



Determinants of Farm Record Keeping Among Rice Farmers in Northern Ghana

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Abstract: Farm record keeping is essential for agricultural business success, yet adoption remains low in many developing countries. This study investigates the determinants of farm record keeping among rice farmers in Northern Ghana, a region that contributes significantly to national rice production. Using a mixed-methods approach, data were collected from 245 rice farmers across three districts (Tolon, Kumbungu, and Savelugu) through questionnaires and focus group discussions. The study employed a binary probit model to identify factors influencing farmers' decisions to keep records. Results revealed that only 11% of respondents maintained farm records. Educational level, household size, and knowledge of farm accounting records significantly influenced record keeping decisions. Farmers cited lack of knowledge on how to keep records and uncertainty about their usefulness as major barriers. Most records maintained by farmers were rudimentary and insufficient for generating meaningful financial statements. The study recommends targeted educational interventions and simplified record-keeping systems tailored to farmers' literacy levels. Government agencies and agricultural extension services should incorporate basic farm accounting training in their support programmes to enhance record-keeping practices among rice farmers, thereby improving farm management and profitability.

Keywords: Farm accounting, rice farming, record keeping, Northern Ghana, farm Profitability

INTRODUCTION

Record keeping represents a fundamental aspect of business management that enables entrepreneurs to track performance, assess profitability, and make informed decisions (Muchika, 2012). In agricultural enterprises, particularly small-scale farming, proper record keeping is crucial for monitoring farm operations, evaluating productivity, and ensuring sustainable business growth (Tham-Agyekum et al., 2010). Despite these benefits, evidence suggests that farm record keeping practices remain inadequate among smallholder farmers in many developing countries, including Ghana (Ibrahim, 2015; Amoako, 2013).

Ghana's agricultural sector employs approximately 50% of the country's population and contributes about 22% to the national GDP (SRID/MOFA, 2016). Rice has emerged as a significant crop in Ghana's food security strategy, with increasing per capita consumption from 12.7kg in 1995 to 58kg in 2015 (FAO, 2013). The Northern Region of Ghana produces about two-thirds of all rice in the country, making it a critical area for national rice production (USAID & EAT, 2012). Despite this importance, there is limited understanding of the accounting practices employed by rice farmers in this region and the factors that influence their record keeping decisions.

Previous research on agricultural accounting has predominantly focused on technical aspects of farming such as yield (Tanko et al., 2016), marketing (USAID & EAT, 2012),

technical efficiency (Donkoh et al., 2010), and farm management practices (Donkoh & Awuni, 2011). Farm accounting, despite its importance in agricultural business management, has received comparatively less attention in research (Sharma, 2012). This knowledge gap is particularly significant in the context of developing countries where agricultural policies often aim to commercialise farming and enhance farmers' access to credit and markets—objectives that require proper farm records. While studies such as Hassan (1981) and Tham-Agyekum et al. (2010) have identified factors influencing farm record keeping in various contexts, there is limited research specifically examining these factors among rice farmers in Ghana. Understanding the determinants of record keeping adoption is essential for designing effective interventions to improve farm management practices among this critical group of agricultural producers.

This study aims to investigate the determinants of farm record keeping among rice farmers in Northern Ghana. Specifically, the research seeks to:

1. Identify factors that influence rice farmers' decisions to keep farm records
2. Explore reasons why most rice farmers do not maintain accounting records
3. Examine the types and quality of records kept by those who practice farm accounting

The research is justified by several considerations. First, keeping proper books of accounts enables business owners to determine whether their enterprises are profitable or not (Hall, 2010). For rice farmers who produce primarily for commercial purposes, understanding production costs, sales revenue, and profit margins is essential for business sustainability. Second, various stakeholders including farmer-based organisations (FBOs), non-governmental organisations, and government agencies require reliable farm accounting information to provide appropriate support to farmers. Third, the findings will contribute to the limited literature on farmers' record keeping in Ghana, particularly in the northern region.

The study draws on the Record Continuum theory (McKemmish, 2001), which conceptualises record keeping as a continuous process involving creation, capture, organisation, and pluralisation of information. This theoretical framework enables an analysis of how rice farmers create, maintain, and utilise farm records within their specific context. The remaining sections of this paper are structured as follows: The literature review examines existing research on farm accounting, record keeping practices, and factors influencing these practices. The methodology section describes the research design, sampling procedures, data collection methods, and analytical techniques employed. The results section presents the findings on factors influencing record keeping decisions and reasons for non-adoption. The discussion interprets these findings in relation to existing literature and theoretical frameworks, while the conclusion summarises key findings and offers recommendations for policy and practice.

