sugarcane farming in the Kenyan coastal region, particularly Kwale county. It is on this notion that I undertake to study the factors which influence productivity of sugarcane farming, particularly to farmers attached to Kwale International Sugar Company Limited (KISCOL) in Kwale county.
3.0 METHODOLOGY

3.1 Sampling procedure and data collection

Simple random sampling technique was used to select sugarcane farmers of Ramisi division in Kwale county. This is because the farmers operate in homogenous agro-climatic conditions and sugarcane is a major crop enterprise in the area. The target population was all smallholder sugarcane growers. Thirty respondents were randomly selected. The researcher chose a sample size of 30 farmers because according to the law of central limit theorem (CLT), a sample size of 30 respondents and above is large enough to give accurate results. A farmer was only interviewed if he/she had sold sugarcane at least once to the sugar mill. Those farmers who had not yet sold sugarcane to the mill were not included in the sample.

The instrument used to solicit data from farmers was a semi-structured questionnaire. This was very appropriate since questionnaires are used to collect basic information from a sample. All the items in the questionnaire were developed to address the research objective. The questionnaires were personally delivered by the researcher to the farmers. A brief explanation about the study was given to the cane farmer (respondent) before the questionnaire was given. The researcher also guided the farmers in filling in the questionnaires.

3.2 The model used

The factors that affect sugarcane farmers can be modeled as follows: yield was used as the dependent variable and the independent variables include farming experience (measured in years of sugarcane farming), size of farm (measured in acres), times a farmer was visited by an extension officer.

\[Yield = f(\text{farming experience}, \text{size farm}, \text{education level}, \text{farm visits frequency})\]

Therefore, a regression model was used to determine the relationship between the factors (Xi) and yield (Y),

\[Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon.\]

\[Y = \text{Yields (tons/acre)}\]
\( \beta_0 = \) Constant term of the regression

\( \beta_1 \ldots \beta_4 = \) Parameters to be estimated

\( X_1 = \) Farming experience (years)

\( X_2 = \) Farm size (acres)

\( X_3 = \) Farm visits frequency

\( X_4 = \) Level of education

\( \varepsilon = \) Random error term.

### 3.3 Variables and their expected influence

Table 1: The estimated variables and their expected influence on cane yields

<table>
<thead>
<tr>
<th>Variable</th>
<th>Expected output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming experience</td>
<td>+</td>
</tr>
<tr>
<td>Farm size</td>
<td>+</td>
</tr>
<tr>
<td>Farm visits frequency</td>
<td>+</td>
</tr>
<tr>
<td>Level of education</td>
<td>+</td>
</tr>
</tbody>
</table>

Table 1 shows the variables to be estimated and their expected influence on sugarcane yields. A + sign means that the variable was expected to positively influence the yields. All the variables were expected to have a positive relationship with sugarcane output. The number of years a farmers has been involved in sugarcane farming is a proxy of his/her management capabilities of the farm. It is expected to have an influence in the farmers management skills as well as improved interaction with the mill where they deliver their sugarcane. Through the interaction,
the farmers may develop some confidence in sugarcane farming by applying the required management expertise to produce good yields. Thus, farmers who had been involved in the sugarcane farming for several years are expected to perform better than relatively new farmers. Therefore, a positive relationship is expected between farming experience and sugarcane yields per acre. The size of the farm has an effect on the productivity of the cane enterprise. Farmers with big farm sizes are expected to obtain high yields than those with smaller farm sizes, and therefore a positive relationship is expected between farm sizes and yields per acre.

Smallholder sugarcane growers receive extension services in order to manage their crop enterprises well. The number of visits that they are afforded by the extension officers is hypothesized to result in a good crop yields. A positive relationship is therefore expected between farm visits and good yields. Education is a proxy of a farmer’s management expertise of the crop enterprise. It is expected to influence the farmer’s understanding of good crop husbandry. Therefore, farmers who had acquired a post-primary education are expected to better manage their farms than relatively farmers who has below primary education or without any formal education at all. Thus, a positive relationship is expected between the level of education and crop yields.
4.0 RESULTS AND DISCUSSION

4.1 Descriptive statistics

Table 2: The descriptive statistics of Ramisi division smallholder sugarcane growers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Descriptive statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average farming experience</td>
<td>3.43 (1.04)</td>
</tr>
<tr>
<td>Average farm size</td>
<td>3.67 (1.09)</td>
</tr>
<tr>
<td>Average farm visits frequency</td>
<td>1.03 (0.72)</td>
</tr>
<tr>
<td>Average farmers age</td>
<td>33.63 (3.91)</td>
</tr>
<tr>
<td>Average income level</td>
<td>18100 (6326.46)</td>
</tr>
<tr>
<td>Easy credit access (% yes)</td>
<td>23.3</td>
</tr>
<tr>
<td>Education level (% primary and above)</td>
<td>40</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>33.3</td>
</tr>
</tbody>
</table>

