UNIVERSITY OF NAIROBI

ANALYSIS ON FACTORS AFFECTING COMMERCIAL RABBIT REARING IN KIAMBU COUNTY

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A87/3555/2010

A PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF BACHELOR OF SCIENCE DEGREE IN AGRIBUSINESS MANAGEMENT

SUBMITTED TO:
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APRIL 2014
Acknowledgement

I wish to give thanks to Almighty Father for the far He has taken me through His guidance, comfort, protection and gift of life and love. May His name be glorified and honored by all creatures on earth.

I would also give thanks to my family for their support in all rounds especially my grandmother. Love you big grandma.

I wish also to show my gratitude to my dear and hardworking lecturer Mr. Kennedy Pambo for his overwhelming guidelines and efforts in enabling me to acquire this golden skill. May God bless you in all your endeavors.

Lastly I wish to thank my fellow classmates for their cooperation and help they have offered to me either directly or indirectly.
# Table of contents

Acknowledgement ........................................................................................................... i
Table of contents ............................................................................................................. ii

## 1.0 INTRODUCTION

1.1 Background information ......................................................................................... 1
1.2 Problem statement ................................................................................................. 3
1.3 Purpose of the study .............................................................................................. 4
1.4 Hypothesis .............................................................................................................. 4
1.5 Justification of the study ....................................................................................... 4
1.6 Study area ............................................................................................................... 5
1.7 Organization of the project report ......................................................................... 5

## 2.0 LITERATURE REVIEW ......................................................................................... 6

## 3.0 METHODOLOGY ................................................................................................ 8

3.1 Data collection and sampling procedure ................................................................. 8
3.2 Empirical model used ........................................................................................... 8
3.3 Variables included in the model ............................................................................ 9

## 4.0 RESULTS AND DISCUSSION ............................................................................ 11

4.1 To characterize rabbit producers ......................................................................... 11
4.2 To identify the relationship between socio-economic characteristics and adoption of commercial rabbit keeping ....................................................... 12

## 5.0 CONCLUSION ..................................................................................................... 15

References .................................................................................................................... 16
LIST OF TABLES

Table 1-Variables used in the model

Table 2-To characterize rabbit producers

Table 3-To identify the relationship between the socio-economic characteristics and adoption of commercial rabbit producers
1.0 INTRODUCTION

1.1 Background information
Agribusiness in layman’s language involves commercialization of agricultural activities. According to FAO files, agribusiness is a term that is used to mean commercial farming. It incorporates all the other industries and services that constitute the supply chain from farm to consumer. This process of incorporation is facilitated through production, processing, distribution and marketing where a farm to fork program is highly emphasized in case of food products for traceability issues. To be competitive enough great emphasis was placed on application of science and technology in order to increase productivity of agricultural sectors such as agribusiness enterprises (UNIDO, 2009).

In fact in most developing countries such as Kenya agribusiness dominates in terms of contribution to value addition in manufacturing. Agribusiness entails two broad groups namely livestock keeping and crops growing. Livestock keeping entails small stocks such as poultry, pigs, goats and rabbit to name a few and large stocks such as cattle (MoLD, 2010). Rabbit rearing is mainly characterized by smallholders who are normally faced by various constraints according to Madukwe (2005).

Smallholders’ farmers in developing countries have found it hard to participate in commercial agriculture and the production of high value products according to Catelo and Costacles (2008). There are various suggestions presented for this; one is the market liberalization policies promoted by the World Bank and the International Monetary Fund (IMF) in the 1980s and 1990s that transferred government responsibility for the provision of agricultural inputs and of a market for farmers’ produce to the private sector. Other include the lack of collateral for smallholders to access loans from lending institutions, no guaranteed market for their produce, lack of investment by governments in infrastructure (roads, power, water and education) and poor engagement with agri-food value chains which offers them very little opportunity for growth and expansion.

Some economists indicate that agribusiness is shifting from a pyramid structure to a horizontal one where strategic alliances, co-operation, supply chain agreements and specialization are facilitated; therefore agribusiness enterprise should have to spend less time on the farm and more
time developing business service strategies that aim at enhancing their competitiveness. The focus is not only on traditional economical and technological interests but also on value addition.