LITERATURE REVIEW

Farm Accounting and Its Importance

Farm accounting involves the systematic recording, classifying, and summarising of farm transactions and interpreting the results for decision-making purposes (Cremers et al., 2006). It provides a framework for capturing and analysing financial information related to

agricultural operations, enabling farmers to assess their performance and make informed decisions. According to Hartsfield (2012), modern farm operations require not only technical farming skills but also sound financial management capabilities, making proper record keeping essential for success.

The importance of farm accounting has been emphasised by numerous researchers. Gerloff and Holland (1995) identified several reasons why farmers should maintain proper records, including effective management of farm operations, meeting requirements from lending institutions, complying with regulations, and fulfilling tax obligations. Sharma and Pawan (2019) further highlighted that farm records facilitate evaluation of farm performance, enhance managerial control, support budgeting efforts, enable measurement of gains and losses, and help in obtaining bank loans.

In a global context, farm accounting has received increased attention due to its role in agricultural development. The European Union, for instance, established the Farm Accountancy Data Network (FADN) in 1965, which now includes over 80,000 agricultural enterprises across 28 countries (Laptes, 2012). However, research indicates that farm accounting practices in developing countries remain underdeveloped compared to those in developed economies (Vazakidis et al., 2010).

Farm Record Keeping Practices

Studies on farm record keeping practices have revealed varying levels of adoption across different contexts. In the United States, researchers found that 75% of farmers used single-entry cash-basis accounting systems, and 89% were unaware of established financial standards for agricultural producers (Gumirakiza & Kamer, 2018). This suggests that even in developed economies, sophisticated farm accounting systems are not universally adopted.

In developing countries, the situation appears more challenging. Dudafa (2013) found that most small farmers in Nigeria did not keep farm records, with record keeping being more common among literate farmers and those operating poultry/livestock farms. The records maintained were primarily sales and production records, which varied in format from traditional to modern approaches.

Similar findings have been reported in Ghana. Tham-Agyekum et al. (2010) assessed farm record keeping behaviour among small-scale poultry farmers in the Ga East Municipality and found limited adoption of formal record keeping practices. Amoako (2013) also observed a widespread absence of proper bookkeeping and basic accounting procedures among small-scale enterprises in Accra. The types of farm records typically recommended include production records, financial records, inventory records, and supplementary records (Poggio, 2006, cited in Tham-Agyekum et al., 2010). Production records document inputs used and outputs obtained, while financial records track income and expenses. Inventory records maintain information on assets and materials, and supplementary records capture additional relevant information such as weather patterns or market conditions.

Factors Influencing Farm Record Keeping

Previous research has identified various factors that influence farmers' decisions to keep records. Hassan (1981) conducted a study in northern Nigeria and identified several factors

affecting farm record keeping, including illiteracy, inefficiency in management skills, non-involvement of farmers in farm planning, inadequate development of agriculture, lack of farm management associations, farming not being business-oriented, lack of trained farm managers, absence of farm management consultants, traditional farming methods, limited access to loans, lack of extension services on farm records, and reluctance of farmers to keep records.

Tham-Agyekum et al. (2010) corroborated some of these findings, noting that illiteracy, time constraints, subsistence farming orientation, small farm holdings, lack of awareness about the importance of record keeping, shortage of trained specialists in farm management, and fear of taxation were major constraints to farm record keeping. Devonish et al. (2000) further observed that farmers often dislike paperwork and thus resist record keeping activities.

Some studies have examined demographic and socioeconomic factors associated with record keeping adoption. Mariene (1995, cited in Tham-Agyekum et al., 2010) found that age, gender, farm size, level of formal education, and years of farming experience were not significantly associated with farm record keeping. However, farmer status (full-time vs. part-time), access to credit, and net income were significantly related to record keeping practices.

More recent studies have highlighted additional factors. Rathnasiri (2015) found that legal form, firm size, owner/manager education background, and business leverage significantly influenced the adoption of financial management tools and techniques among small and medium enterprises in Sri Lanka. Ibrahim (2015) noted that despite recognising the importance of proper accounting systems, most small and medium enterprises in Bauchi Metropolis, Nigeria, did not maintain adequate accounting records due to lack of accounting knowledge and the cost of hiring professional accountants.