Note: standard deviation are in parenthesis

From the results in Table 2, the average farming experience is 3.43 years. This implies that the farmers in Ramisi are already in their establishment stage of cane cultivation. The nature of sugarcane growing requires that farmers possess good experience in application of effective crop husbandry in order to get good yields. The average farm size is 3.67 acres. Under good crop management, this farm size can ensure good yields form sugarcane enterprise. Sugarcane production requires a farm size which can allow mechanization and a farm size of 3 acres and above can allow that to enable the farmer realize economical output. The average farm visits by extension agents is approximately once in a month. This means that Ramisi farmers are poorly exposed to extension services. Frequent visits of farmers by extensions officers is expected to help farmers improve their crop management and thus harvest good yields.
The mean age of Ramisi sugarcane farmers is 33.63 years. This means majority of the farmers are young. To the general sugarcane cultivation, this is the group which is vibrant and energetic to work in sugarcane farms since the cane enterprise is labour-intensive. This group is also easy to grasp knowledge whenever educational forums and seminars are organized. The average income level of Ramisi cane farmers is Ksh 18,100. This means that the farmers have some disposable income to procure farm inputs. Utilization of funds by farmers to procure farm inputs require proper advice to the farmers to understand which inputs are effective in sugarcane growing.

The Table 2 results further reveal that only 23.3% of the Ramisi farmers access credit facilities easily. The larger group of the farmers struggle to get loan facilities or don’t access them at all. This implies that the majority of sugarcane farmers lack enough financial muscle to invest in cane production and end up getting poor and/or low quality cane yields. The majority of Ramisi farmers are female, as the percentage for male is only 33.3% of the farmers interviewed. This implies that majority of agriculture-related meetings, forums and training should invite more of the women, because the results reveal that they are the ones highly involved in farm management.

The results also reveal that 60% of the farmers interviewed in Ramisi had only elementary education. This translates to poor crop management hence poor yields. Sugarcane cultivation requires considerable education so that the farmers can understand and apply good crop husbandry practices in order to reap good yields. Thus, various approaches should be used to introduce more farmers to education and knowledge transfer forums.
4.2 challenge faced by smallholder farmers

The estimates of the parameters of the linear regression function model were obtained through the use of the Statistical Package for Social Sciences (SPSS version 16). The results of the regression are presented in table 3.

Table3: Regression results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-11.056</td>
<td>20.478</td>
<td>0.594</td>
</tr>
<tr>
<td>Farming experience</td>
<td>-1.558</td>
<td>3.848</td>
<td>0.689</td>
</tr>
<tr>
<td>Farm size</td>
<td>18.153</td>
<td>4.102</td>
<td>0.000</td>
</tr>
<tr>
<td>Farm visits frequency</td>
<td>0.916</td>
<td>5.453</td>
<td>0.868</td>
</tr>
<tr>
<td>Level of education</td>
<td>5.494</td>
<td>9.107</td>
<td>0.552</td>
</tr>
</tbody>
</table>

From the results in Table 3; an increase in farm size by one acre will increase the level of yields by 18 tons, this means that as the farm size increases the total harvest would increase. This can be attributed to; farmers with large pieces of land may invest in efficient technology to use in production, hence cane farmers should be encouraged to increase their farm sizes to tap this benefit or an increase in farm size by cane farmers would motivate them to increase efficiency that will translate to higher yields. This agrees with the earlier expected cane output of the variable. An increase by 1 unit in number of the farm visits by extension agents will improve the yields by 0.9 tons. This means that approaches should be sort to increase cane farmers access to extension services. This increase in yield can be attributed to farmers applying whatever they learnt in trainings and advice given by extension agents. Cane farmers should be encouraged to seek more extension services or even form groups within themselves to facilitate knowledge transfers amongst themselves, and this will enable them reap higher yields. This coincides with the expected output of the variable.
An improvement in level of education by one year will improve the yields by 5.5 tons. This implies that as the level of education increases the total yields increases. This can be related to; farmers with a higher level of education are able to understand proper crop management, select good cane varieties and determine effective agrochemicals like pesticides and when to apply them. This means that farmers should be encouraged to attend more training forums, seminars and be aggressive to learn so that they can realize the benefits attributed with better understanding and application of good cropping practice. The result is in agreement with what was expected. There is an inverse relationship between farming experience and cane yields. This means that an increase in farming experience by one year will reduce yields by 1.5 tons. It was expected that more farming experience would be associated with increase in yields. The negative relationship could be that, farmers who have been in farming for many years tend to be complacent as they realize that they have the knowledge of cane farming. As a result they ignore some of the important crop husbandry practices that are upcoming, thus obtaining low yields. In addition to this, farmers could be using obsolete methods of farming, traditional tools and varieties which do not encourage high output. This disagreed with the expected output of the variable.
5.0 CONCLUSION

The purpose of this study was to assess the challenges faced by smallholder cane growers in Kwale County. Regression model was used to answer the study objective and the results revealed that farm size, extension services, farming experience and education level were very critical factors affecting the farmers’ efforts to realize good yields. Farmers should be encouraged to invest in large tracks of land for cane cultivation as this will enable them adopt efficient technologies necessary for cane production. Various approaches should be used to enable farmers improve their farms. Farmers should have more access to extension services in order to improve their knowledge of farming practices like observing planting times, pest and disease control and crop maturity. Approaches should be instituted to introduce more framers to education access through adult literacy education and establishment of demonstrations farms. Farmers who have been in production for a long time should be encouraged and advised so that they don’t ignore basic farming practices as these leads to poor cane yields.
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