Therefore agribusiness will play a big role in any developing county. And to be precise there is need for farmers to focus on small livestock enterprises such as rabbit rearing. Among the livestock industry the study focused keenly on commercial rabbit keeping due to its favorable characteristics such as high rate of reproduction adaptability to inexpensive housing and useful by product (Madukwe, 2011). As a matter of fact population increases on a daily basis over fixed piece of land thus diminishing land sizes problem will set in later on. Due to this rabbit production will be of great importance in eradicating malnutrition and poverty since it can be practiced on small land area (Borter, 2013)

Rabbit rearing in Kiambu county is still a new enterprise and is mainly in smallholder system that has advantages over livestock systems because of the small rabbits body size, high rate of reproduction adaptability to inexpensive housing and useful by products. Since inadequate food production is a critical problem throughout Kenya, rabbit rearing could make a significant contribution to human welfare in areas with inadequate food production (Madukwe et al, 2011). Rabbit rearing is practiced on small scale farming essentially due to small land space, which if well adopted can be practiced widely (Borter, 2013). Some of the challenges identified by previous studies include limited access to technical information by farmers. This results in farmers doing some of things unknowingly such as inbreeding (MoLD, 2013).

There have been previous studies which try to analyze the factors which affect the development of the rabbit enterprises. Some of findings such as according to Borter (2013) showed major factors which need to be addressed. These factors include promotional campaigns, extension services, breeding and genetic improvement, research and modernization of production and export market targeting. Some have been implemented but still farmers are reluctant to adopt rabbit keeping as a commercial enterprise. The rabbit industry is somehow not well established bearing in mind it has some opportunities which will favor its development. Some of the opportunities include change of eating culture to white meat, increasing number of people on dietary problems and many others (MoLD, 2010). Therefore study has been targeting rabbit farmers, potential non-rabbit farmers and some few researchers in this field. Descriptive analyses were used in explaining the socio-economic characteristics affecting the industry. Also
regression analysis was done on factors affecting its adoption. The results will be useful to government policy makers, farmers and other researchers.

1.2 Problem statement

The study entails agribusiness activity whereby a study on commercial rabbit rearing in Kiambu County was conducted, because it wanted to find out what are the factors affecting its development, in order to understand the opportunities the industry has in promoting the county’s economic development goals. The findings will encourage stakeholders (farmers, government policy makers and other researchers) to invest in the industry thus increment in its growth.

Previous studies focused mainly on this issue in country-based dimension. For instance Borter(2013) did a research on current status and way forward of rabbit industry in Kenya as whole but mine will be focused on Kiambu County. Most of the studies have been done in Nigeria which mainly deals with adoption of commercial rabbit rearing unlike in Kenya thus a gap of place is evident. This is proved by few studies done in Kenya which have pinpointed some of the challenges that affect the adoption. For instance Borter (2013) identified that market is not well defined and proposed for various interventions such as promotional campaigns and provision of extension services to livestock industry. The reason for my argument is that in Kenya many researchers have not pinpointed the exact problem facing the slow adoption of commercial rabbit keeping as in the case of Nigeria (Madukwe et al, 2013).

Main focus was to analyze the factors on why farmers are reluctant to practice commercial rabbit keeping yet it is a profitable enterprise (Karanja, 2013). Rabbit meat is highly demanded due to its low cholesterol and fat level thus is normally used for special diets such as those for heart disease patients, diets for aged, low sodium diets, weight reduction diets, yet the industry is not well exploited due to various parameters which am bound to find out.(Amin et al, 2011). Variables which the project incorporated were technology used, market accessibility, credit accessibility, farmers’ characteristics (age, gender, education level, and stock size) knowledge about the issue and traceability criteria used.

Therefore the study was designed in manner whereby identification of the characteristics of rabbit producers which was analyzed using descriptive analysis. Secondly regression analysis was used to test the relationship between the above characteristics and the adoption of
Finally the research has drawn implication which the livestock extension needs to undertake and advocate for the implementation of the policy. Therefore in a summary the economic research problem will be to analyze the factors behind the reluctances of farmers to adopt commercial rabbit keeping seriously.

1.3 Purpose of the study

The purpose of this study is to analyze the factors affecting commercial rabbit rearing in Kiambu County. The specific objectives of the study will be as follows;

i. To characterize rabbit producers.

ii. To identify the relationship between the above characteristics and adoption of commercial rabbit keeping.

