UNIVERSITY OF NAIROBI

FACTOR THAT CONTRIBUTE TO THE DECLINING TREND OF COFFEE PRODUCTION IN KENYA: THE CASE IN NYERI COUNTY

BY

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# Table of Contents

List of figures and tables.................................................................iv

Abstract .....................................................................................v

1.0 Introduction ............................................................................. 1
  1.1 Background information .................................................... 1
  1.2 The Research problem ....................................................... 3
  1.3 The purpose of the study .................................................... 4
  1.4 The specific objectives ....................................................... 4
  1.5 The hypothesis ................................................................. 4
  1.6 Justification of the study .................................................... 4
  1.7 Study area ......................................................................... 4

2.0 An Overview of the Literature .................................................. 5

3.0 Methods ................................................................................ 8
  3.1 Sampling and data collection ............................................. 8
  3.2 Model used in the study .................................................... 8
  3.3 Factors affecting coffee production .................................... 9

4.0 Results and discussions .......................................................... 11
  4.1 Characteristic of coffee farmers ....................................... 11
  4.2 Regression result of variables .......................................... 12

5.0 Conclusion ............................................................................. 15
List of Figures and Tables
Figure 1: Coffee production and Exports 1961-2011..................................................I

Table 1: Description of factors affecting coffee production ......................................9

Table 2: Descriptive results of variables .................................................................11

Table 3: The regression result for variables ............................................................13
Abstract

Kenyan coffee has been among the top five of the country’s agricultural exports and it is known to contribute greatly in Kenyan economy by employing about 6 million Kenyans either directly or indirectly. The coffee production trend has been studied for the past 50 years and it has been observed that coffee production has been declining from a peak of 128,700m tons per year to an average of 49,088m tons hence greatly affecting the economy. For this reason, this study was carried out to assess the major causes of coffee decline at farm level with a case study done at Nyeri County. The assessment was done using descriptive statistics where OLS model was used to analyze the factors which could be affecting coffee production. The study used primary data collected from the interviewed sample of 30 farmers. The result of the study found out that produce price, loan accessibility, distance to market and visit by extension officers to be the major factors that had significant impact on coffee production. The study offered some recommendation on how the above mentioned factors could be addressed to enhance a reverse in the coffee production trend.
1.0 INTRODUCTION

1.1 Background information

Kenyan coffee is among the top five of the country’s agricultural exports and is known to be the best quality of the species Arabica produced in international market therefore used to blend other coffee from other origin (Kegode, 2005). The main reason why Kenyan coffee has best quality is because it’s grown in areas with the best agronomic conditions (Mureithi, 2008). This coffee industry has contributed to the Kenyan economy by employing about 6 million Kenyans either directly or indirectly (Margaret, 2013) who depend on it as a major income earning source which enable them to pay school fees, provides food security, improve their living standard and also contribute to foreign exchange earning to the country (Nyachamba, 2012).

Coffee production in Kenya is a two level product (Chege, 2012), the first level being small holder farmers organized into cooperative societies which help to increase their significance in trade, in marketing and also in semi-processing and the second level is large scale farmers. According to (Bichanga and Kabaka, 2013), the production rates by these two levels are, 35% and 65% respectively. Coffee production in Kenya had managed to earn 40% of the country’s foreign exchange back in 1986, but since then its contribution has continuously declined to about 3% in year 2010 due to the drop in its production, i.e. from 128,700m tons in 1987/1988 crop year to an average of 49,088m tons (Bichanga and Kabaka, 2013) and this has greatly affected the economy of Kenya.

Figure 1: Coffee production and exports, 1961-2011

Source: (GAIN, 2010)
Figure 1 illustrates the coffee trend in Kenya for the past 50 years for both production and exports. Note that, both graphs are almost similar because Kenya has been exporting almost a 98% of what they produce with a local consumption estimated to 2%. The trend shows an increase for the years 1961 to 1988 after which the coffee reaches a peak at 150,000mt and starts to decline to the current status of 40,000mt as at 2011. This decline in coffee production has been under study and a few reasons identified as the major contributors to the decline.

