AN ASSESSMENT OF THE FACTORS AFFECTING FARM RECORD KEEPING AMONG SMALL SCALE FARMERS IN ZAMBIA'S CHIBOMBO DISTRICT

Research report presented to the Department of Agricultural Economics and Extension Education of the University of Zambia

BY

STEPHEN M. MULANDA

In partial Fulfillment of the Requirement for the Degree of Bachelor of Agricultural Sciences

ACKNOWLEDGEMENT

I praise God's name for according me the chance to successfully conduct this research. Special thanks go to my supervisor Ms. Benadette Chimai for her guidance and suggestions rendered in producing this report. I would also wish to thank all the staff in the Department of Agricultural Economics and Extension for their contribution towards this report. My heartfelt gratitude goes to my mother Mrs. Moka Mulanda for her emotional and financial support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURE

LIST OF ABBREVIATIONS

MACO	Ministry of Agriculture and Cooperatives
FNDP	Fifth National Development Plan
MFNP	Ministry of Finance and National Planning
CSO	Central Statistical Office
FAO	Food and Agriculture Organization
CSPR	Civil Society for Poverty Reduction
GDP	Gross Domestic Product
CTA	Technical Centre for Agriculture and Rural Cooperation
NFSP	National Fertilizer Support Program
SMS	Subject Matter Specialist
SMC	Scheme Management Committee
NGO	Non Governmental Organizations
MBT	Micro Bankers Trust
UNZA	University of Zambia
NFSP	National Fertilizer Support Program

ABSTRACT

An Assessment of the Factors affecting Farm Record Keeping among SmallholderFarmers in Zambia's Chibombo District

Stephen Mulanda
University of Zambia, 2012

Supervisor
Ms. B. Chimai

Record keeping is an important practice in the farm of business and the farm business is not an exception. Proper record keeping on the farm can help bring rationalization and increase profits.This research was aimed at assessing the factors affecting farm record keeping; to do this a probit model was used to determine the significance of each of the independent variables. This was done in STATA. A number of descriptive statistics was also generated to describe the characteristics of the target population.A cross section research design was used, i.e. data was collected at one point in time in Chibombo district of the central province of Zambia.

The research found out that farm record keeping is dependent on; Farming experience (p=0.000), farming experience was found to be positively related to record keeping, this implies that, the more experience a farmer has the more likely it is that a farmer will keep records.Farm size (p=0.000),Farm size was found to be directly related to record keeping; the larger the farm size the more likely it is that the farmer will keep records. Crop income (p=0.003), Crop income was found to be directly related to record keeping; the larger the crop the more likely it is that the farmer will keep records; marital status of the household head (p=0.081),Marital status of the household head was found to be negatively associated to farm record keeping; compared to single parent headed married household heads were more likely to keep records, this sums up because married household head may need to keep records as production decisions in the household are not made independently.Education level of the household head (p=0.068),The influence of education on record keeping was found to be positive, this was as expected, as more educated household heads are able to read, write and comprehend the importance of record keeping in the farm business and hence are more likely to keep records. Age of the household head (p=0.070). It also showed that farm record keeping does not depend on the receipt of government subsidies and on total household assets.

The study therefore recommends that the level of education of the farmers should be improved, this enables farmers to read and write, government also should encourage the youth to engage in agricultural production as young people in this research have been found to be more likely to keep records.Finding ways of increasing the income of farmers is one important variable that can help increase record keeping among small scale farmers. The government can do so by encouraging farmers to sell their products, i.e. developing a proper marketing system.Finally this research recommends that regular training should be conducted in order to improve record keeping practice in the long run, this will enable farmers appreciate the importance of record keeping in bringing rationalization and improving profits in the farm business.

CHAPTER ONE

INTRODUCTION

1.1 Background

Farm record keeping involves collecting an account of a farmer's daily operations in the farm. There is no universally accepted definition of farm records. However, Torres (2001) gave two definitions for farm record keeping. Record keeping is keeping of detailed records by a farmer of his farm's daily operations, income and expenses. He added that record keeping refers to data collection activity of a research organization which involves the keeping of records of a group of farmers with some guidance and support from the researcher.

There are various types of farm records but Omoruyi, (1999) and Poggio (2006) classified them under four basic types. They are the resource inventories, production records, financial records and supplementary records. Resource inventories include assets and liabilities of the farm whiles production records include mortality, breeding, bird performance, feed information, laying and labour, fertilizer, seed and weedings. Financial records include income from sale of eggs, milk,grain, birds and expenditure from feed, seed, fertilizer, weeding, vaccines, labour and maintenance of farm equipment. Supplementary records include survey map, the farm layout (map) and the legal documents of the farm.

Most small scale famers in many developing countries Zambia including; do not keep farm records (Poggio, 2006) and when they are asked questions such as how many 50kg bags of maize grain they have harvested they are often found groping for answers. Researches conducted in Zambia, Tanzania, Uganda, Namibia, Swaziland, Malawi, Ghana and Kenya by Minae *et al.*, (2003) and Mahiyu (2008) noted that small-scale farmers rarely keep a record of their farm business. The small numbers of birds kept,dairy cows and hectares of crops by small scale farmers is likely to reflect on their farm record keeping behavior because according to Johl & Kapur (2001), the subsistence nature of farming does not produce any incentive for keeping farm records and farmers cannot engage separately trained accountants to help them in farm

accounting. Singh (2001) added that small-scale farmers are likely not to show interest in keeping farm records because they know that because of the small size of their farm holdings they will not be able to effect economies of scale. However this is despite of the importance farm record keeping in accessing creditand proper management of the farm,Iton (2009).Hence this research has the objective of determining the factors affecting record keeping among small scale farmers, once these factors have been un earthed it can then be a stepping stone to policy intervention to help our farmers.