1.4 Hypothesis

The first objective will be achieved through descriptive statistics and therefore no hypothesis has been specified for it. Consequently the study identifies only one hypothesis that corresponds to the second objective which state as;

i. Characteristics of rabbit producers do not influence commercial rabbit keeping.

1.5 Justification of the study

The need for research is based on developing issues bearing in mind Kenya is still in its developing stages. Thus it has to rely on commercial agricultural activity for it to achieve its development goals such as poverty eradication, food insecurity and malnutrition as stipulated well in its vision 2030. To achieve this each county Kiambu being one has to play a role. In Kiambu county land sizes are becoming smaller daily since more people prefer to settle in the area due to its nearness to the capital city. Therefore rabbit being a good source of protein which can be achieved cheaply by even low income earners will be the most profitable business venture among the livestock industry due to its growth characteristics and also requires small land sizes. The results will be useful to rabbit farmers, potential farmers, other researchers and government policy makers in the livestock ministry of agriculture as a whole. Therefore commercialization of rabbit keeping will play a vital role of agriculture in achievement of vision 2030. Thus the study to identify the hindering factors will have a positive effect on economic development.
1.6 Study area
Area targeted with this study is Kiambu County. Reason for its selection is based on issues to do with land sizes, socio-economic characteristics of the people living there. For instance land sizes in the area are becoming smaller due to what they call real estate investments. More land is being used to build rental houses thus minimizing the land available for agriculture. Therefore food productivity is affected somehow which calls for small stock like rabbit keeping to be given a thorough seriousness since it can do well in small land sizes. To touch on socio-economic characteristics Kiambu is the main supply of food to the capital city as in they can engage in commercial agriculture mainly in crops. Thus there is need to diversify their risk by incorporating livestock industry also even if land sizes are becoming unfit for large stock among livestock rearing.

1.7 Organization of the project report
The rest of the project is arranged as follows; chapter two which is all about the literature review, then followed by chapter three which is all about methodology issues namely; data collection and sampling procedure, model used and variables included in the model. Chapter four which stipulates results and discussion, chapter five concludes the report and finally chapter six gives a list of references.
2.0 LITERATURE REVIEW

This section highlights the previous studies which have been done in relation to the study undertaken by this project. It incorporates their methods, findings, conclusions and the ways in which they are different to my study and also their similarities.

One of them is in Journal of Agriculture, Food, Environment and Extension, vol4, number1, 2005 pp70-73 written by Madukwe et al. They did analysis of obstacles to the adoption of improved rabbit technologies by small scale farmers in Nigeria. Methods used were structured interviews of sixty respondents, which were analyzed by percentages, multiple regression and factor analysis. Findings showed that production of rabbit is dominated by young children of school age (63.3%) and males (93%). Also they found that age was a significant factor in influencing the improved rabbit technologies. Major obstacles identified were management, economic, constraints, nutritional and housing constraints. They concluded that extension agents should design programs that aimed to encourage students in secondary school towards this adoption. Differences of the study to mine is that mine will be focused in identifying the factors behind the reluctances of farmers to commercialization of rabbit keeping plus the study will use descriptive analysis and sampling methods backed with questionnaires. It is similar to the study in that also usage regression analysis in analyzing the relationship of variables.

Another study was done by Abu et al who focused on status and promotional strategies for rabbit production in Nigeria in year 2008. Methods used were field survey, questionnaires, personal interviews and observations plus experiences of the author. Findings showed that rabbit production mainly non-commercial oriented, smallholder type kept mainly by women and mainly were for specialized research based institutions and inbreeding was highly evident. They also found that space was a limiting factor. Conclusion showed that there is need for promotional strategies and policy suggestions. Different to my study in that mine analyses factors affecting farmers in commercializing rabbit keeping fully and will also use regression analysis. Similarities are in the use of questionnaire in data collection.