Liberalization of the coffee sector has been quoted by (Bichanga and Karanja, 2013) who have carried out research in coffee industry as one of the contributor to the decline, others are price factors (Karanja and Nyoro, 2002), input price factors and climate factors according to (Mugweru, 2011). The liberalization involved legal and policy reforms to remove government control in the producer co-operative societies and encouraged competition in the processing and marketing of the produce. This was aimed at reversing the already noted decline in coffee production to boost incomes among the people who depend on coffee but the observation was that it made the decline worse off (Chege, 2012) who claim that liberalization process was incomplete. The following are some of the factors alleged to have emerged from liberalization act; mismanagement of co-operative societies (Kegode, 2005), decline in farmers earnings leading to loss of confidence in management of coffee affairs, also due to poor farming practice and lack of application of inputs.

The industry have tried to address issues identified by encouraging a policy reform in coffee sector, a direct payment systems and break of monopoly in coffee sectors for provision of favourable factors to help improve coffee yield (Karanja and Nyoro, 2002), also by delivering of inputs, and extension services (Nduati, 2012). Chege (2012) mentioned of the Initiatives to promote coffee productions which have been tried such as project put in place; the Second Coffee Improvement Project (SCIP II) and Stabilization of Export Funds (STABEX) to provide loans but the projects have failed to be sustainable. The above strategies have been tried but production problem has not been fully solved only a slight increase in the production has been observed. So more research needed to be done to assess the effectiveness of the solution suggested and also indentify more strategies to enhance an increase by addressing the issues at farm level, stabilize the coffee prices and addressing issues to do with infrastructure which could be contributors to the decline such as poor roads. By doing this, the Kenyan coffee farmers
would regain the confidence hence benefit from its production economically through foreign exchange earnings.

1.2 The problem statement

The economic research problem in this study was to evaluate ways to address factors and market issues contributing to the decline in coffee production in Kenya. Coffee farming has been an important economic activity in Kenya contributing in creation of employment, income earning to about 45% of the country’s population and in earning foreign exchange (Mureithi, 2008). Liberalization has greatly contributed to decline in coffee production (Bichanga and Karanja, 2013), removal of government control over coffee sector lead to mismanagement of cooperative societies and this in turn has affected the farmers confidence in management of coffee affairs who opted to uproot the coffee crop to replace it with other economic activities or neglecting the coffee farms (Kegode, 2005).

Decline was also contributed by factors that affected small scale farmers such as gender issues where coffee farms were owned by men and not women, this resulted to women getting discouraged and tended to shift to food crops hence the decline in coffee production (Kariuki, 2013). Other factors were; marketing factors which affected prices and cost to coffee production, finances issues which were as a result of limited access to credit, government policies, physical (land division) and human resources (Gathura, 2013).

Good recommendations have been given, such as government intervention needed to help in provision of favourable factors which would enhance improvement in coffee yield. A few strategies have been put in place with the aim of solving this declining trend in production; for example, projects have been put in place (STABEX and SCIP II) to provide funds in form of loans and this has failed to be sustainable leaving most of the cooperatives in debts (Karanja and Nyoro, 2002). A lot of concentrations have been directed to higher level of coffee production like in management of cooperatives, marketing level and government interventions, and little has been done at farm level. Therefore, the study was to fill this gap by assessing the factors which has perennially hindered farmers from realizing optimal production potential per tree in a crop year.
1.3 Objectives of the study

The main objective was to study the factors and market issues contributing to decline in coffee production in Kenya.

1.4 The specific objective

a. To identify factors and market issues contributing to decline in coffee production at farm level

1.5 The hypothesis

a. Coffee production is not a function of factors of its production.

1.6 Justification of the study

The study is intended to be of importance in exposing the factors and market issues affecting coffee production at farm level in Kenya a case study in Nyeri County and this would help the country realize how these factors could be addressed to improve the coffee production. This would be of much significance to coffee farmers who would be enlightened on how to improve their coffee production and in return benefit from the increased earnings.