1.2Statement of the Problem

Successful farmers can not simply memorize answers to their problems no make decisions based on habit, they instead realize that their decisions are subject to a myriad of factors and that changes in these factors will necessitate a change in the way they make their decisions. In the face of rapid improvement in technology and the rapid pace of the farming industry, it is undesirable for producers to manage a farm enterprise the way their parents did 30 years ago (Arzeno, 2004). Hennderson and Gomes (1974) noted that farm record keeping is an avenue for improving small scale farming. In the absence of farm records, a farmer will find it difficult to cope with to day's business environment; this is because a farmer who keeps records is able to handle problems better than the one who doesn't (Hansen et al, 1991; Poggio, 2006). Good record keeping is not only essential for traceability in supply chains (KIT *et al.,* 2006), but a useful decision-support tool for monitoring and evaluation of farm performance (Brand et al., 2001).

Despite the importance of farm records to the growth of a farm business, farmers often consider it as a difficult task (Poggio, 2006) and therefore fail to keep records and the decisions they make are guided by vague estimates and guesses based on their past experience of farming (Johl & Kapur, 2001). A study done by Omondi and Meinderts (2009) on the status of good dairy farming practices on small scale farms in Central Highlands of Kenya showed that only 22.5% of the farms kept records of their dairy enterprises and that even those records were not adequate. This state of affairs warrants a situation where policy formulation, planning agricultural

programs, monitoring and evaluation becomes difficult because data collection from the records of farmers is practically impossible, even though it is imperative for policy-makers to convey information to producers by demonstration projects, technical assistance, and education programs. And despite the great potential of farm record keeping in increasing agricultural output it has received little attention in terms of Agricultural policy thrust and economic research (Auko, 2006).

Most researches done in the area of record keeping have looked at particular sectors such as poultry and dairy, the methods used to analyze the data is often inadequate, such as participatory action research by Daniel Kinyanjui which assessed record keeping among dairy farmers in Kenya and Uganda. On the contrary this research will include in its sampling frame all small scale farmers ranging from poultry, dairy, beef, pig, small ruminants and crop producers, it will therefore be able to make cross comparisons such as which sector is a better record keeper. The research will also perform a regression in STATA, implying that it will be able to isolate which among the factors affecting record keeping is the most important and be able to address many data problems such as multicolinearlity and heteroskedastcity which are prevalent in cross sectional analysis.

1.3Objectives

1.4 Main Objective

To determine factors affecting farm record keeping among small scale farmers

1.5 Specific Objectives

1. To determine the effect of social economic status on record keeping among small scale farmers.
2. To establish an overview of record keeping practice among small scale farmers.
3. To determine the effect of education on record keeping among small scale farmers.
4. To establish the effect of enterprise on farm record keeping among small scale farmers.
5. To determine the effect of demographic characteristics on record keeping among small scale farmers.

1.3 Rationale for Conducting Research

Muhammad *et al.*, (2004) noted that farm record keeping is a key practice used by very successful farmers. Essentially, accurate written farm records are very helpful. Chapman (2003) and Iton (1999) stated that a farmer who has a well-kept farm record is in a more favorable position to borrow needed funds than one who has no farm records. This is confirmed by Devonish *et al.*, (2000) that more than half (57%) of a total of 160 farmers interviewed were obtaining credit due to the fact that they were keeping farm records. It can be said here that their farm records helped them in obtaining the farm loans. However, the 43% who were not obtaining farm credit were those who did not keep farm records. According to Johl & Kapur (2001), when farmers keep records, they continuously give the needed information for state and national farm policies such as land and price policies. This further helps in research works which will require precise and correct data which is possible only if proper records are maintained on the farms and

included in the study. Farm records therefore serve as a helpful tool in obtaining the correct data for examining and developing sound policies. In some countries farmers must maintain proper farm records in order to receive subsidies from government, Rolls (2001). The above explanation gives the reason for conducting the research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviews literature on record keeping among small scale farmers; it covers many areas where studies have been done including Zambia. The chapter looks at known findings and sums up with the conceptual frame work for the study.