Farm Accounting in Ghana

Research on farm accounting in Ghana remains limited, particularly in relation to rice farming in the Northern Region. However, some studies offer insights into the broader context of accounting practices among small enterprises in the country. Amissah (2011) found a general absence of proper bookkeeping and basic accounting procedures among small-scale enterprises in Accra. Amoako (2013) similarly observed that most small and medium enterprises in Kumasi failed to maintain complete accounting records, perceiving no need for such practices or fearing exposure of their financial position.

The Ghana Commercial Agriculture Project (GCAP) aims to commercialise agriculture in the country, which necessitates improved financial management practices among farmers (MoFA, 2011). However, the extent to which rice farmers have adopted proper accounting methods to support this transition remains unclear.

While previous studies have examined factors influencing farm record keeping in various contexts, there is limited research specifically focusing on determinants of record keeping among rice farmers in Northern Ghana. Given the economic importance of rice production in this region and the national drive toward agricultural commercialisation, understanding these determinants is crucial for designing effective interventions to improve farm management practices. This study aims to address this gap by investigating the factors

that influence record keeping decisions among rice farmers in three districts of Northern Ghana.

The literature review reveals that factors influencing farm record keeping may vary across different contexts, farming systems, and socioeconomic environments. Therefore, a context-specific investigation is necessary to identify the determinants relevant to rice farmers in Northern Ghana. This study contributes to the existing body of knowledge by providing empirical evidence on these determinants, which can inform policy and practice aimed at enhancing farm management capabilities among this important group of agricultural producers.

METHODOLOGY

Research Design

This study employed a mixed-methods approach, combining quantitative and qualitative research techniques to investigate the determinants of farm record keeping among rice farmers in Northern Ghana. The quantitative component utilised a survey questionnaire to collect data on factors influencing record keeping decisions, while the qualitative component involved focus group discussions (FGDs) to gain deeper insights into farmers' perspectives on record keeping practices. This methodological triangulation enhanced the validity and reliability of the findings by capturing both breadth and depth of information (Creswell, 2014).

Study Area

The research was conducted in three districts of Ghana's Northern Region: Tolon, Kumbungu, and Savelugu. These districts were purposively selected based on several criteria. First, they contribute significantly to rice production in the region, with extensive rice valleys and irrigation facilities. Second, they share common cultural characteristics, being predominantly populated by Dagombas with similar belief systems. Third, they exhibit strong correlation (0.998) between farmer-population and district population, indicating representative farming communities. Fourth, the White Volta River runs through all three districts, creating vast expanses of rice valleys suitable for cultivation. Fifth, they contain major irrigation schemes including Bontanga in Kumbungu district, Golinga in Tolon district, and Libga in Savelugu district.

Sampling Procedure

A multi-stage sampling procedure was employed to select respondents for the study. First, Northern Region was purposively selected due to its prominence in rice production, accounting for approximately 67% of Ghana's total rice cultivation area (USAID & EAT, 2012). Second, the three districts (Tolon, Kumbungu, and Savelugu) were purposively selected based on their rice production activities and presence of irrigation facilities. Third, rice farmers were selected using simple random sampling based on quotas proportional to the farming population in each district.

The sample size was determined using the formula provided by Bartlett et al. (2001):

$$n = (z^2 p(1-p)) / c^2$$

Where: n = Sample size z = z-value (1.96 at 95% confidence level) p = proportion of district population engaged in agriculture (calculated as 85% from district data) c = confidence level expressed as a decimal (0.05)

This calculation yielded a sample size of 196, which was increased by 25% to account for potential non-responses, resulting in a final sample size of 245. This sample was proportionally distributed across the three districts as follows: Tolon (76), Kumbungu (46), and Savelugu (123).

Data Collection

Data were collected using both primary and secondary sources. Primary data were gathered through semi-structured questionnaires and focus group discussions (FGDs). Secondary data were obtained from literature review, including academic publications, government reports, and documents from relevant organisations.

The semi-structured questionnaire was designed to collect information on demographic characteristics, farm characteristics, record keeping practices, factors influencing record keeping decisions, and reasons for not keeping records. The questionnaire consisted of both closed-ended questions (using Likert scales) and open-ended questions to capture detailed responses. Before full-scale administration, the questionnaire was pre-tested in Dadganjajo, a farming community near Sabali, to refine the instrument and ensure its validity and reliability.