1.7 Study area

Nyeri county has a geographical condition which favour coffee farming: has an attitude range of 1220-2300m, red volcanic soils, and an average rainfall of approximate 953mm (Theuri, 2012). Area under coffee is 1106 ha which represent 8.9% of the total area under coffee in Kenya with an estimated annual production of 8264 metric tonne by the Kenya coffee network. Nyeri County is not an exception of the experienced decline in coffee production and this has been reflected by the increasing level of unemployment, inequality level, and inability to cater for basic educational and medical need. This justified the need to carry out research in this area with an aim to improve coffee production because it reflected what the whole country is experiencing.
2.0 LITERATURE REVIEW

This chapter aims at elaborating more on coffee production in Kenya and also review what other researchers have done in the coffee industry. The findings of review will help the researcher identify the gaps in coffee industry and this will enhance the need to study the declining trend of coffee production in Kenya with the aim of identifying factors contributing to the decline and in the end recommend on ways to address those factors.

Coffee was introduced to Kenya back in 1893 and was grown by British and European farmers because the Kenyans were hindered from venturing into the industry until when the Kenya gained independence in 1963 giving Kenyans freedom to farm coffee (CRF, 2013). Later the independence was granted and this came along with changes where Kenyans were allowed to venture in coffee production which resulted in increase of production to the year 1988/89 when the country reached its peak by producing 130,000 metric tonnes (CBK, 2006). In the later years after 1989 the coffee production trend has been observed to decline to 40,000 tons in 2011/12. This decline was attributed to property boom in areas that grew coffee and price instability and also by other factors such as liberalization of coffee industry (Kabaka and Bichanga, 2013).

Despite the decline, coffee industry in Kenya is still highly considered for contributing an approximate of 3% of all the exports from Kenya. It’s also estimated that 6 million Kenyans are employed directly or indirectly in the coffee industry. This benefits the country in provision of income, tax revenue and foreign exchange earnings. The Kenyan coffee is highly demanded for its well known intense flavour and pleasant aroma which is attributed to the excellent conditions for growing coffee plants in areas of high plateaus around Mt.Kenya, the Aberdare Ranges, Kisii, Nyanza Bungoma, Nakuru, Kericho and Rwanzori mountains (Gathura, 2013). This study explain the good performance which to some extent influence the coffee production and this contributes to the current study which is majoring in observing the trend.

The other factor identified to affect the production trend is high cost of production which is a combination costs of resources such as labor which contributes to 50% and percentage lest is of fungicides, insecticides, fertilizers and manure (CRF, 1999). This raise in cost is associated with inflation, inefficient input markets and poor road infrastructure which hinders accessibility of markets by producers hence the continued decline in production.
(Kabaka and Bichanga, 2013) argued that the major contributor to coffee production decline is the liberalization of coffee industry which resulted in negative effect after the government withdraw its control in coffee industry, the issues of cooperative mismanagement, decline in application of inputs, declined farmers income and poor farming practices emerged leading to farmers’ loss of confidences in management of coffee affairs.

According to (Gathura, 2013) study, she aimed at determining whether marketing factors, finances, government policies and physical and human resources affect coffee production, she used the stratified sampling technique in collecting data and applied the qualitative and quantitative descriptive statistic in analysing the data and found out that the above mentioned factors did contribute the decline in production, therefore recommend the government to encourage coffee production by formulating favourable marketing factors.

According to (Theuri, 2012) study on factors affecting coffee revitalization programmes in Mukurueini district Nyeri County using a descriptive survey design to analyse his observation pointed out such as access to coffee market, funding of coffee and gender as factors affecting revitalization programs. The gender was listed as a factor because it was observed that men dominated in decision making in coffee farms and this hinder women and children from getting a good portion of the benefit despite contributing much in labor force, therefore women have been shifting from cash crop production to food production out of frustration and this result to a decline in coffee production.

