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# Socioeconomic Factors Influencing Meat Value Addition by Rural Agribusinesses in Kenya

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**Abstract:** The aim of this study was to determine and quantify the socio-economic factors influencing decision by meat agribusiness operators to add value to their products, describe and characterize the existing systems of value addition in rural Kenya. The study carried out a census of 120 butchery operators in Igembe north district. Data was collected with the help of a structured questionnaire. Using a probit model to evaluate the socioeconomic factors influencing the decision to add value, the study found that credit, management's level of education and age significantly influenced the decision to engage in value addition. The study therefore recommends policy interventions to enhance access to credit, reduce illiteracy levels among rural entrepreneurs through training and extension services.

**Key words:** Agribusiness, butchery, entrepreneur, probit, value addition

## INTRODUCTION

Most of the under developed economies are heavily dependent on agriculture, and in Kenya agriculture accounts for 24.2% of the GDP, over 60% of exports, 75% of the total labor force and over 80% of industrial raw materials (Owuor and Bobe 2009). Therefore, agricultural productivity remains crucial to the nation's economic development and welfare of her people. Due to this, agricultural sector was identified as the engine for economic growth in Kenya's Vision 2030 (GoK, 2007) which aims to transform the economy into a newly industrialized economy by the year 2030. This national development plan emphasizes promotion of investment in agricultural production, value addition and marketing.

Despite the key role played by agriculture, it has experienced low productivity over the years. One of the contributing factors to low productivity is poor agricultural finance. This is because most financiers shy away from lending to the sector due to the covariant risks related to rain-fed agriculture, non-linear relationship between inputs and outputs and turbulent input and output prices (Nyikal, 2007; Simtowe and Zeller, 2007; Kibaara and Nyoro, 2007). Funds from the informal credit sector are more fungible than those from formal sources. Therefore there is evidence of small firm bias in the use of informal credit Turvey (2009). The cause of such fungibility has been suggested to be lack of serious penalties in the case of informal credit.In Addition, agriculture also experiences low returns due to labour underemployment in the sector and low value commodity output; since more than optimal number of people are involved in the production process and the fact that output is marketed in commodity form. This attracts low prices due to price depression actions of middlemen and processors, high supply during harvest time when most peasant farmers sell their produce and low demand especially for starchy cereals (Bozic *et al*., 2009).

Historically much of the effort has been focused on increasing agricultural productivity. However, productivity is looked at in terms of physical output rather than the monetary value. In looking at monetary value, focus will shift from extractive activities to post harvest (marketing) activities like transport, storage, breaking bulk and transformation to consumable products. Due to this shift in focus, agribusiness and value addition have gained more importance as a way of fighting rural poverty.

Value addition in Agriculture is a capital intensive activity, and there is need to tailor financing of such investments to accommodate the unique characteristics of the agriculture and agro industries. Ghandhi *et al*. (2001) found that one of the constraints to agro industry development is lack of finance. Financial institutions are mainly geared to lending for fixed capital needs, while agro industries, have a large requirement of working capital. Banks lend working capital, if at all, at higher interest rates than other capital loans. Arndt *et al*. (2001) found that availability of low cost credit enhances efficiency and equity in the society through low food prices, and that value addition activities like storage are better done on-farm or at the lowest locales to minimize welfare losses.

Agribusiness enables rural residents to capture more margins from their farm produce, however, this is only

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possible if the credit and other constraints are resolved. 'It is imperative that both the productivity and market difficulties experienced by smallholder agriculture be considered in an overall strategy for increasing rural incomes (Stanton, 2000). Linkage between farmers and urban agribusinesses should be established in order to minimize farm gate and urban livestock price differentials (Owuor and Bebe, 2009).

Value addition (among other things) in rural agriculture should be enhanced in order to promote market oriented smallholder agriculture in the developing countries (Omitti *et al*., 2007; Okello *et al*., 2009). As such, there is need to finance the lumpy investments needed to help resource poor farmers meet the required safety standards in order to access high value market chains. Therefore there is need to finance addition of value to agricultural output, and agribusiness has been identified as the best avenue to channel credit into agriculture, and hence promote value addition (Stanton, 2000).

Several important factors are impacting the global agri-food industry. These factors include the growing trade of processed foods, changing consumer needs, rising disposable income, improved diets in many areas, industry consolidation, and increasing food demand in developing countries. Researchers have predicted that, meat demand will be strongest in China, Latin America, and developed countries. As a result of economic and population dynamics, value added in global agribusiness will continue to shift towards the end product; traceability will gain more importance in marketing. In the 21$^{st}$ century, food distribution sectors will observe the great debate over farm vs rural policy and domestic vs global policy (Kohl, 2001).

Consumers' decision on beef consumption is heavily influenced by quality and safety attributes. The significant attributes were found to be fat content, freshness, neatness of butchery and personnel, abattoir stamp and price. Social economic characteristics of the consumers were found to significantly influence amount of meat demanded by the households (Admassu, 2007).