Another study was done by Hungu et al on production characteristics and constraints of rabbit farming in central, Nairobi and rift-valley provinces in Kenya 2013. Methods used were questionnaire and examination sheets in recording data. Findings showed that rabbit rearing is done on small-scale due to small land space but there was sustained interest in rabbit farming as
shown by a large proportion of farmers. Also they noticed that farmers had limited access to technical information in rabbit farming as seen in the poor design and construction of the rabbit hutches. Major constraints identified included disease, predators like rats, death and unavailability of rabbit feed. Conclusions revealed that there are opportunities and challenges to increase rabbit production in the country though access to technology and marketing strategies were major hindrances to this development thus need for promotional and extension services. Difference to this study is it focused on both characteristics and constraints while the research will be mainly on factors affecting the adoption of commercial rabbit keeping. Similar to the study is the use of questionnaires.

Fourth previous study was on factors affecting the growth of agribusiness enterprises in Kenya a case of rabbit keeping in Kiambu County. This was done by Geoffrey in 2008. Methods used were purposive sampling technique in conducting the study, selection of study used sample probabilistic sampling technique where a sample of 30 out of 120 rabbit farmers was selected. Data was analyzed using descriptive statistics and tools used to process data were SPSS V20 and Ms Excel spreadsheet. This data was presented using frequency tables and pie charts. Findings showed market availability remained a challenge, little research has been done, and there were inadequate financial resources and minimal extension services. Conclusion indicated that government should spearhead promotion campaign to create market, encourage research and extension services. Different to my study because it focused mainly on factors affecting rabbit industry as a whole while mine will focus on factors behind the reluctances of farmers to adopt the commercial rabbit keeping. It is similar to mine due to the use of sampling techniques and questionnaires.

Therefore in summary findings from previous studies as seen in the above paragraphs showed that main obstacles to adoption are market inaccessibility, type of technological advancement used and personal characteristics. Thus these will be roots of the research variables which are yet to be tested.
3.0 METHODOLOGY

3.1 Data collection and sampling procedure
Data used in this study was mainly primary and secondary which was collected through use of semi-structured questionnaires and face to face interviews. Type of data collected were both qualitative (market access, gender, education level) and quantitative (age and stock). Therefore Kiambu County was selected on purposive sampling since some studies have been done justifying rabbit keeping in the area. (Godfrey, 2013). Farmers were selected using the central limit theorem which incorporates law of large numbers and sample of 30 rabbit farmers was used with 95% confidence level. They were interviewed and opinions recorded as answers to the questionnaires.

3.2 Empirical model used
The study involved identification of factors that affect the slow adoption of commercial rabbit keeping, thus linear regression model was used in testing the relationship of the variables (factors) and adoption process. Dependent variable here was adoption while independent variables included socio-economic characteristics of the farmers. Linear regression model helps in testing how the dependent variable is affected by a change in independent variable. Therefore the independent variables and dependent variable were formulated and linear regression was run using the SPSS software. To clarify on variables used, dependent variables included socio-economic characteristics, market accessibility, credit accessibility and technology level used. Socio-economic characteristics include factors such as age, gender, education level, and stock size kept.

The mathematical equation for this model is given as;

\[ y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 \]

Where;

i. \( y \) is the adoption of commercial rabbit rearing
ii. \( \beta_0 \) is the coefficient of adoption when no variable is in effect
iii. \( \beta_1 x_1 \) is socio-economic characteristics and its beta coefficient
iv. \( \beta_2 x_2 \) is technology and its beta coefficient
v. \( \beta_3 X_3 \) is market accessibility and its coefficient
vi. \( \beta_4 X_4 \) is credit accessibility and its coefficient

3.3 Variables included in the model

Table 1. Expected output

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description of the variable</th>
<th>Expected output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Age of respondent (1=above 35)</td>
<td>-</td>
</tr>
<tr>
<td>Gender</td>
<td>Gender of the respondent (1=male)</td>
<td>±</td>
</tr>
<tr>
<td>Hedul</td>
<td>Education level of respondent (1=above primary)</td>
<td>+</td>
</tr>
<tr>
<td>Operationscale</td>
<td>Scale of operation (1=large)</td>
<td>±</td>
</tr>
<tr>
<td>Stocksize</td>
<td>Size of stock kept (1=above 30)</td>
<td>±</td>
</tr>
<tr>
<td>Creditaccess</td>
<td>Credit accessibility (1=no)</td>
<td>±</td>
</tr>
<tr>
<td>Technicality</td>
<td>Is technology a factor (1=no)</td>
<td>+</td>
</tr>
<tr>
<td>Mktaccess</td>
<td>Market accessibility (1=n)</td>
<td>+</td>
</tr>
</tbody>
</table>

According to the above table age was expected to affect the adoption in a negative manner since most of the rabbit keeping is practiced by small boys. Thus the beta coefficient of age was expected to have negative sign due to these social-cultural believes. Subsistence type of rabbit keeping is mainly associated with women and small boys therefore gender was expected to affect the commercial adoption in either way depending on the gender of respondent. Thus if the majority of the respondent were of male gender then the adoption would be affected positively.