2.2 Known Findings

Studies that have been done on record keeping in the agricultural industry have looked at specific sectors such as poultry and dairy. However factors affecting record keeping has just been handled as part of the specific objectives and not as the main objective of the research. According to Devonish *et al.*, (2000) and Aning (2006), most farmers keep their farm records manually. Both stated that the majority of farmers (81%) kept their records hand written, that is in books, ledgers bills and other loose leaves. Devonish *et al.*, (2000) further stated that 4% of them store their records on the computer using some type of accounting software and 15% of the farmers keep both hand written and computerized records. In a study by Okantah *et al.*, (2003), poultry farmers were asked to determine the frequency with which they collected, inspected, analyzed and referred to their farm records. It was noted that most farmers collected farmrecords on a daily basis but tended to refer to them on a weekly or monthly basis. Thus records were not likely to have an immediate influence on the daily business decision making process by the poultry farmers. Devonish *etal.*, (2000) showed contrary results that most of the farmers (38%) interviewed for their research work preferred to record their data weekly whiles 30% preferred monthly basis and 28% recorded data daily. Keeping of farm records is affected by certain factors. According to Mariene (1995) and Devonish et al., (2000), farm record keeping dependent on age, gender, farm size, level of formal education and years of farming experience. The research by Devonish *et al.*, (2000) however, further showed that there was a significant relationship between farm record keeping and the following factors: farm assets, farmer status,

the receipt of credit and net income. Farmers who owned the larger farms tended to keep records than those with relatively smaller farms.

2.3 Conceptual Framework

A farmer either keeps records or does not, this is an example of a binary response dependent variable and for this particular variable the appropriate model to employ is the probit model.Probit model will be used to avoid having to work with negative dependent variables and assuming non-linear effects of the explanatory variables. Also, the Probit model discriminate better near median potency (i.e. probability of response) and is more appropriate when the binary dependent is assumed to represent a normal distribution. This model is a popular specification of a generalized linear model, using the probit link function. The Probit model is specified as:

$Pr(Y=1|X = x) = \Phi (x'\beta)$

Where β is a parameter to be estimated, and Φ is the normal cumulative distribution function (cdf). Under Probit model, farm record keeping, Yi, can be represented by the equation;

$$Yi = 1 (Y* > 0) = \begin{cases} 1 & \text{if } Yi* > 0 \\ 0 & \text{otherwise} \end{cases}, \text{ where } Yi^* = x'\beta + \varepsilon, \text{ and } \varepsilon|x \sim N(0, 1).$$

Here i = 1, 2, 3, 4, 5...n and denotes the sample size surveyed, Yi is the dependent variable representing record keeping, β is the set of parameters to be estimated which reflect the impact of changes in x on the probability, x is a vector of independent variables, i.e. experience, farm size, crop income, total value of assets, marital status, age and level of education. ε isthe independent normally distributed error term assumed to be normal with zero mean and variance 1.

CHAPTER THREE

METHODS AND PROCEDURES

3.1Introduction

This chapter describes the methods and procedures that will be used to help in the achievement of stated objectives. The chapter also describes the study area, sample to be used and the method of collecting and analyzing data.

3.2 Research Design

When all data is collected at the same time, the research design is known as cross sectional. This study happened to be a cross sectional study because data was collected at one point in time. The cross sectional design was appealing for reasons of economy of time and cost though the design did not allow for change overtime, that is, all data was collected at once hence, difficult to demonstrate or offer causal interpretations generally overtime. However, the immediate nature of cross sectional design as well as the relative ease of data collection made it a design of choice because there was only one period for collection of data and the researcher group was not faced with difficult and cost of maintaining contact with subjects over a long time.

3.3 Study Area

This study will be conducted in chibombo district in central province. This area is selected because it comprises not only village farmers but also smallholder farmers who have settled there. Therefore, it represents both the village farmers and smallholder farmers. It has a true representation of various household characteristics such as education and levels of knowledge, which are some of the variables this study will measure. Chibombo district is also chosen because of the presence of various enterprises which include livestock and crop production and this will help the research generate statistics.

3.4 Study Population and Sampling Procedure

A sample of 100 farm households will be selected from a sampling frame comprising all small scale farmers in chibombo and this sampling frame will be collected from the ministry of agriculture and cooperatives. A simple random sample of a total of 100 households will then be selected using excel. A farm household will be used as a sampling unit.

3.5 Data Collection and Analysis

Data collection will be by way of questioners which will be distributed to the farmers. The research will rely on primary data. The data from questionnaires will be analyzed using the Statistical Program for Social Sciences (SPSS) to generate necessary descriptive statistics. Microsoft excel will be used to organize the outputs. The Probit model will be run in STATA to generate estimates of the parameter ß through the maximum likelihood method.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter highlights the findings of the research project. It begins with description and discussion of demographic attributes of the target farmers, farming characteristics and later discusses the probit regression estimates.

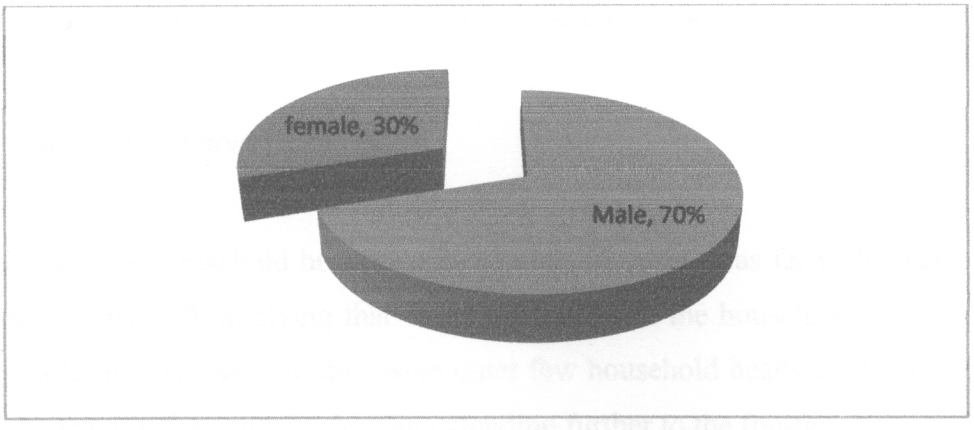
4.2 Demographic Characteristics

The tables below show the distribution of the sample with respect to demographic characteristics. These include distribution by gender, age, marital status and the distribution of by education level. It describes how household heads responded to these characteristics.