Consumers are becoming more aware of the relationship between diet and health and this has increased consumer interest in nutritional value of foods. This is impacting on demand for foods which contain functional components that play important roles in health maintenance and disease prevention. For beef, much attention has been given to lipids. It is evident that opportunities exist to enhance the content of health promoting fatty acids in beef and beef products offering opportunities to add value and contribute to market differentiation. However it is imperative that these approaches to deliver "functional" attributes do not compromise on the health value or the taste of the beef products (Scollan *et al*., 2006).

This study examines the socio-economic factors that constrain the development of meat agribusiness in rural Kenya. It uses data collected from meat shops and kitchens - referred to here as meat agribusinesses - from Igembe north district in Eastern province of Kenya. The paper also characterizes and describes the systems of value addition existing among meat agribusinesses enterprises In Igembe north district.

## MATERIALS AND METHODS

**Study area:** This study was done in Igembe north district, which is one of the 209 districts in Kenya, and consists of three divisions and nine locations as shown in Fig. 1. It borders Igembe south district to the west and south, Isiolo district to the north and the east, and Meru national park to the south east. The district has a land mass of 1313.8 km$^2$ and a population of 229,000 as per 2009 census report. The district had 56% of its population living on less than one dollar a day according to1999 census report. The district is one of the semi arid districts in Kenya and it experiences bi-modal rainfall with long rains starting from March to July while short rains begin in mid October and end in late December. The main agricultural activity in the district is cultivation of *khat*, otherwise known as *miraa*. Cattle herding takes place in the drier and less fertile areas of the district, especially those bordering Isiolo district. The district is also provides a major market for livestock from the predominantly pastoral Boran and Somali communities living in Isiolo district, while the pastoralists also consume a substantial part of farm produce from Igembe North.

Agribusinesses in the district range from cereal distribution, *khat* trade, hotels, meat shops and kitchens. Economic activity in the district fluctuates with the price of *khat* which is the major source of income in the district. Igembe north was chosen as the study area because trade in meat and meat products is well developed due to high economic activity, that ensures that most people eat out. The district has also been classified as a high income rural district (KNBS, 2005). There is high supply of animals from the surrounding arid areas where pastoralism is the main economic activity. The study conducted a census survey of all the butchery operators in the district in the month of June 2010, and data was collected with the help of a structured questionnaire.

**Analytical methods:** Objective one was analyzed using two step cluster technique. Using information collected on asset endowment and capitalization of the business, mean capitalization was computed and the systems of value addition determined in relation to that mean. The study evaluated whether the entrepreneurs engaged in value addition activities, the motivating factors for engaging in value addition, and finally the value addition systems were characterized and described. Information was