Five trained research assistants helped administer the questionnaires to ensure proper data collection. The questionnaires were administered through face-to-face interviews to accommodate varying literacy levels among respondents.

Three focus groups were formed, one in each district: Golinga (Tolon), Bontanga (Kumbungu), and Libga (Savelugu). Each group comprised approximately ten rice farmers. The discussions centred on record keeping practices, challenges, and potential solutions to encourage record keeping among farmers. The FGDs were segregated by gender to ensure that women could express their views freely, as cultural norms might inhibit their participation in mixed-gender settings.

Additional information was obtained from key informants, including agricultural extension officers, field officers of agro-based NGOs, irrigation scheme managers, retired farmers, and opinion leaders. These informants provided valuable contextual information and helped identify rice farmers for the study.

Analytical Framework

The study employed both descriptive and inferential statistical techniques to analyse the data. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarise the socioeconomic characteristics of respondents and their record keeping practices. To identify factors influencing farmers' decisions to keep farm accounting records, a binary probit model was employed, given the dichotomous

nature of the dependent variable (keep records = 1, do not keep records = 0). The probit model is expressed as:

$$\Pr(Y_i = 1 | X_i) = \Phi(X_i \beta)$$

Where: Pr represents the probability of keeping farm accounting records Y_i is the binary decision variable X_i is a vector of explanatory variables β is a vector of unknown parameters to be estimated Φ is the cumulative distribution function (CDF) of the standard normal distribution

The empirical specification of the probit model for this study is:

$$\Pr(Y_i = 1 | X_i) = \Phi(\beta_0 + \beta_1 \text{Gender} + \beta_2 \text{Education} + \beta_3 \text{Age} + \beta_4 \text{HouseholdSize} + \beta_5 \text{FarmSize} + \beta_6 \text{FarmEngagement} + \beta_7 \text{Experience} + \beta_8 \text{Location} + \beta_9 \text{KnowledgeAccounting} + \beta_{10} \text{TrainedRecord} + \varepsilon_i)$$

Where ε_i is the random error term, and the explanatory variables include gender, educational level, age of farmer, household size, farm size, type of farm engagement, experience in rice farming, location of farm, knowledge of accounting records, and training in record keeping.

To analyse reasons why farmers do not keep records, Kendall's coefficient of concordance (Kendall's W) was used to measure the degree of agreement among respondents regarding these reasons. Kendall's W ranges from 0 (no agreement) to 1 (complete agreement), providing a statistical measure of consensus.

Qualitative data from FGDs and open-ended questions were analysed using thematic content analysis, identifying patterns and themes in respondents' perspectives on record keeping practices.

Reliability and Validity

Several measures were taken to ensure the reliability and validity of the research. The questionnaire was pre-tested to identify and address potential issues before full-scale administration. Training was provided to research assistants to ensure consistent data collection. Methodological triangulation (combining surveys, FGDs, and key informant interviews) enhanced the validity of the findings by providing multiple perspectives on the research questions.

For the quantitative analysis, reliability tests were conducted to ensure internal consistency of scale items. The probit model was assessed for goodness of fit using appropriate statistics, including the likelihood ratio test and pseudo- R^2 value.

Ethical Considerations

Informed consent was sought from all participants before data collection. Participants were assured of confidentiality and anonymity, and their right to withdraw from the study at any point was respected. The research adhered to ethical principles for research involving human subjects, including respect for autonomy, beneficence, non-maleficence, and justice.

RESULTS

Respondents' Demographics

The study sample comprised 245 rice farmers from three districts in Northern Ghana: Tolon (76), Kumbungu (46), and Savelugu (123). Of these respondents, 64% were male and 36% were female (Figure 1). The gender distribution was relatively consistent across the three districts, with female farmers comprising 37% in Savelugu, 30% in Kumbungu, and 38% in Tolon. It is noteworthy that all female rice farmers were engaged in irrigation farming rather than rain-fed cultivation.

The age distribution of respondents revealed that most farmers were middle-aged, with a mean age of approximately 50 years. The largest age group was 41-50 years, representing 33% of respondents, followed by the 51-60 age group (29%). Only 4% of respondents were under 30 years, indicating limited youth participation in rice farming (Table 1). The average farming experience was 17 years, with a minimum of 1 year and a maximum of 40 years.