Education level was expected to have a positive effect on the adoption process since the more one is educated the higher the chances he or she will practice commercial type of agriculture. This is due to factors such as awareness associated with the benefits of commercial rabbit rearing. Scale of operation was expected to have either positive or negative effect depending on majority of respondents interviewed. For instance if majority were practicing small scale type of
rabbit keeping expectation is that there will no willingness to adopt it commercially. Also stock size kept by the respondent would have the same effect as that of scale of operation since they are both related.

Credit accessibility was expected to have either positive or negative effect on adoption process. Reason being a farmer can be accessible to credit facilities but he or she chooses to invest in other form of commercial agriculture, thus affecting the adoption process negatively. Technology such as value addition and pelt processing was expected to affect the adoption positively since more and more farmers will be attracted to adopt commercial due to increased returns in the industry. Market accessibility was expected to affect the adoption process positively in a manner such that if a farmer is accessible to market he or she will be willing to commercialize it.
4.0 RESULTS AND DISCUSSION

4.1 To characterize rabbit producers

Table 2: Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Descriptive statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production type (% otherwise)</td>
<td>56.7</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>60</td>
</tr>
<tr>
<td>Age (% above 35)</td>
<td>53.3</td>
</tr>
<tr>
<td>Education level (% above primary)</td>
<td>80</td>
</tr>
<tr>
<td>Operation scale (% large)</td>
<td>16.7</td>
</tr>
<tr>
<td>Stock size (% above 30)</td>
<td>50</td>
</tr>
<tr>
<td>Market accessibility (% no)</td>
<td>33.3</td>
</tr>
<tr>
<td>Technology as a factor (% no)</td>
<td>23.3</td>
</tr>
<tr>
<td>Credit accessibility (% no)</td>
<td>63.3</td>
</tr>
</tbody>
</table>

Most of the rabbit farmers were of the male gender as stipulated in the table above. Reason for this was due to factors such as cultural and non-familiarity of the female gender. Most women practiced small crop farming which requires only small amount of start-up capital compared to commercial rabbit. On age factor most of the respondents constituted of people above age of 35 years. This trend was attributed to the fact that most youths are running for white collar jobs thus neglecting agriculture. Education level results showed that most of the rabbit farmers had acquired education past primary level. This is attributed to knowledge acquisition about the benefits associated with commercial rabbit keeping. Issue like value addition is taught at high levels of education thus knowledge of this will motivate a farmer to adopt rabbit rearing commercially.
It was evident that majority practiced small scale farming thus adopting commercial rabbit keeping was hard to them due to low returns on capital due to lack of economies of scale. Only few who practiced on large scale and they have joined association to increase their bargaining power. On issue of size of stock it was on 50% basis whereby half kept more than 30 rabbits while the other half kept less than that. Factor affecting this was attributed to market accessibility.

Market accessibility constituted of only 34% thus majority were not accessible to market making it difficult for them adopt it commercially. Market inaccessibility was due to lack of proper market systems whereby the industry has imperfect competition. Around 77% of the respondent accepted that technology is still a major in making the rabbit industry competitive. This portion highlighted things like introduction of value addition and pelt processing in the rabbit industry. Lastly majority were not accessible to credit facilities due to obstacles like lack of collateral, biasness in credit delivery, too procedural and lack of awareness about the existence of those facilities.