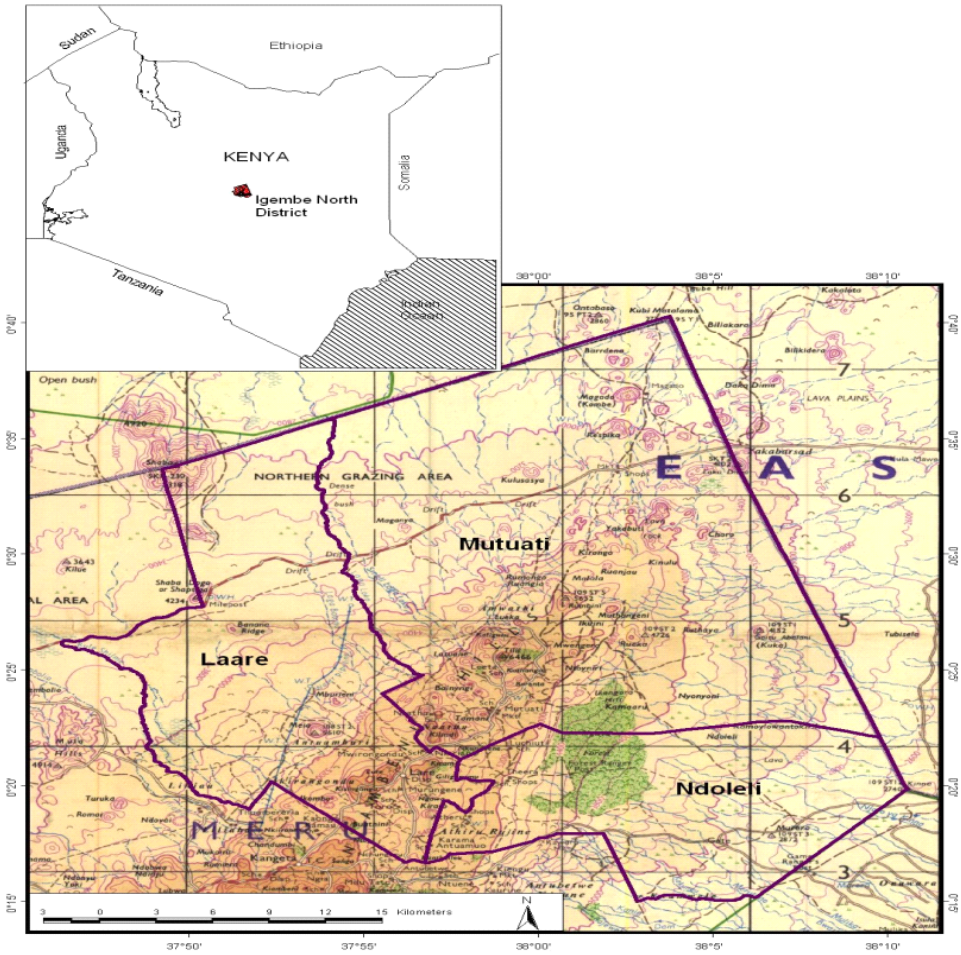


Fig. 1: Map of Igembe North district, Kenya

collected from the butchers on the form in which they dispensed their products (meat) and all the other related services that accompanied the sale for example slicing the meat, transporting, packaging, branding, deboning and others were also considered as they are all just different ways of adding value to meat. The quantities of meat that goes to each form of value addition/after sale service were also noted, because enterprises could be doing more than one form of value addition simultaneously. The intended goal for value addition was given by the operator and his perception on whether it was achieved or not. The study used percentages to analyze data for objective two. The results were presented using a pie chart. Descriptive statistics like mean, frequency and percentages were used to analyze data for objective three.

The decision to practice value addition is discrete, binary and qualitative. It can thus be analyzed using qualitative response models. In qualitative studies where that involve more than two choices, multinomial logit is appropriate (Gujarati, 2004). But in this study the choice being analyzed is whether to add value or not which is binary and mutually exclusive. Therefore multinomial logit would be inappropriate.There are three approaches for developing a probability model for a binary response variable. They are Linear Probability Model (LPM), Binary probit and Binary logit models (Gujarati, 2004). For the case of LPM, it has the following shortcomings; it leads to a questionable value or $R^2$ as a measure of goodness of fit, it can generate probability values that lie below zero or above one- and this would be statistically unacceptable, it suits data that assumes a Bernoulli distribution of error terms rather than the normal distribution assumed in this study and finally the model does not assume homoscedastic distribution of error terms, due to the Bernoulli distribution of the error terms (Gujarati, 2004). Therefore, due to the foresaid weaknesses, LPM was not chosen for this study. Binary logistic regression is only suitable in cases where disturbance terms are logistically distributed (Greene, 2002) and hence it would be inappropriate

in this study since the study assumes normal distribution of disturbance terms.

As a result of the above stated considerations, a Binary probit model was used to determine the factors influencing the decision to engage in value addition, objective four. The decision to use probit is based on the fact that this study assumes a normal distribution of disturbance terms in the data and that the decision to add value is discrete, dichotomous and mutually exclusive.

For this study, the model has been derived as follows. An entrepreneur's decision to add value to his produce depends on an unobservable index ρi (expected utility) which is determined by the socio-economic characteristics of his/her household. The larger the utility index ρi the higher the probability of the entrepreneur adding value. The index is expressed as:

$$\rho_i = \beta_1 + \beta_2 X_i \ldots\ldots\ldots \beta_n X_n \quad (1)$$

(Gujarati, 2004)

To show the relationship between the utility index and the decision to add value, it is assumed that Y=1 if the entrepreneur adds value and Y=0 if he does not. It is reasonable to assume that there is a critical level of utility (like ρ*) such that if utility exceeds ρ* then the entrepreneur will engage in value addition (i.e., Y = 1), otherwise he will not, this threshold is appropriately zero (if expected utility is less than the critical threshold, he will not practice value addition, and vice versa). This threshold is not observable, but it is assumed that it is normally distributed with the same mean and variance. Therefore,

$$Y = 1 \text{ if } \rho^* > 0 \text{ and } Y = 0 \text{ if } \rho^* \leq 0 \quad (2)$$

(Greene, 2002)

Empirically the model is presented as follows:

$$Y = \alpha_{1+}\beta_1 age + \beta_2 HHsize + \beta_3 experince + \beta_4 HHduc + \beta_5 Opeduc + \beta_6 credit + \beta_7 freq + \beta_8 ATrisk + \beta_9 employees + \beta_{10} profit + \varepsilon_1 \quad (3)$$

Y= if the operator adds value or not, α = constant, $\beta_i$ = Coefficient of influence, $\varepsilon_1$ = Error term

Marginal effects were computed and used to interpret the results. Marginal effects were calculated by taking the first derivative of the explanatory variable with respect to the explained variable, as shown below:

$$\frac{\partial Y}{\partial X} = F(\beta X) \text{ (Greene, 2002)} \quad (4)$$

## RESULTS AND DISCUSSION

**Proportion of butcheries practicing value addition:** Butcheries in Kenya distribute close to 70% of the fresh meat in Kenya (Tschirley *et al*., 2010). Statistics shown in Fig. 2 below reveal that, of the 120 butcheries operating in the study area, 73% of them engage in value addition albeit at different levels. Value addition being considered as any act by the trader that takes his product a step closer to the form in which the consumer desires it, there are five conventional forms of utility; time, space, form, task and possession utility. The butchery business is entirely a process of value addition because slaughtering an animal itself adds some form utility. For the purpose of this study, as will be shown later in this chapter, value addition will be categorized into cooking, packaging and transportation. The other 27% of the butcheries sell raw meat over the counter and this study deemed them not to add any value to their meat. Value addition has been necessitated by structural changes in the economy and meat demand systems. Structural economic changes impacting heavily on developing economies were observed and documented by Kohl (2001). They include growth of middle income households, growth of importance of traceability in agribusiness, climate change which has diminished arable land and hence reduced food supply, urbanization, entry of women into the labor market, population growth especially in South East Asia and Africa. Changes on the meat demand systems have been put forward by Unterschultz (2000). They include growing concern on health and wellness, change in tastes and preferences, increase in quantities demanded and seasonality of demand.