Table 1: Age Distribution of Respondents

Age Group	Frequency	Percentage
Up to 20	3	1.22
21-30	10	4.08
31-40	40	16.33
41-50	81	33.06
51-60	71	28.98
Above 60	40	16.33
Total	245	100

Educational attainment among respondents was generally low, with 51% having no formal education. Among those with formal education, 22% had completed Junior High School (JHS) or equivalent, 13% had Senior High School (SHS) education, 6.9% held diplomas, and less than 8% had university degrees (Table 2). The data showed an inverse relationship between educational level and number of farmers, with fewer farmers having higher educational qualifications.

Table 2: Educational Level of Respondents

Educational Level	Frequency	Percentage
No formal education	125	51.0
JHS/Middle School	54	22.0
SHS/A-Level	32	13.1
Diploma	17	6.9
Bachelor's Degree	11	4.5
Master's Degree	4	1.6
Doctorate	2	0.8
Total	245	100

The average household size among respondents was 12 persons, with considerable variation (standard deviation of 11). The average number of dependants was 8, while the average number of adults in a household was 4. On average, 3 adults assisted in farming activities.

Regarding farm characteristics, the mean farm size was 35 acres, with a minimum of 2 acres and a maximum of 360 acres. Male farmers tended to have larger farms than their female counterparts. Most respondents (82%) cited commercial motives as their primary reason for engaging in rice farming, while 79% mentioned inheritance as a secondary motivation. Land tenure arrangements varied, with 40% of farmers cultivating family land, 16% obtaining land throughout-grower schemes, and less than 10% receiving land allocations from chiefs.

Record Keeping Practices Among Rice Farmers

The study revealed that only 11% of respondents maintained some form of farm records, while 89% did not keep any records (Figure 2). Among those who kept records, 39% were male and 11% were female, indicating a gender disparity in record keeping practices. Correlation analysis showed a weak but statistically significant relationship between gender and record keeping (Spearman's correlation coefficient = 0.182, $p = 0.004$).

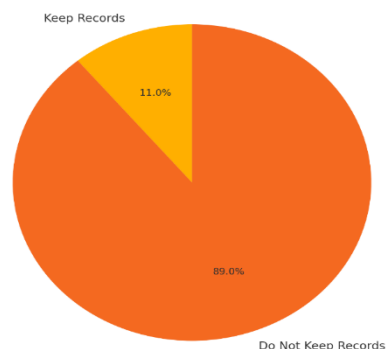


Figure 2: Proportion of Record Keepers and Non-Record Keepers

Examination of records maintained by farmers who claimed to keep accounts revealed that these were generally rudimentary and insufficient for generating meaningful financial statements. Most records were kept in notebooks or diaries as reminders rather than systematic accounting documents. The records typically included information on expenses for inputs (seeds, fertilisers, herbicides), labour costs, and output quantities, but lacked proper classification and organisation according to standard accounting principles.

When asked about their understanding of farm accounting, most respondents who claimed to keep records defined it as simply “keeping records of expenditure and income” or “writing down necessary costs about the farm.” These definitions reflect a basic bookkeeping perspective rather than a comprehensive understanding of accounting principles and practices. None of the farmers maintained standard accounting books such as journals and ledgers, and few prepared financial statements.

Factors Influencing Record Keeping Decisions

The probit model analysis identified several factors that significantly influenced farmers' decisions to keep farm accounting records (Table 3). The model showed good fit with a likelihood ratio chi-square of 84.61 ($p < 0.001$) and a pseudo- R^2 of 0.498.

Table 3: Probit Estimation of Factors Influencing Farm Record Keeping Decisions

Variable	Coefficient	Std. Error	Marginal effect	Std. Error
Constant	-2.686**	5.85229		
Gender	0.527	0.394	0.049	0.036
Education Level	0.289***	0.102	0.026***	0.001
Age of Farmer	0.002	0.020	0.000	0.002
Household Size	0.028*	0.015	0.002*	0.001
Farm Size	-0.000	0.005	-0.000	0.000
Type of Farm Engagement	0.426	0.432	0.039	0.040
Experience in Rice Farming	-0.034	0.023	-0.003	0.002
Location of Farm	-0.209	0.192	-0.019	0.017
Knowledge of Account Records	1.029***	0.387	0.095***	0.034
Trained in record keeping	0.553	0.432	0.051	0.040
LR $\chi^2(10)$	84.61			
P-value	0.000			
Pseudo R^2	0.498			
Log likelihood	-42.696			
Number of observations	245			

*Note: *, **, *** represent significance at 10%, 5%, and 1% levels, respectively.