4.2.1 Distribution by Gender

The figure below shows the distribution of the respondents with respect to gender as shown below most of the house hold heads in Chibombo district are males with a small proportion of females.

Figure 1: Sex of Household Head

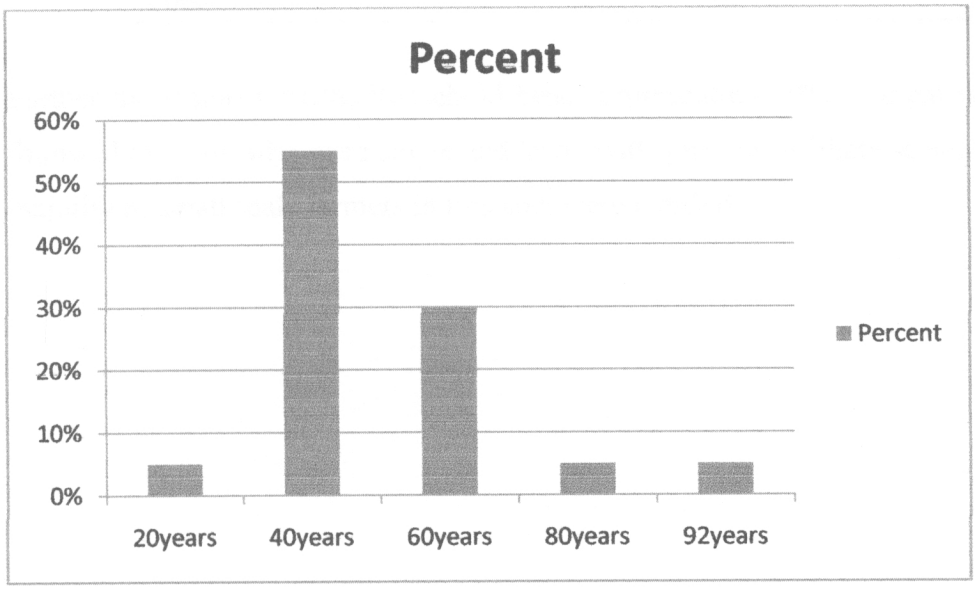


Male headed households represented about 70% of the total population. The remainder of the population was headed by females. There were more males because only household heads in each household wererespondents implying that females were respondents only in female headed households. It also indicates a bias towards selection of male headed households.

4.2.2 Age Distribution of Household Heads

The distribution of the age of the household head in this sample is as shown below; most of the respondents were around about fourty years. There was a few household heads aged above eighty years and below twenty years.

Figure 2: Age distribution of Household Heads



Source: Own Survey data

Further the household headage had a range 24 years to as far as 92years. The mean age for the sample was 40, implying that on average most of the household interviewed were elderly. The distribution shows that their were quiet few household heads above 50years most of them were clustered in the youthful domain extending further to the fourties.

4.2.3 Respondent's Marital Status

Marital status of the household head was distributed as shown in the following table; in this sample most of the household heads were married and followed by those who were single and in the end the divorced and widowed.

Table 1: Marital distribution of Household Heads

Marital status	Number	Percent
Single	40	36.4
Married	66	60.0
divorced or separated	2	1.8
Widowed	2	1.8
Total	110	100.0

Further the majority of the household heads representing 60% of them were married, this was followed by those who were single and lastly with very few of them separated and widowed. The majority of small scale farmers in this area were married.

4.2.4 Education Level of Household Heads

The table below shows the distribution education level in the sample; most of the respondents in this sample were of humble education.

Table 1: Marital distribution of Household Heads

Education Level	Number	Percent
None	10	9.1
Sub A; Grade1	1	0.9
Std2;SGrade3	2	1.8
Std3;Grade4	10	9.1
Std4;Grade5	11	10.0
Std5;Grade6	11	10.0
Std6;Grade7	33	30.0
Form1;Grade8	10	9.1
Form5;Grade12	11	10.0
Form6	2	1.8
Tertiary Certificate	9	8.2
Total	110	100.0

Further as stated above; a large number of the farmers were of humble education with most of them only going as far as grade seven; of importance to note is that their was a number of farmers who had no education at all representing about 9.1% of the population. Therewere traces of farmers who had gone as far as tertiary education, these were mostly nurses and teachers sent in rural areas. In general it can be said that the household heads wear of low education, this is not surprising as the research had its population target as small scale farmers.

4.3 Farming Characteristics

Farmers in the sample were engaged in the enterprises as shown in the table below, in general there was more people practicing crop production than livestock production.