**Reasons for engaging in value addition:** Four key reasons were revealed by butchery operators who engaged in value addition as the major goals for adding value. Results are shown in Fig. 3, and it is revealed that 36% of the respondents identified the desire to improve profitability as the main reason for participating in value addition of meat. This finding coincides with that of Armagan and Ozden (2010) that most of the entrepreneurs aim at earning high profit and value in their dairy farms, and thus they add value to their dairy output in order to capture greater margins from the market. Butchery operators are able to increase profit by adding value due to the fact that most people in the district eat out during daytime and so they are willing to pay a premium for value added. Due to the high number of people eating out, food demand is generally high and therefore food retailers among them butchery operators could still be enjoying abnormal profits. Despite the seasonal fluctuations of meat demand.

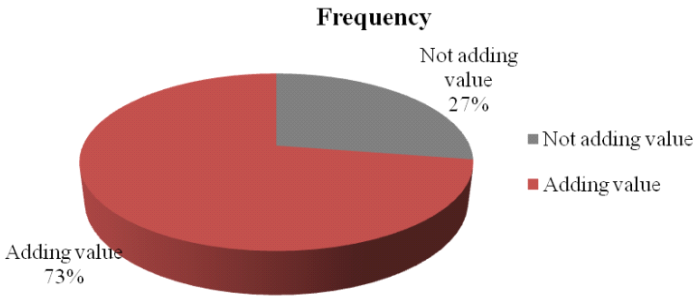


Fig. 2: proportion of butcheries practicing value addition

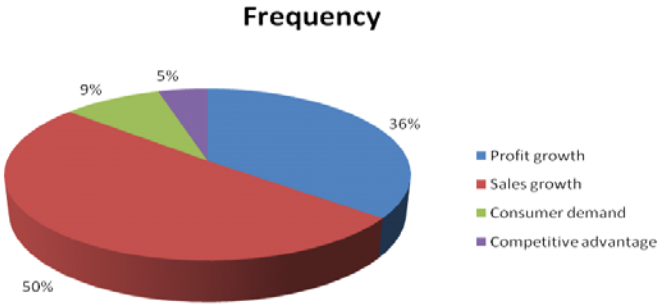


Fig. 3: Revealed reasons for engaging in value addition

As indicated in Table 1, 66.7% of the operators also perceived beef as the most profitable meat type. This could have attracted most of the traders to trade in beef. But these traders often struggled to raise sales level to avoid losses related to perishability during periods of low meat demand, arising from low income or other socio-economic factors faced by consumers. Therefore, despite the perception by two thirds of the respondents that trading in beef was more profitable than the other meat types, only 37% of the butcheries traded in beef. They perceived beef as profitable possible because of the benefits of large scale operation. Despite this, the traders had to put other factors like the size of the market demand, and consumer tastes and preferences into consideration. This corresponds with the findings of Juma *et al*. (2010) that 52% of the households in Kenya prefer goat meat (chevon) and mutton to other meat types. The finding also contrasts the finding of Gamba (2005) that most households in Nairobi do not consume chevon and mutton and as such the meat does not comprise the diets of most households. The short shelf life of meat as explained above could also have influenced entrepreneurs to opt for smaller ruminants, to avoid the losses resulting from perishability. There is a strong preference for chevon than other meat types in the study area. This preference could be attributed to taste and other perceived quality aspects like less fat content and softness. This is corroborated by Kaliba (2010) where he revealed that beef

Table 1: Animals traded and profitability as perceived by operators

| Animal | Frequency | Percent | Percentage of traders perceiving animal as most profitable |
|---|---|---|---|
| Cattle | 44 | 36.7 | 66.7 |
| Chicken | 7 | 5.8 | 17.5 |
| Goats | 51 | 42.5 | 15.8 |
| Sheep | 14 | 11.7 | 0 |
| Pigs | 4 | 3.3 | 0 |
| Total | 120 | 100.0 | 100 |

and small ruminant meat are more preferred to pork and poultry in rural areas. He also found that marginal rate of substitution is constant among meat commodities and types. Poultry are also not commercially viable in the rural areas as they are mostly home produced and consumed, this could explain the relatively small number of traders selling poultry meat (Alboghdady and Alashry, 2010).