Three variables showed statistically significant effects on farmers' decisions to keep records: educational level, household size, and knowledge of farm accounting records. Educational level had a positive and significant effect ($p < 0.01$), with the marginal effect indicating that farmers with formal education had a 2.6% higher probability of keeping farm records compared to those without formal education, *ceteris paribus*.

Household size also showed a positive and significant effect ($p < 0.10$), suggesting that farmers from larger households had a 0.2% higher likelihood of keeping farm records than those from smaller households. Knowledge of farm accounting records had the strongest effect ($p < 0.01$), with farmers possessing such knowledge having a 9.5% higher probability of keeping records.

Other variables, including gender, age, farm size, type of farm engagement, farming experience, farm location, and training in record keeping, did not show statistically significant effects on record keeping decisions.

Reasons for Not Keeping Records

Analysis using Kendall's coefficient of concordance revealed several reasons why farmers did not keep records (Table 4). The most important reason, with a mean rank of 7.54, was that "record keeping can discourage me from farming." Farmers explained that keeping

records would make them aware of the substantial investments made compared to returns, potentially causing psychological distress and discouraging continued farming.

Table 4: Reasons Why Farmers Do Not Keep Accounting Records

Reason	Mean Rank
Record keeping can discourage me from farming	7.54
I don't know what to use it for	6.43
I don't know how to do it	6.07
It is expensive to employ an Accountant	5.99
Illiteracy	5.24
I cannot combine it with my farming activities	4.37
I have poor management skills	3.44
Farming not business oriented	3.09
I have poor business skills	2.82
N = 216	
Kendall's W = 0.45	

The second most important reason (mean rank 6.43) was “I don't know what to use it for,” indicating that farmers did not perceive the value of keeping records. This was closely followed by “I don't know how to do it” (mean rank 6.07), suggesting a lack of knowledge and skills in record keeping. Other significant reasons included the perception that “it is expensive to employ an Accountant” (mean rank 5.99), “illiteracy” (mean rank 5.24), and “I cannot combine it with my farming activities” (mean rank 4.37).

The overall level of agreement among farmers regarding these reasons was moderate, as indicated by Kendall's W of 0.45, suggesting a general consensus on the major barriers to record keeping.

Focus group discussions provided deeper insights into these reasons. Participants emphasised that most farmers, particularly those without formal education, did not see the need for written records as they relied on memory and experience. Some farmers expressed concern that keeping records would reveal the true costs of production, which might discourage them from continuing with farming. Others highlighted practical challenges such as time constraints and the difficulty of maintaining paperwork in farming environments.

Farmers' Understanding of Farm Accounting

When asked about their understanding of farm accounting, most farmers who did not keep records struggled to provide clear definitions. Among those who claimed to keep records, definitions were generally limited to basic bookkeeping concepts such as “keeping records of your expenditure and income on a particular activity to determine whether you are making profit or loss” or “records on all agricultural practices with dates and cost.”

These definitions reflect a rudimentary understanding of accounting, focusing on recording transactions rather than the broader processes of classification, summarisation, and interpretation essential to proper accounting practice. None of the definitions mentioned standard accounting principles or financial statement preparation.

Examination of records maintained by some farmers revealed that they were primarily simple listings of expenses and income, without proper categorisation or adherence to accounting standards. These records were insufficient for generating comprehensive financial statements that would support effective decision-making.

Indigenous Accounting Practices

The study also investigated indigenous accounting practices among farmers without formal education. These farmers typically did not maintain written records but relied on memory-based systems. For measuring farm produce, traditional units such as calabashes (locally called “zag-mgani”) were used instead of standard weight measurements like kilograms. Farm sizes were traditionally measured in “nakpaa” and “loo” (equivalent to acres and hectares), with footsteps used as units of measurement.

For counting produce, some farmers used visual aids such as marking strokes or collecting stones to represent quantities harvested. Labour costs were often not formally calculated, as farming activities relied heavily on family labour or community support systems such as “Kpariba” (communal labour) and “Talma” (labour exchange for food).

Regarding profit determination, farmers without formal education conceptualised profit in various ways, including “revenue realized minus cost of inputs,” “output level relative to community average,” “sales revenue minus cost of pressing needs,” and “availability of stock for sale at any time.” These concepts reflect a social rather than purely financial understanding of profit.