4.2 To identify the relationship between socio-economic characteristics and adoption of commercial rabbit keeping.

According to Table two it was evident that out of all the variables regressed against the dependent variable of commercial rabbit keeping, only technology was statistically significant with a p-value of 0.036 and a beta coefficient of 0.439, the other variables were insignificant. It was in fact the most determining factor in adoption of commercial rabbit keeping according to these results; this means that an increase in technology by 1 unit will increase commercialization of rabbit farming by 43%. From the study policies to increase technology and extension services to encourage farmers to adopt technology should be applied to rabbit farming to increase its commercialization. The direction of the output was positive as stipulated in chapter three. Therefore value addition such as pelt processing and technology to process rabbit manure and urine into viable fertilizer is highly recommended by this output.

Gender had a positive effect on the adoption process meaning most of the respondents were of the male gender. It justified the expected output from table 1. This meant that an increase in one number of male would result to an increase of 13% in adoption of commercialization. Age was expected to have a negative effect on the adoption process but the result showed that it affected it
positively. It was evident that an increase in age would result to 3% increase in commercialization. This can be attributed to as one get older the tendency for him or her to invest in agriculture is high since retirement is approaching.

Education level was expected to affect the regression process positively and it was confirmed so by the results which showed that as one increases in level of education the commercialization will increase by 26%. This is attributed to acquisition of knowledge such as value addition and health benefits associated with rabbit rearing. On variable to do with scale of operation, it was evident that it had negative effect on adoption process; therefore the relationship is inversely related. This means that if you increase the scale of operation would result to a decrease in adoption by 33%. This can be attributed to the fact that most of the farmers are small scale type of farmers thus affecting it negatively.

Credit accessibility affected the commercialization in a negative way. This confirmed the expected output. Reason for credit accessibility to have an inverse relationship with the adoption was due to fact of fungibility where farmer is accessible to credit but he or she invest it in other type venture. To clarify on the relationship it was evident that increase in credit inaccessibility would result to 24% decrease in adoption. Factors attributed to credit inaccessibility were lack of collateral and biasness in credit delivery. Lastly market accessibility affected the commercialization positively as expected from table 1. Therefore an in market accessibility would result to 25% increase in commercialization of rabbit rearing. Factors that affected the market inaccessibility included imperfect competition.

Therefore from the analysis of table two and table three which explained on my two objectives it is evident that socio-economic characteristics affected the adoption of commercial rabbit rearing thus the study failed to reject the null hypothesis stated in chapter one.
Table 3. Regression results

<table>
<thead>
<tr>
<th>Variable</th>
<th>coefficient</th>
<th>std error</th>
<th>significance (P-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.407</td>
<td>0.290</td>
<td>0.175</td>
</tr>
<tr>
<td>Gender</td>
<td>0.134</td>
<td>0.171</td>
<td>0.443</td>
</tr>
<tr>
<td>Age</td>
<td>0.031</td>
<td>0.166</td>
<td>0.853</td>
</tr>
<tr>
<td>Education level</td>
<td>0.264</td>
<td>0.233</td>
<td>0.270</td>
</tr>
<tr>
<td>Operation scale</td>
<td>-0.328</td>
<td>0.228</td>
<td>0.166</td>
</tr>
<tr>
<td>Stock size</td>
<td>-0.264</td>
<td>0.169</td>
<td>0.133</td>
</tr>
<tr>
<td>Market access</td>
<td>0.253</td>
<td>0.169</td>
<td>0.150</td>
</tr>
<tr>
<td>Technology</td>
<td>0.439</td>
<td>0.196</td>
<td>0.036</td>
</tr>
<tr>
<td>Credit access</td>
<td>-0.235</td>
<td>0.169</td>
<td>0.180</td>
</tr>
</tbody>
</table>
5.0 CONCLUSION
The purpose of this study was to analyze the factors affecting commercialization of rabbit rearing in Kiambu County. The objectives of the study were to characterize rabbit producers and identifying the relationship between these characteristics and commercialization of rabbit rearing. Selection of respondents was through sampling and Central Limit Theorem was used to determine the sample size and linear regression model was used to test the relationship. The results showed that technology was the most significant factor among the independent variables. Therefore significant of the results to the study showed that one unit increase in technology would result increase in commercialization. Thus policies that deal with improvement of technology and extension services should be directed towards rabbit rearing for it to be commercialized. These technologies include pelt processing, technology that converts manure and urine into fertilizer and introduction of usage of artificial insemination. For instance artificial insemination will increase efficiency thus reduction of cost of production.
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