Figure 3 also indicates that the need to grow sales volume was identified by 50% of the respondents as the main reason for practicing value addition in their meat. This can be attributed to the unavailability of modern food preservation technology and equipment among the butchery operators in the study area. Value added in order to raise sales volume involved processing the meat is aspects that were targeted to improve consumer confidence in their product. Research by Colbon and Menapace (2011) found that it is important for agri-food distributors to understand the psychological construct underlying consumers' purchase decision process and

Table 2: Results for gender, marital status, occupation, training and ownership of premises

| Characteristic | | Frequency | Percentage |
|---|---|---|---|
| Gender | | | |
| | Female | 23 | 19.2 |
| | Male | 97 | 80.8 |
| Marital status | | | |
| | Single | 11 | 9.2 |
| | Married | 94 | 78.3 |
| | Separated | 151 | 2.5 |
| Occupation | | | |
| | Butcher | 81 | 67.5 |
| | Govt worker | 14 | 11.7 |
| | Social worker | 8 | 6.7 |
| | Other self employment | 17 | 14.1 |
| Ownership of premises | | | |
| | Owned | 43 | 35.8 |
| | Rented | 66 | 55.0 |
| | Other | 11 | 9.2 |
| Training | | | |
| | Untrained | 105 | 87.5 |
| | Trained | 15 | 12.5 |

Table 3: Results for age of operator, household size, experience and education level of the household head and the operator

| Variables | Min. | Max. | Mean | S.D. |
|---|---|---|---|---|
| Age of the operator | 24 | 72 | 45.29 | 9.617 |
| Total number of household members | 1 | 13 | 6.19 | 2.555 |
| Number of years in business | 1 | 21 | 6.92 | 4.559 |
| Household head number of years in school | 0 | 18 | 8.78 | 3.699 |
| Education level of the business operator | 1 | 14 | 7.21 | 3.167 |

those factors that shape product perceptions. Therefore, butchery operators compete to address the concerns of their customers in to gain a competitive edge their business rivals.

Results in Fig. 3 indicate that 9% of the respondents add value due to express demand by their clients. These are mostly the clients who come and make specific orders on how their meat is to be prepared. Such business operators face lesser risk than those who sell readily prepared meat. This is as meat is processed in absence of proper storage facilities, the risk of perishability increases. By doing business this way, the operators are able to attract the clients who are very concerned on food preparation and handling process. The entrepreneurs end up achieving customer satisfaction and with time, this leads to consumer loyalty. Espejel (2008) found that consumer loyalty is a key goal in most promotional undertakings, and it is a long-term competency for any business. The researcher also argued that consumer loyalty is born out of satisfaction and product trust more than any other factor.

Lastly, in Fig. 3 Competition was identified by 5% of the respondents as a major reason for value addition. Though competitive advantage is intrinsic in other goals like profit and sales growth, it is important to isolate the traders who recognize the need to be competitive even at the expense of achieving other goals. Competitiveness is achieved through employing strategies that enable the business to deliver desired results to its stakeholders most optimally. This would involve surmounting the pervasive institutional and market challenges facing their businesses.

**Socioeconomic characteristics of butchery operators:** Socioeconomic characteristics of butchery operators and their households have been categorized into categorical characteristics, (Table 2) and continuous variables (Table 3). Table 2 reveals that approximately 81% of the butchery operators were male with only 19% percent being women. This is could be indicates male dominance in the society that could be hindering participation of women in income generation activities, in fact majority of the women involved in butchery were either single or separated with their husbands through death or divorce. The absence of a breadwinner in the household could have forced single women into income generating activities. Sutter *et al*. (2009) found that uneducated and financially weaker women had low influence in joint decision making in the household.

Most of the respondents had butchery as their main occupation although they also had *khat* trading and/or farming as part-time activities. Also a combined total of 32.5% of the respondents were in formal or informal employment. Involvement of the respondents in more than one job could be attributed to the need to subsidize income from employment, and to insulate the households from the shocks resulting from prevalent business cycles related to turbulent prices of *khat* which is the main cash crop for the area, and also to shield the households from the risks facing agriculture which employs majority of the respondents either directly or indirectly. According to Kaliba (2010), demand for meat is responsive to income changes in the society as consumers increase the budgetary allocation to meat commodities, which also increase the total expenditure on meat in the market.

Only 36% of the respondents owned the premises in which the business was housed, 55% was rented and 9% used premises owned by operators' parents or other members of the family apart from themselves. This indicates that most butchery operators are so resource constrained that they cannot afford to own a business premises, and also that they can make limited investments since the premises do not belong to them.As shown in Table 3, the mean number of years completed in school by the household head is higher than that of the actual butchery operators indicating that in most of the cases the owner of the business is different from the one who runs it day by day (operator). In most of the cases it was found that the businesses were run by the less educated members of the household or employees. This is because butchery business is perceived as a menial job meant for the uneducated or the unemployed. This makes the business

to suffer from mismanagement because education level has been found to be directly proportional to management skills (Robinson and Sexton, 1994). Also related to this is the finding that nearly 90% of the operators have not had any formal business training.

The average age of the operators was found to be 45.3 years and this indicates that those involved in butchery business are active and energetic members of the society. The average number of household members is 6.19 which is slightly above the national average of 5 members (KNBS, 2005). The average years of experience is 6.9 and this indicates that most of the operators have in the business for a long time, and with the absence of formal training this could be an indicator that the operators spent some time under-studying their mentors in butchery business. Age is positively related to the level of risk aversion, experience and access to inheritable resources like land, animals and buildings.