DISCUSSION

This study examined the determinants of farm record keeping among rice farmers in Northern Ghana, revealing that only 11% of farmers maintain some form of records. This finding aligns with previous research in developing countries that has documented low adoption of farm record keeping practices. For instance, Dudafa (2013) found that most small farmers in Nigeria did not keep farm records, while Amoako (2013) observed a widespread absence of proper bookkeeping among small-scale enterprises in Ghana.

The probit model analysis identified three significant determinants of record keeping decisions: educational level, household size, and knowledge of farm accounting records. These findings offer important insights for understanding record keeping behaviour among rice farmers and designing interventions to promote improved practices.

Educational Level and Record Keeping

The significant positive relationship between educational level and record keeping aligns with previous research that has highlighted education as a crucial factor in the adoption of management practices. Dudafa (2013) found that literate farmers were more likely to keep records than illiterate ones, while Rathnasiri (2015) identified owner/manager education background as a significant factor influencing the adoption of financial management tools.

The marginal effect of 2.6% suggests that while education increases the probability of keeping records, its impact is relatively modest in practical terms. This might reflect the

fact that general education does not necessarily provide specific training in farm accounting, limiting its effectiveness in promoting record keeping. Nevertheless, the significance of this factor underscores the importance of education in enhancing farmers' capacity to adopt improved management practices.

The finding that 51% of respondents had no formal education provides context for the low overall adoption of record keeping. Without basic literacy and numeracy skills, farmers face fundamental barriers to maintaining written records. This suggests that interventions to promote record keeping must address educational limitations or provide alternative approaches suitable for farmers with limited formal education.

Household Size and Record Keeping

The positive relationship between household size and record keeping decisions is an interesting finding that warrants discussion. The marginal effect indicates that farmers from larger households have a slightly higher probability (0.2%) of keeping records. While this effect is small, it is statistically significant and points to the potential role of family dynamics in farm management practices.

Several explanations can be proposed for this relationship. First, larger households may have more members with formal education who can assist in record keeping. The data showed that on average, 4 adults were present in each household, with 3 typically assisting in farming activities. These family members might contribute not only labour but also administrative support, including record keeping.

Second, larger households might face greater pressure to optimise resource use and maximise returns, given their higher consumption needs. This could motivate more careful tracking of farm activities and finances. Third, larger households might benefit from division of labour, allowing some members to specialise in administrative tasks while others focus on physical farming activities.

This finding suggests that family-based approaches to promoting record keeping might be effective, particularly by targeting educated family members who could support the documentation of farm transactions. Extension services could develop training programmes that involve multiple household members rather than focusing solely on the primary farmer.

Knowledge of Farm Accounting Records

Knowledge of farm accounting records emerged as the strongest determinant of record keeping decisions, with farmers possessing such knowledge having a 9.5% higher probability of keeping records. This significant effect highlights the importance of specific knowledge about record keeping methods and their uses, beyond general education.

The finding aligns with Muchika's (2012) observation that small and medium enterprises often lack accounting knowledge, which impedes record keeping. Similarly, Ibrahim (2015) found that despite recognising the importance of proper accounting systems, most small enterprises did not maintain adequate records due to insufficient accounting knowledge.

The importance of specific knowledge is further supported by the reasons cited by farmers for not keeping records. “I don’t know what to use it for” and “I don’t know how to do it” ranked second and third, respectively, indicating that lack of knowledge about both the purpose and methods of record keeping constitutes a significant barrier. This suggests that interventions should focus not only on teaching record keeping techniques but also on clearly demonstrating the practical benefits of maintaining farm records. Targeted training programmes that illustrate how record keeping can improve farm management decisions and profitability might be more effective than general accounting instruction.

Reasons for Not Keeping Records

The finding that “record keeping can discourage me from farming” was the most important reason for not keeping records merits particular attention. This fear that documenting costs and returns might reveal discouraging financial realities represents a psychological barrier rather than a technical or knowledge-based constraint. This perspective aligns with observations by Tham-Agyekum et al. (2010) that farmers may be reluctant to keep records that could reveal unfavourable financial situations. It also resonates with Amoako’s (2013) finding that some SMEs avoid record keeping for fear of exposing their financial position.

The concern about discouragement suggests that farmers may intuitively recognise that their operations might not be as profitable as they wish to believe. Rather than confronting this reality through systematic record keeping, they prefer to avoid documentation that might confirm their suspicions. This avoidance strategy, while psychologically protective in the short term, ultimately prevents farmers from making informed decisions that could improve their financial situations.