Another study by (Nginyangi, 2011) was aimed at analyzing factors which influenced the level of economic efficiency of coffee production, he used the data envelop approach model to compute economic efficiency and he found out that the mean economic efficiency was 45% therefore creating opportunities of 55% which could be realized if the following were improved; level of education, access to credit facilities from cooperatives, government formulation of policies and access to extension services. This study relate to current study because its focusing at identifying factors which need to be address with the aim of improving coffee production.

A study was conducted on finding out the determinants of coffee production in the Kenyan economy (Mugweru, 2011), he used a Nerlovian model to estimate supply response of coffee to these determinants and found out that there was appositive relationship between price and coffee
output, output and rainfall, output and hectare planted and coffee output and price of input. The recommendation was that the government had to intervene by addressing the credit constraints and other factors contributing to a negative change of the above mentioned determinants so the study give the current study a better understanding of the possible factor which might be a current problem hence contributing to the decline in coffee.

(Mureithi, 2008) in his study on some of the challenges for decent work which is done for international labor office, the commodity he choose was coffee. He highlights the need for decent work to help upgrade coffee production by encouraging farmers to apply the good agronomic practices which would address the issues of high costs of production and also the issues of mismanagement by cooperatives. The study addresses some of the factors which contribute to the decline in production and the current study fail in same line of identifying more factors and find ways to address them.

The literature review captures most of the facts stated about coffee industry, the studies carried out in relation to the decline of coffee production and also points out the recommendations given by the various researchers on how to address the issues identified. Therefore, it is evident that little concentration has been given on how to improve coffee production by addressing factors at farm level and this creates the gap which this study aims to bridge.
3.0 METHODS

3.1 Sampling and data collection

The target population included all coffee farmers in Nyeri County. The sampling was done using the stratified random sampling whereby two members was randomly picked from each of the 23 cooperatives and 16 estates out of the total 163 estates making a total of 60 sample size. The criteria used to determine sample size was based on relevant literature. The stratified method was used in this study because the population had two subset one of the small scale farmers who operated under cooperative, and the large scale farmers who were estates. Random sampling was then used to select a sufficient number of subjects from each stratum by picking the 10th estate from the list of estates and any two farmers from each cooperative were randomly picked.

Data collection was done using a questionnaire through a face-to-face interaction, this aspect of the interview enhanced a higher level of reliability to the data collected, and also the interviewer could provide clarification where necessary. This face-to-face interview ensured that the questionnaires were filled by the right people (coffee farmers). The data was collected in December 2013. The type of data collected was on factors and market issues expected to affect coffee production.

3.2 Model used in the study

The study adopted the ordinary least-squares (OLS) model and descriptive design. The reason for choice of OLS is that, it’s a linear modeling technique used to model multiple explanatory variables. Therefore, it well fitted this study in that it could relate the dependent variable $Y$ (coffee production) with its independent variable $X_i$ (factors of coffee production).

$$ Y = \alpha + \beta_i X_i + U_i $$

$Y$ is the average coffee production of the respondent (dependent variable)

$\alpha =$ Constant

$\beta_i =$ coefficient (average expected change in $Y$ for one unit change in $X_i$)
3.3 Factors affecting coffee production

Coffee production was expected to be a function of its factors of production and market related issues which would contribute to either a positive or negative change to the productivity. These factors and market issues if well understood could be addressed to enhance a change in the current coffee production trend. For example, price issues, input use, credit accessibility, size of land, extension services to farmer, and other variables as listed in the table below.