**Characterization of value addition systems:** A number of approaches have been used to characterize value addition systems as found in literature (Kruska *et al*., 2003). However, there is unanimity in the fact that value addition is influenced by resource availability, labour availability, technology used, customer needs, infrastructure available and equipment employed. In this study, value addition systems were characterized on the basis of assets employed to support the value addition. Data was collected on the value of five classes of assets employed in value addition, namely; kitchenware, mechanical implements, electronic equipment, furniture and other high value assets employed. The mean value of assets was found to be 33,324 Kenya shillings. The butchery businesses were classified as either small or large depending on whether the value of their assets was below or above that mean. The characteristics of butcheries under the two different systems of value addition are shown in Table 4. These results were generated under the assumption of equal variances.

Results show that there was a statistically significant difference in age, household size, number of years of experience, premises ownership, operator's level of education and the animal handled by the business between the two systems of value addition. Mean age of the operators in the two systems is significant at 99% confidence level; from the results above we find that the small scale system is dominated by younger members of the society who could be resource poor hence low capitalized, while the converse applies to the large scale system. The difference in household size is also significantly different at 95% confidence level, with large scale system having a higher mean; and this can be explained by the difference in age between the operators of the two systems. Years of experience are also significantly different at 99% confidence level. The large scale system has a larger mean and this can also be attributed to the difference in age, this indicates that members of the large scale system have been in business for long and this could be one of the reasons for high capitalization.

The mean level of education of the operators was higher in the large scale system than the small scale system. The difference was statistically significant at 99% confidence level. This difference can be attributed to the ability of the large butcheries to attract more educated staff due to their ability to offer better salaries and better working conditions because they are more profitable as indicated in the table above. Larger butcheries are also more established and hence they offer a sense of job security to the employees. Education is important and it has been found to influence other factors because, although butchery business does not strictly require formal education since skills can be passed on informally from older experienced operators, formal education helps one to grasp issues better, anticipate, appreciate and respond to market needs. Education has also been found to enhance ability to manage risk and uncertainty, and capital mobilization skills. Therefore the operators have the ability to appropriately choose the animals to trade in, have an optimum number of employees, and therefore secure higher profits.

Mean household income is higher in the large scale system; this can be due to higher average profits earned from butchery business. High income directly influences welfare as proxied through household expenditure which is higher for the large scale system and statistically significant at 95% confidence level. The mean number of employees is higher in for the large scale than the small scale system. This is because there are more activities in the larger butcheries which warrant for more employees. Average profit is also high in the large scale system than in the small scale system. This can be attributed to the benefits accruing to the business due to large scale operations and better management practices due to more educated operators. Mertinez (2008) found that value added beef products received the largest premiums in the beef market in the United States of America.

The difference between the means for premises ownership is statistically significant at 95% confidence level. The mean for small scale butcheries is 1.81 while that of large scale butcheries is 1.53, this could be interpreted to mean that the younger generation (which dominates the small scale sector) is more interested in making long-term investments like premises. Such operators approach the business with a longer term strategy than the older members of the large scale system. It is also imperative to mention that some members especially in the small scale system had access to premises owned by their parents, this means they had procession and not ownership; but this was taken to mean ownership as they could make investments and improvements in anticipation of ownership in future,

Table 4: Characteristics of butcheries under different systems of value addition

| Characteristic | Mean for small scale butcheries | Mean for large scale butcheries | Mean difference | t-value | Sig (2-Tailed) |
|---|---|---|---|---|---|
| Age of the operator*** | 43.67 | 49.75 | - 6.08 | - 3.177 | 0.002 |
| Household size** | 5.85 | 7.13 | - 1.27 | - 2.464 | 0.015 |
| Employment status | 1.77 | 1.75 | 0.02 | 0.228 | 0.820 |
| Experience*** | 6.19 | 8.91 | - 2.71 | - 2.977 | 0.004 |
| Premises ownership** | 1.81 | 1.53 | 0.28 | 2.194 | 0.030 |
| Gender of the operator | 0.60 | 0.56 | 0.04 | 0.389 | 0.698 |
| Operator's level of education*** | 6.73 | 8.53 | - 1.80 | - 2.840 | 0.005 |
| Animal*** | 2.59 | 1.84 | 0.75 | 3.153 | 0.002 |
| Household expenses** | 160239.77 | 208093.00 | - 47853.98 | - 2.070 | 0.041 |
| Household income*** | 182022.73 | 267075.00 | - 85052.27 | - 2.665 | 0.009 |
| Profit | 234.09 | 360.00 | - 125.91 | - 6.301 | 0 |
| Number of employees | 1.65 | 3.16 | - 1.51 | - 8.859 | 0 |