This finding has important implications for extension approaches. Rather than portraying record keeping primarily as a tool for evaluating profitability, it might be more effective to emphasise its role in identifying specific areas for improvement and optimisation. Demonstrating how records can help farmers reduce costs or increase yields could present record keeping as a solution rather than a potential source of discouragement.

Quality of Records Maintained

The examination of records kept by the 11% of farmers who claimed to maintain accounts revealed that these were generally rudimentary and insufficient for generating meaningful financial statements. Most records consisted of simple listings of expenses and income without proper categorisation or adherence to accounting standards.

This finding is consistent with observations by Tham-Agyekum et al. (2010) that farm records in Ghana often lack standardisation and vary widely in format and content. It also aligns with Dudafa’s (2013) report that farmers in Nigeria primarily maintained sales and production records rather than comprehensive accounting systems. The inadequacy of records reflects limited understanding of accounting principles and practices. Most farmers defined farm accounting in terms of basic bookkeeping rather than the broader processes of classification, summarisation, and interpretation. This suggests a need for education not only on the mechanics of record keeping but also on the underlying principles and purposes of accounting.

Indigenous Accounting Practices

The investigation of indigenous accounting practices revealed that farmers without formal education rely on memory-based systems and traditional measurement units. These practices, while culturally embedded, have limitations for modern commercial farming. The use of non-standard measurement units such as calabashes (“zag-mgani”) for produce and footsteps for land area makes it difficult to compare productivity across farms or regions. The reliance on memory rather than written records limits the ability to track trends over time or make detailed analyses of farm performance. However, these indigenous practices also represent adaptive responses to environmental constraints, including limited literacy and resource constraints. The fact that farmers have developed methods to track quantities and assess relative performance suggests recognition of the importance of monitoring farm activities, even in the absence of formal record keeping.

This finding suggests that interventions to improve record keeping should acknowledge and build upon existing indigenous practices rather than imposing entirely new systems. For instance, transitional approaches might combine traditional measurement units with more standardised documentation methods, gradually introducing formal accounting concepts in ways that complement rather than replace local knowledge systems.

CONCLUSION

This study examined the determinants of farm record keeping among rice farmers in Northern Ghana, finding that only 11% maintain any form of records. Key factors influencing record-keeping practices include educational level, household size, and knowledge of farm accounting. Reasons for not keeping records range from fear of discouragement and illiteracy to time constraints and the perceived cost of professional assistance.

The study enriches existing literature by highlighting context-specific influences and the interplay of educational, psychological, and knowledge-based factors. It recommends that agricultural extension services design literacy-sensitive training programmes focused on both the technical and practical benefits of record keeping. Family-based approaches and transitional systems that align with indigenous practices may enhance adoption, especially when linked to successful farmer case studies.

The findings, viewed through the lens of the Record Continuum theory, indicate that most rice farmers in Northern Ghana remain at the creation stage—producing but not systematically organising records. Determinants such as limited knowledge, fear of discouragement, and low education levels influence their ability to progress to more advanced stages of record management. Addressing these determinants through literacy-friendly tools, basic classification systems, and demonstrations of practical benefits can support farmers in enhancing their record-keeping practices and making more informed decisions.

The findings have several practical implications for promoting improved record keeping among rice farmers in Northern Ghana. First, educational interventions should be tailored to farmers’ literacy levels, with pictorial or simplified systems for those without formal education. Second, training should clearly demonstrate the practical benefits of record keeping rather than focusing solely on techniques. Third, family-based approaches

that involve educated household members could leverage existing social structures to support record keeping.

Fourth, transitional approaches that build on indigenous practices while gradually introducing formal accounting concepts might be more culturally appropriate and effective than attempting to impose standardised systems. Fifth, psychological barriers, particularly the fear that records might reveal discouraging financial realities, should be addressed by emphasising how record keeping can identify opportunities for improvement rather than simply evaluating performance.

To promote uptake, policymakers should integrate record-keeping training into broader agricultural initiatives, such as credit access and input support. Conditional incentives could also drive compliance. However, the study's focus on only three districts may limit generalisability. Future research should explore diverse contexts, track long-term adoption trends, assess the impact of record keeping on farm performance, and evaluate system effectiveness across literacy levels to guide more targeted and sustainable interventions.

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