Table 3: Type of Enterprises Practiced

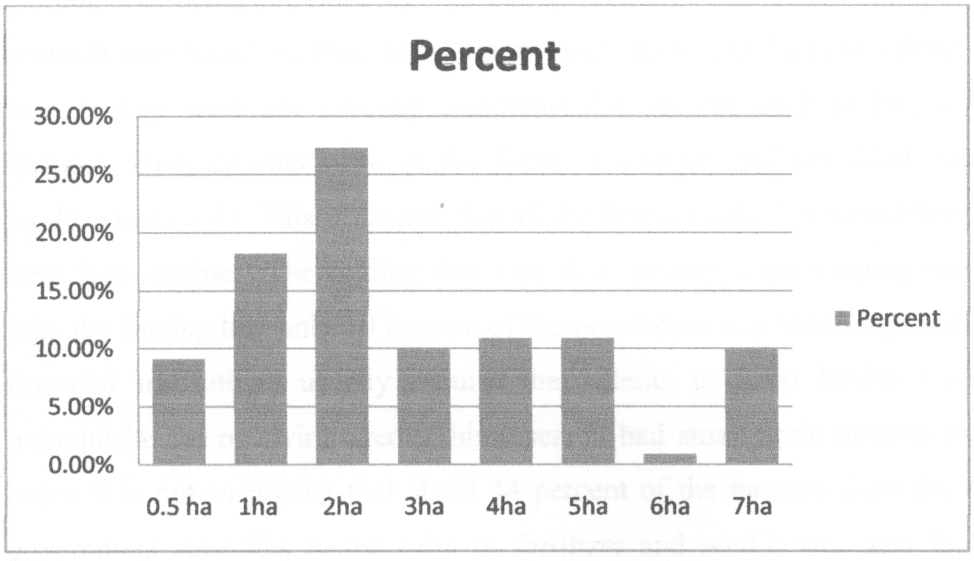
Type of Enterprise	Number	Percent
Crop production	33	30
Crop and animal	11	10
Crop and poultry	22	20
Crop, animal and poultry	44	40
Total	110	100

Further; with respect to the enterprises practiced by the farmers; this research found out that all the farmers grew crops, more than half of the population i.e. 55% kept animals while 66% had poultry. This is not surprising as agriculture in Zambia is crop biased and very little effort is directed towards livestock production. From direct observation the researcher observed that each farmer at least some maize and the livestock that was produced was majorly cattle and village chickens with small traces of goats.

4.3.1 Distribution of Farm Size

The distribution of the farm size is as shown below in the bar chart below, these were small scale farmers and their farm size was small in general.Further; on average farmers have size of land of about 2 hectares, and this was quiet substantial considering the fact that these were small scale farmers.

Figure 3: Distribution of Farm Size



However from direct observation the research found out that actually despite the large size of land, most of it was not being exploited and that only a small proportion was being used agriculturally.

4.4 Distribution of the Variables

Table 4 gives a description of the characteristics of the sample with respect to the variables considered in this study.

Table 4: Variable Distribution.

Sample Characteristic	Percent
Received Training	25%
Kept Records 2010/2011 Season	40%
Ever Kept Records	40%
Belong To Cooperative	43%
Received credit	10%
Receive government subsidy	46%
Think record keeping is important	100%
Provided labour	90%

The table above clearly shows that, a very small percentage of the sample had received training in record keeping, most of them had not received training in farm record keeping and this training was being provided by NGO's, government had done very little in this area. Further; research also found out that, few farmers keep records, in fact even those farmers who had kept records they were not keeping comprehensive records such as income statements and farm budgets. Their records were in the form of receipts and scribbled papers on the quantities produced and sold. This is despite that all the farmers said that record keeping was important for their farm business.The finding that very few farmers were keeping records is also consistent with the finding that only 10 percent of the population was receiving credit, this sum up because financial institutions usually require that clients to keep business records as one of the prerequisite for receiving credit.This research had small scale farmers as its target population; hence it is not surprising that about 44 percent of the farmers from the sample were receiving government subsidies in the form of fertilizer and seed.It was also found out that almost or

household members had provided labour toward agricultural production in the 2010/2011 production season. In fact only children who were too young to engage in production had not provided had not contributed to family labour, all household members had provided farm labour.

4.4.1Model Variable Characteristics

The table below shows the characteristics of the sample with respect to the independent variables in the model. It gives the average with respect to each independent variable.Most of the household heads in this research had farming as their main occupation, it is no wonder that the average farming experience for the sample was sixteen and a half years considering the fact that most household heads stated farming as soon as they became independent, i.e. running their own houses.

Table 5: Model Variable Characteristics

Variable	Mean
Farming experience	16.5
size major enterprise	2.7
Total Crop income	6568
Dummy variable for single	0.34
Dummy variable for married	0.63
Dummy variable for divorced	0.2
Dummy variable for widow	0.1
Education level of the household head	7
Age of the household head	43.8
Total value of assets	343

Most of the household heads in this research had farming as their main occupation, it is no wonder that the average farming experience for the sample was sixteen and a half years considering the fact that most household heads stated farming as soon as they became independent, i.e. running their own houses.The major enterprise engaged in was maize production as all farmers were producing maize as shown in table three, on average farmers were growing 2.7 hectares of maize. However it must be stated here that most farmers did not know

the exact hectares of maize they were growing, hence their responses were mere estimates.The average income from crop production was 6568 thousand kwacha and on average each household had an asset value of 3430000 kwacha. These averages recognizes the presence outliers such as teachers, nurses and other formally employed workers who may misrepresent the actual values obtaining on the ground, i.e. the general weakness of averages, as a disadvantage.