**: Significant at 95% confidence level; ***: Significant at 99% confidence level

Table 5: Probit results on factors influencing value addition

| Variable | Coefficient | S.E. | p>\|z\| | Marginal effects |
|---|---|---|---|---|
| Age** | 0.0608 | 0.0286 | 0.034 | 0.0157 |
| Household size | - 0.0705 | 0.1036 | 0.496 | - 0.0182 |
| Years of experience | 0.0327 | 0.0439 | 0.456 | 0.0085 |
| Household head's number of years completed in school* | - 0.1056 | 0.0542 | 0.051 | - 0.0273 |
| Operator's number of years Completed in school*** | 0.2752 | 0.0734 | 0.000 | 0.0710 |
| Amount of credit used in the last year (Thousands)*** | 1.3790 | 0.4082 | 0.001 | 0.3023 |
| Slaughter times/week | 0.0274 | 0.1556 | 0.860 | 0.0071 |
| Attitude towards risk | - 0.3135 | 0.2210 | 0.156 | - 0.0809 |
| Number of employees | 0.1324 | 0.2768 | 0.632 | 0.0342 |
| Profit per day | - 0.0020 | 0.0023 | 0.394 | - 0.0005 |

*: Significant at 90%; **: Significant at 95%; ***: Significant at 99% confidence levels

furthermore they hardly paid rent for the premises. This could have tilted ownership in favour of the small scale system. Another possible cause is that most large scale businesses are located in the large urban centers, and here most of the premises owners fetch quite high amounts in rent collections, and hence they either participate in the 'prestigious' businesses or they just live on the rent.

**Socio-economic factors influencing value addition by butchery agribusinesses:** Study findings revealed that butchery agribusinesses in the study area can be classified into two classes; value adders and non value adders. A probit regression was used to determinethe factors that influence the decision to add value among agribusiness operators.

Table 5 shows estimates of the probit model for the factors influencing value addition among the respondents of the study. Marginal effects indicate the effects of one unit change in an exogenous variable on the probability that an operator adds value to his product. Marginal effects of continuous variables only were considered since marginal effects may not be meaningful for binary variables (Greene, 2002).

An increase in the age of the operator by one year increases the probability of adding value by 1.57%. This is because access to resources increases with age especially in a traditional society where resources are passed on through inheritance. Also responsibilities and tend to follow a sigmoid curve and this leaves more time and resources for investment in value addition as one advances in age. The influence of age on value addition is statistically significant at 95% confidence level. This finding contrasts to that of Berem *et al*. (2010), where it was found that age is inversely related to the probability of one engaging in value addition. This was due to the fact that as one advanced in age they become risk averse and thus tend to avoid new ventures, on whose performance they are not certain. Value addition is mostly labor intensive and older entrepreneurs lack the kind of energy required to successfully add value.

Age and experience usually show a strong correlation in socio-economic research. This study seeks to treat these two factors in a way that ensures divergence rather than convergence of influences on the explained variable. Age is expected to influence access to resources that come from inheritance like land and buildings, while experience in meat business directly influences the quality of value added to meat products. This kind of treatment has been used by Armagan and Ozden (2010) and both variables were found significantly influence the entrepreneurship index of dairy farmers in Turkey.

The level of education of the operator is statistically significant at 99% confidence level and if it increases by one year, the probability of adding value increases by 7.1%. This indicates that it is a key factor because it has been found to influence other factors like management skills, household income, household size and access to capital, which would all have a positive effect on value addition. Illiteracy levels are quite high due to high school drop out in the study area; this is because the youth value

participation in *khat* trading over attending school and the traditional beliefs that discourage investment in education especially for the girl child. Therefore, marginal returns to education are still quite high in the study area.

The level of education of the household head affects the probability of adding value negatively. This could be attributed to the fact that the learned members of the society perceive butchery business as a menial job, meant for the illiterate or the poor in the society; this could also be attributed to the high premiums to education in other sectors due to high illiteracy level in the area. It should be noted that there is a distinction between the business operator and the household head, although in some cases these roles fell on the same person. This finding coincides with that of Berem *et al.* (2010) who also found that the level of education of the household head had an inversely relationship to the probability of practicing value addition. It was also found that educated people are more likely to earn more income and hence depend on other activities hence they put less effort and time on agribusiness (Mishra and Uematsu, 2010).

Although education can be measured in categories of primary secondary college and others, most studies have used the number of schooling years to measure education level. In a study to Predict Household Poverty, Mwabu *et al*. (2002), found out that education emerged as the most important determinant of poverty. They reported that in the year 2000, poverty rates among household heads with no education were 72.02 and 69.05% for rural and urban households respectively, which were highest among all groups. In addition, people with at least secondary education were less affected by the increase in poverty between 1997 and 2000 than those with lower levels of schooling.

Intuitively, one might expect higher levels of formal education to spur Small and Micro Enterprises (SME) growth by enhancing firm capabilities. For example, formal education may provide entrepreneurs with a greater capacity to learn about new production processes and product designs, offer specific technical knowledge conducive to firm expansion, and increase owners' flexibility. While most empirical evidence indeed suggests that firms with better educated owners and managers are more efficient greater complexity emerges when one examines the relationship between education and SME growth in developing countries (Nichter and Goldmark, 2009). The study further argues that with respect to effect of education on entrepreneurial success, there is need to recognize country specific thresholds in order to achieve clear findings. In Kenya and Zimbabwe, the threshold that spurs SME growth is secondary level education while in other sub-Saharan countries it primary level education.