Table 1: Description of factors affecting coffee production

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description of the variable</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRICE</td>
<td>Low price of coffee produce</td>
<td>-</td>
</tr>
<tr>
<td>ACCESSLOAN</td>
<td>Loan accessibility</td>
<td>+</td>
</tr>
<tr>
<td>INCOME</td>
<td>Income of the respondent</td>
<td>-</td>
</tr>
<tr>
<td>DISMARKET</td>
<td>Distance to the market</td>
<td>-</td>
</tr>
<tr>
<td>VISEXTEN</td>
<td>Visit by extension officers</td>
<td>+</td>
</tr>
<tr>
<td>LANDSIZE</td>
<td>Land size under coffee</td>
<td>+</td>
</tr>
</tbody>
</table>

It was expected that low price would affect coffee production negatively because the farmers would be lacking the motivating factor which should be higher prices for their produce. Loan accessibility and increase in number of visit by extension officers was expected to contribute positively to coffee production where loans were to help farmers meet cost of production and the extension services which were meant to enlighten farmers on the good agricultural practice and offering other services in relation to coffee farming. Note also that, income of the farmer was expected to contribute positively in meeting the cost of inputs and any other cost.

The distance from farm to the market was expected to affect production in that, the shorter the distance to the market the more the coffee production because this would reduce the cost in transportation. Land size was also expected to affect coffee production positively such that an
increase in land size would lead to an increase in coffee Production if all other factors are held constant.
4.0 RESULTS AND DISCUSSIONS

4.1 Characteristic of coffee farmers

The interviews were done to both genders, where 53% of the respondents were female this was so because interview was based on availability. The female were main gender available since they were mostly left behind to manager most of the household activities including farm activity but this does not mean that the females owned the farms. The result on age shows that 63% of coffee farmers fall in age bracket of above 35 years. This is greatly contributed by elderly people holding to the coffee farms as the source of income at their old age therefore do not give it out for inheritance. Young people are not actively participating in agricultural activities. They are interested in white collar jobs leaving behind old people to manage the farms.

Table 2: Descriptive results of variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Descriptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of respondent (% above 35yrs)</td>
<td>63</td>
</tr>
<tr>
<td>Gender of respondent (% male)</td>
<td>53</td>
</tr>
<tr>
<td>Education level of respondent (% above high school)</td>
<td>33</td>
</tr>
<tr>
<td>Income level of respondent (% above ksh 25,000)</td>
<td>37</td>
</tr>
<tr>
<td>Land tenure under coffee (% on-farm)</td>
<td>90</td>
</tr>
<tr>
<td>Bad weather as a challenge (% Yes)</td>
<td>83</td>
</tr>
<tr>
<td>Pest and disease as a challenge (% Yes)</td>
<td>67</td>
</tr>
<tr>
<td>Low price as a challenge (% Yes)</td>
<td>76</td>
</tr>
<tr>
<td>Input access as a challenge (% Yes)</td>
<td>30</td>
</tr>
<tr>
<td>Visit by extension officer (% Yes)</td>
<td>43</td>
</tr>
<tr>
<td>Beneficiary of loan services (% Yes)</td>
<td>47</td>
</tr>
<tr>
<td>Member to any cooperative (% Yes)</td>
<td>83</td>
</tr>
<tr>
<td>Years of coffee farming</td>
<td>9(4.642)</td>
</tr>
<tr>
<td>Size of land under coffee (acres)</td>
<td>3(2.5266)</td>
</tr>
<tr>
<td>Average coffee production annually (kilograms)</td>
<td>2065(1735.01)</td>
</tr>
<tr>
<td>Distance in kilometers from market</td>
<td>3.2(3.0693)</td>
</tr>
</tbody>
</table>

Note: Standard deviations for continuous variables are in parentheses
It was also observed that most of the coffee farming was carried out on owned land which took 90% with only 10% under leased farms, this is contributed by the nature of coffee crop of being a perennial plant, and this does not fit to the limiting short term contracts of leasing land. With regard to level of education, 68% of the respondents were below college level and this explains result on the level of income where 61% of the farmers fell under an income level of below Ksh 25,000 and this is also largely associated with their occupation as farmers.