4.5 Probit Model Results:

This section attempts to explain the factors affecting record keeping among small scale farmers, Initially the model as a whole is statistically significant, implying that it sits better than a model without predictor variables. The pseudo R^2 which is a false R^2 can be interpreted in the same way as the OLS R^2, meaning that, in this case a pseudo R^2 of 0.86 means that the model is able to explain 86% of the observed change in dependent variable, which is good enough.

Table 6: Parameter Estimates

Variable	dy/dx Marginal Effects
Constant	0.3185
	(4.0385)
Experience	0.0424***
	(0.0324)
Farm size	0.4293***
	(0.3166)
Crop income	0.0001***
	(0.0001)
government subsidy receipt	0.0953
	(0.5205)
Dummy variable for married	-0.8473*
	(1.637)
Dummy variable for divorced	-0.3517**
	(0.9934)
Education level of household head	0.1424*
	(0.2119)
Age of household head	-0.1406*
	(0.2108)
Age of household head^2	0.0012*
	(0.0019)
Total value of assets	0.00003
	(0.0004)

pseudo R^2	0.8609
F-statistic	0.012
Number of observations	110
Dependent variable	Record keeping
Log pseudo likelihood	-9.2929335

*, **, *** denote statistical significant at 10 percent, 5 percent and 1 percent respectively. Robust standard errors in parenthesis.

From Table 6 below; it can be seen that farm record keeping is dependent on; Farming experience, farm size, crop income, marital status of the household head, Education level of the household head, Age of the household head, and the square of the age of the household head. It also shows that farm record keeping does not depend on the receipt of government subsidies and on total household assets.

The research established that, there is a positive relationship between a farming experience and record keeping. This implies that, the more years in farming a farmer has the more likely it is that they will keep records. This is a case of the learning curve, the more farming experience a farmer has, the more likely it is that they will come to release the practical assistance resulting from record keeping and hence they will keep records.

Farm size has been found to be directly related to record keeping; the larger the farm size the more likely it is that the farmer will keep records. Farmers with larger farm size are linked to local village leadership, these tend to be innovative and look at farming as a business and not way of life and the observed record keeping.

Marital status of the household head was found to be negatively associated to farm record keeping; compared to single parent headed married household heads were more likely to keep records, this sums up because married household head may need to keep records as production decisions in the household are not made independently.Compared to single parent headed households, households with divorced household heads were more likely to keep records.

The influence of education on record keeping was found to be positive, this was as expected, as more educated household heads are able to read, write and comprehend the importance of record keeping in the farm business and hence are more likely to keep records. In this sample however education levels were low, which is one of the reasons why the majority of farmers were not keeping records.The age of the household head was found to be negatively related to record keeping, this means that the older the household head the more likely it is that they will keep records. The age of the household head is linked to education level negatively, the older the household head the more likely it is that they will have low education, and as shown above the more likely it is that they will not keep records.However age has been found to have functional form specification of a quadratic function, hence with age squared as shown below; the formula;

Recodkplstyr= $-ß_1age+ß_2age^2$

drecordkplstyr/dage= $-ß_1 + 2ß_2age = 0$

Minimum age = $ß_1/2ß_2 = 0.1406/2*0.0012 = 58.6$ years

The above further analysis shows that; the influence of age on record keeping is negative for values of age less than 58.6 years, i.e. for values of age that are less than 58.6 years, an increase in age increases the probability of a farmer to keep farm records. However for values of age that are greater than 58.6 years; an increase in age will increase the probability of a farmer to keep records. This is linked to experience because the older the farmer the more experience they will have and as mentioned earlier the more likely it is that a farmer will keep records.The receipt of government subsidies was found not to have any effect on record keeping, this is despite what literature review shows that; farmers who receive government subsidies are more likely to keep records than those who don't, especially in countries where record keeping has been made to be a prerequisite for receipt of government subsidies (Rolls; 2011). Total farm assets was found not to affect farm record keeping, this is also contrary to what literature says that the more wealth a farmer is the more likely it is that they will keep farm record (Devonish *et al.*;2000), in this sample however the value of farm assets was very low, with a few large outliers.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter highlights the conclusions and recommendations based on the survey findings and interpretation. It can be seen that farm record keeping is dependent on; Farming experience, farm size, crop income, marital status of the household head, Education level of the household head, Age of the household head, and the square of the age of the household head. It also shows that farm record keeping does not depend on the receipt of government subsidies and on total household assets.

5.2 Conclusions

The study analysis was delineated into two separate categories. Descriptive statistics were generated for several farmers' characteristics such as, gender, age, marital status, type of enterprise practiced and training in record keeping. Then the factors which were assumed to affect record keeping were analyzed.The descriptive statistics indicated that a significant proportion of the farmers in this were in the productive age group of between 30 to 43years and had mostly attended primary education. Most of the farmers were male. All the farmers said that record keeping was important for the farm business but the majority did not keep records. All farmers acknowledged that they grew maize, this was expected as maize a staple food crop for Zambia and most government effort in the agricultural sector is directed toward maize production.A significant proportion of the farmers in this sample said that they did not receive credit while less than fifty percent of them said that they were receiving government subsidies.The study discovered that farm record keeping is dependent on; Farming experience, farm size, crop income, marital status of the household head, Education level of the household head, Age of the household head, and the square of the age of the household head. It also shows that farm record keeping is independent the receipt of government subsidies and the value of total household assets.Training and receipt of credit are some of the variables that literature says

affect farm record keeping (Mariene; 1995), these variables were analyzed; however they dropped out of the model because they described record keeping perfectly.