Use of credit is statistically significant at 99% confidence level, and increase in the amount of credit used by one unit raises the probability of adding value by 0.3 units. This could be attributed to the fact that most of the operators are resource poor and have constrained access to credit. Credit use enables the operator to procure more efficient equipment that help to reduce the cost of operation and helping to attract customers. And therefore credit has an enormous ability to unlock and spur value addition to a great extent. Access to credit has been constrained by lack of collateral, low levels of awareness and unfavorable terms imposed by the lenders.

Hindered access to credit is likely to have more devastating effects on agribusiness than farming. Briggeman *et al*. (2008) investigated the existence, determinants, and implications of credit constraints among US farm and non-farm sole proprietorships. The study found that the value of production is significantly lower for credit constrained sole proprietorships; decline in productivity is higher for non-farm than the farm sole proprietorships.

## CONCLUSION

This study concludes that most of the butchery operators in Igembe north district attempt to add value to meat, this is due to the fact that 72.5% of them add value to their meat albeit at different levels and 27.5% do not add value. The need to grow sales and profits were the major business goals behind the operators' decision to engage in value addition. Sales need to be improved in order to avoid losses arising from perishability of meat, since the businesses lack modern storage facilities - which made them prone to losses related to perishability during low demand periods.

Butchery operators identified beef as being more profitable than other types of meat. In contrast, the consumers prefer goat meat (chevon) than other meat types. Two thirds of the operators traded in goat meat despite the fact that beef was more profitable to them. This was due to consumers' tastes and preferences and due to the fact that it is small bodied and hence it posed a lesser risk of perishability. Therefore this study concludes that consumer preferences and lack of modern storage facilities were the major constraints to rural agribusiness profitability.

The study concludes that there are two systems of value addition in Igembe north district-small-scale and large-scale. These two systems differ significantly in terms of socio-economic characteristics of the owning households, with small-scale butcheries being more in number, and dominated by younger operators with smaller households, less experienced and less educated than the operators in the large scale system.

Access to credit has a huge effect (0.3) on the probability of engaging in value addition, because it helps relax the financial constraints in the household and due to the need to deploy the funds in a productive way so that the borrower is able to repay the credit. This study found that majority of the butcheries are small-scale and that the owning households are resource constrained. Therefore this study concludes that, if resource constraint facing butchery households can be relaxed by improving access to credit, the operators are very likely to engage in value addition since most of them seem to understand that value addition will help them meet their business goals. Participation in credit has been found to cause a rise in household income in the long-run (Owuor and Babe 2009); this rise in income is likely to have a positive effect on the probability to add value.

Results reveal that increase in age would increase the probability of participating in value addition by 0.0157, this is because as one advances in age, he tends to gain more resources especially those which are inheritable like land and livestock. Gaining these resources would relax the resource constraints and improve the credit worthiness/access of the household. Age is also positively skills of the operator, and availability of family (cheap/free) labour to the business. Therefore correlated with experience and household size which influence the quality of value added, managerial re this study concludes that as the business operator advances in age, the probability of adding value increases.

Education level of the butchery operator was found to positively influence the decision to engage in value addition. This is expected since being educated, the butchery operator is able to understand and comprehend business trends, consumer needs and preferences. Therefore if the business operator is educated he is more likely to convince other decision makers in the business to make the necessary investments to aid in value addition. Therefore this study concludes that the more educated the business operator is, the higher the probability that the operator will practice value addition in his agribusiness.

Increase in the level of education for the household head reduces the probability of the butchery engaging in value addition activities. Thus the study finds that there is an inverse relationship between the education level of the household head and the probability of practicing value addition in a butchery enterprise owned by the said household.

## RECOMMENDATION

This study recommends that strategies be put in place to help butchery agribusiness operators to acquire modern storage facilities. This will help reduce the losses that can be attributed to the short shelf life of meat, and it will enable the entrepreneurs (especially those who are risk averse) to adopt value addition and hence raise their business profitability. Rural residents should also be educated on the nutritional and other benefits of consuming other types of meat like beef, mutton, pork and poultry rather than insisting on chevon. This will help some of the entrepreneurs to trade in beef which they regard as being more profitable.

Policy framework to address the constraints that face small-scale butcheries should be put in place. This framework should focus on areas like training on business skills that will cover for lack of experience, low levels of education and help improve profitability among small-scale operators. The framework should also encourage large scale operators to expand their scale even more and develop their market.

Strategies that will improve access to credit by rural entrepreneurs are also necessary. This study has found that access to credit is likely to unlock phenomenal potential in agribusiness and it is recommended that policy makers pay greater attention to this constraint. Such strategies should explore ways of enabling young entrepreneurs to access credit even if they don't possess prime assets that are currently being accepted by financial institutions as collaterable. For example this could be possible by widening the bracket of collaterable assets to include those that are available to young entrepreneurs, and encouraging the owners and/or operators to form self help groups where members can co-guarantee each other and hence build and benefit from social capital.

Awareness campaigns need to be carried out to inform rural entrepreneurs the benefits of investing in value addition. This is in order to discourage the educated entrepreneurs who could be having other sources of income from neglecting their agribusiness enterprises and instead invest in them, even as options of income during their post employment life. This will also enable them to create some employment for the society as well as some more income for their households. The benefits of education should also be highlighted to the school going children and their parents to stem school dropout and hence avoid having uneducated entrepreneurs in future.

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