Generally, a test was done on the frequencies of a few common challenges faced by farmers such as low prices of produce, bad weather, pest and disease and input access and the following were the result of those assessments to the above challenges respectively, 77%, 16%, 67%, and 36%. Other descriptive were on membership to cooperatives with an 83% of farmers being under cooperatives. The reason behind this large number is that farmers gain in many ways when registered with cooperatives because they are offered services such as marketing of their produce, loan services, and extension service. The cooperatives work closely with the farmers in addressing the various factors in coffee production and this is what farmers considers an added advantage when deciding to invest in coffee farming. They put into consideration the distance between farm and the nearest factory and this explains the mean in our results of the 2 kilometers in Table two.

4.2 Regression result of variables

Regression was done on variables where the average coffee production per year was the dependent variable against the independent variables which were price, loan accessibility, income level of respondents, distance to market, land size and extension visit.
Table 3: The regression result for variables

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>COEFFICIENT</th>
<th>ST.ERROR</th>
<th>SIGNIFICANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRICE</td>
<td>2.653</td>
<td>7.067</td>
<td>0.009</td>
</tr>
<tr>
<td>ACCESSLOAN</td>
<td>4.936</td>
<td>6.572</td>
<td>0.046</td>
</tr>
<tr>
<td>INCOME</td>
<td>-1.162</td>
<td>0.532</td>
<td>0.442</td>
</tr>
<tr>
<td>DISMARKET</td>
<td>-0.22</td>
<td>1.017</td>
<td>0.112</td>
</tr>
<tr>
<td>VISEXTEN</td>
<td>0.432</td>
<td>0.891</td>
<td>0.000</td>
</tr>
<tr>
<td>LANDSIZE</td>
<td>1.421</td>
<td>0.541</td>
<td>0.234</td>
</tr>
</tbody>
</table>

The variable price had a positive effect on coffee production coefficient where an increase in one unit of price would lead to doubling in average coffee production. Therefore, an increase in price will result in an increase in level of income enabling farmers to meet the cost of production without strain. The high prices will also help farmers to meet loan payment that had been invested in meeting coffee production cost. Accessibility to coffee loan is another variable that greatly affects coffee production positively. The farmers who benefit from these loans are able to meet the initial capital to be invested in coffee production and in meeting any other cost needed for managing coffee farms. This encourages them to invest more in coffee production and as a result the average coffee production may increase by five times. The main challenge of loan service comes in when a farmer is unable to service the loan which is as a result of unexpected fall in coffee prices the main source of income hence lowering farmers’ ability to repay loan. The farmers will try to evade loan by substituting the coffee crops with other crops, and this will lead to a decline in coffee production.

Distance to market also affected coffee production negatively. The greater the distance from the market the lower the coffee production, this is so because farmer put into consideration the costs associated with transport of their produce. They also consider the bulky nature of coffee produce and the requirement to deliver it within the same day of harvest to factory for quality maintenance. The other significant variable is the provision of extension services by agricultural officers which has a positive effect on coffee production. These services include trainings on
good agricultural practice, management, control of weeds, pest, and diseases. They also expose farmers on new technologies in coffee farming and this will enhance an increase in coffee production.
5. CONCLUSION

This study was done with an objective to assess factors and market issues that affect coffee production at farm level and the result shows that price of coffee produce was the main significant variable that positively affected the coffee production. That is, if prices were to be increased the production would also increase. It was also found out that increase in price would affect other variables such as repayment of coffee loans and income levels and that’s why the current decline in coffee production is greatly associated with the current low prices. Therefore, some actions need to be taken in addressing the above mentioned factors to help meet the target goal of increasing coffee production.

The results of the study recommends that the stakeholders in coffee sector should combine effort in obtaining high and stable prices to coffee products because this will help raise farmer’s confidence in investing in coffee farms. The results also recommend that more investment on extension services be put in place to enlightening farmers on how to produce good quality produce that will be competitive in world market. An increase in numbers of factories is also necessary in those areas with high potential in coffee production to encourage farmers who would be willing to grow coffee if distance to market is made minimal. Finally, it’s necessary to implement a good loan programme that enables information accessibility by farmers with a convenient repayment system. This will encourage farmers apply for these loans which will be used to finance the various cost, such as transport cost, input cost and labor cost. This will enhance a better coffee production annually.
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