5.3 Recommendations

To ensure that small scale farmers keep records in the long run, the following recommendations have been made based on the study findings and interpretations. The study highlighted that education particularly higher level of education was important in explaining farm record keeping. Farmers with a considerably higher level of education had a higher likelihood of keeping farm records. It is thus recommended that government extends its free education policy from primary to secondary education level to enhance formal education to the younger generation who constitute the largest age category. Special attention should be extended to enhancing training of small scale farmers in record keeping and its importance in the farm business. Despite the fact that the variable for training dropped out of the probit model because it perfectly described the dependent, i.e. all farmers who kept records had received training in record keeping; descriptive statistics and OLS preliminary findings showed that it was an important variable in explaining record keeping. It is from this background that, this study recommends that government and NGOs conduct training in record keeping, this will encourage farmers to keep records and stat lookingat farming as a business and not way of life.The age of farmers is one important variable through which government can intervene to enhance the practice of record keeping among small scale farmers. Young farmers were found to be better record keeper than elderly ones. Hence this research strongly recommends that government encourages the youth to take an active role in agricultural production. Finding ways of increasing the income of farmers is one important variable that can help increase record keeping among small scale farmers. The government can do so by encouraging farmers to sell their products, i.e. developing a proper marketing system.

REFERENCES

Arzeno, A. (2004). **Record Keeping in Farm Management**, College of Agriculture and Biological Sciences, South Dakota State University, Brookings.

Chapman, M. E. N. (2003). **Keeping Farm records in Sudan**, Historical Document, Kansas.

Devonish, E., Pemberton, C. A., Ragbir, S. (2000). **Record Keeping among mall Farmers in Barbados**, Department of Agricultural Economics and Extension, University of the West Indies, St Augustine, Trinidad and Tobago.

Iton, A. (1999).**Small Farmer Participation in Export Targeting Production in the Windward Islands**, Roseau, Dominica.

Henderson, T. H.(1979).**Profiles of Small Farming in St. Vincent**, Dominica and St. Lucia: Report of a Baseline Survey, Barbados.

Mariene, C. (1995). **An exploratory Study on Smallholder's Perceptions of Farm Records in the Embu district of Kenya**: A repertory grid technique, Curtin University of Technology, AvailableOnline: www.muresk.curtin.edu, retrieved on 6th April, 2011, 11:30 GMT.

Minae, S. (2003). **Status of Farm Data Systems and Farmer Decision Support in Sub-Saharan Africa**, FAO Rome

Omoruyi, S. A. (1999). **Prescribed Agricultural Science for Senior Secondary SchoolsRevised Edition**, Idodo Umeh Publishers Limited, Benin City.

Poggio, M. (2006).**Farm Management Records**, AvailableOnline: www.srdc.gov.au, retrieved on 4th November, 2011, 9:20 GMT.

Rolls, M. J. (2001).**Review of Farm Management in Extension Programs in Central and Eastern Europe Countries**, Food and Agriculture Organization of the United Nations Rome, Italy.

Ruth, K. L. (2001).**Record KeepingFarm Management in Extension Programs in Central and Eastern Europe Countries**, Food and Agriculture Organization of the United Nations Rome, Italy.

Timothy, S. (2003). **Status of Farm Data Systems and Record Keeping in Sub-Saharan Africa**, FAO Rome

Torres, A.B.D. (2001). **Farm Management in Extension in the Philippines**, FAO, Rome.

APPENDICES

APPENDIX 1: Household Survey Questionnaire

SECTION A: PERSONAL INFORMATION *official use only*

1) I would like to ask you a few questions about each of the members of your household/farm family?

Can you please give me the names of the members of the household? Start with the farm owner/head.		What is ...'s sex?	When was ... born?		What is ...'s marital status?	What is the highest level of **education** attained by ...	What is ...'s relationship to the head?	Did ... provide farm labour the past production year 2010/2011?
Member code	Member name	0=Female 1=Male	Month **Codes below**	Year (e.g. 1967)	1=Single or under-age 2=Married 3=Divorced or separated 4=Widowed	**See code below**	**See code below**	0=No 1=Yes
MID	**NAME**	**DM01**	**DM02**	**DM03**	**DM04**	**DM05**	**DM06**	**DM07**

Month codes (DM02)		**Level of education codes (DM05**			**Relationship to head co**
1=Jan	*7=July*	*0=None*	*5=Std 4; Grade 5*	*11=Form 4; Grade11*	*1=Head*
2=Feb	*8=August*	*1=Sub A; Grade1*	*6=Std 5; Grade 6*	*12=Form 5; Grade12*	*2=Spouse*
3=Mar	*9=September*	*1=Sub B; Grade 1*	*7=Std 6; Grade 7*	*13=Form 6*	*3=Own child*
4=Apri l	*10=October*	*2=Std 1; Grade 2*	*8=Form 1; Grade 8*	*14=College Student*	*4=Step child*
	11=November	*3=Std 2; Grade 3*	*9=Form 2; Grade 9*	*15=Tertiary Certificate*	*5= Parent*
5=May	*12=December*	*4=Std 3; Grade 4*	*10=Form 3; Grade*	*16=Bachelors degree*	*6= Brother/ Sister*
6=June					

2) What is the total size of land you own? [.....hectares]

4) What enterprise (s) are you engaged in?

1. Crops production [ ]

2. Animal production [ ]

3. Poultry production [ ]

5) What was the size of each farm enterprise in the 2010/11 agricultural season?

1. Size of land used for crop production in hectares [ ]

2. Aggregate number of animals [ ]

3. Number of birds [ ]

SECTION B: SOCIAL AND ECONOMIC BACKGROUND

6) Household assets: Production equipment and major household furniture

Assets	Number(no equipment=0)	Original purchase price(ZMK)(if more than one equipment in 2 take average price)	If you would sell [...] how much would you receive from the sale? (ZMK), for more than one item take average price)
1	2	3	4
1.Donkey/ox cart			
2. push cart			
3. ox-plough			
4. sickle			
5. pick axe			
6. axe			
7. hoe/jembe			
8. knapsack sprayer			
9.mortorized			
10. mechanical water pump(hand, foot, treadle pump)			
11. mortorized water pump (diesel)			
12. spade or shovel			
13. radio, cassette or cd player			
14. cell phone			
15. Improved charcoal/wood stove			
16. kerosene stove			
17. bicycle			
18. cars			
19. motorbike			
20.trailers			
21. jewellery: gold, silver watches			
22. chairs			
23. tv			
24. corrugated iron sheet house			
25. table			
26. fish pond			
27. wooden bed			
28. metal bed			
29. panga knife			
30. others, specify.....			
31. others, specify.....			

7) Does any member of this household belong to a cooperative? [ ]

0=Yes

1=No

8) Income

a)Off farm income (cash and in-kind)

Who earned income in the oct2010 –sept 11 Use MID from section 1	Source of *income*, **Use codes A**	No. of units earned	Unit (e.g. *month,week,year*)	Cash (or cash *equivalent for in-kind* payments) (ZMK)	Total income
MID	1	2	3	4	5= 2*4

Codes A

1=Rented/sharecropped out land	21=Pension income	30=fishing
2=Rented out oxen for ploughing	22=social cash transfer	31=marriage gifts
3=Salaried employment	23=poles from own and communal forest	32=other specify
4=farm labour wages	24=hawker/vendor/marketer	33=agro-processing
5=Non farm labour wages	25=firewood/charcoal production	34=tailor
6=Non-farm agribusiness NET income (e.g. grain milling/trading)	26=carpentry	35=bicycle repair
7=other civil servant	27=builder	36=weaving
8=clerk	28=sales of fire wood/charcoal	37=blacksmithing
9=other business net income (shops, trade, tailor, sales of beverage)	29=butchery(all meats including game, cooked or uncooked)	38=traditional doctor
10=non agricultural piece work		

b) crop income

Crop **Use code B**	Quantity produced (kg)	Quantity sold	Price per unit	**Total value**
1	**2**	**3**	**4**	**5=3*4**

Codes B

1=maize	8=bananas	15= others,
2=sweet potatos	9=mushroom	specify.....
3=ground nuts	10=pumpkins	16= others,
4=cassava	11=tobacco	specify.....
5=vegetables	12=paprika	
6= millet	13=cotton	
7=beans	14=sunflower	

c)animal income

Animal Use code c	Quantity produced (kg)	Quantity sold	Price per unit	Total value
1	2	3	4	5=3*4

Codes C

1=cattle
2=pigs
3=goats
5=village chickens
6=sheep
7=ginefaol
8=darks
9=milk
10=animal hide
11=others, specify

10) Do you receive government subsidies ? [ ]

0= yes
1=No

11) How long have you been in this farm business? [..... years]

12) Do you borrow money from banks and or other financial institutions? [ ]

0=Yes

1=No

14) If yes does record keeping assist you in this respect? [ ]

0=Yes

1=No

SECTION C: RECORD KEEPING CHRACTERISTICS

Type	Have you ever kept this type of records? 0=yes 1= N0	Did you keep this record in the 2010/11 season? 0=yes 1=No	If no why? **Use codes RC3**	Have you ever received training in this record keeping? 0=yes 1=No.	If yes when did you receive the training? **Enter year**	Who provided the training? **Use codes RC7**	
Rc1	Rc2	Rc3	Rc4	Rc5	Rc6	Rc7	Rc8
1. Production							
2. Financial							
3. Legal							
4. Resource							
5. Other (specify.....							
6. Other (specify.....							
7. Other (specify.....							
8. Other (specify.....							

Codes CR3	**Codes CR7**
1=Not important	1= Extension workers
2= cant write	2=NGO
3=cumbersome	3=Radio
4= don't know how to	4=relatives/neighbors
5=others	5=other
(specify.....)	(specify.....)

22) Do you think record keeping is important in the farm business? [ ]

0=Yes

1=No

23) If no why? .....