

Statistical Farm Records: Drivers and Challenges among Smallholder Rice Farmers in Ndop Plain, Cameroon

Isa Nghochu Njingun^{1*}, Mathias Fru Fonteh², and Mbu Daniel Tambi³

^{1,2&3}Department of Agribusiness Technology, College of Technology
University of Bamenda, Cameroon

*Corresponding author's email: njingunisanghochu@gmail.com

ABSTRACT--- *The study seeks to analyze statistical farm records: drivers and challenges among smallholder rice farmers in Ndop Plain, Cameroon. Specifically, to determine the factors influencing smallholder rice farmers in Ndop Plain to keep statistical farm records and to analyze the challenges in the exercise. Methodologically, the study employed primary data collected from some 470 rice farmers using a well-structured questionnaire. Purposive sampling technique was applied to select respondents and a conventional Probit model used to estimate the result. It was observed that: male farmer, level of education, used of records, used of technology to manage statistical farm records, production of different types of rice, use of farm record for input and output analysis, had farm record training and Movement from manual to electronic record keeping are significantly influencing farmers' statistical farm records practices in Ndop Plain. The challenges observed with record keeping are: fundamental error keeping, bulky records, inadequate finance, records misplacement and burdensome to keep farm records. Considering that only 34% of farmers are involved in records keeping and willing to move from manual way of keeping records to electronic, the study suggests that an online App is created for easy accessibility and inputting of these farm records. This will be a wise-step for the government to scale the process of farm output.*

Keywords--- Statistical farm records, Rice farmers, Smallholder farmers, Ndop Plain, Cameroon

1. INTRODUCTION

The benefits that statistical farm record techniques make to the food security of rural families cannot be overstated. Despite the significance, many farmers still rely on antiquated record-keeping methods, while others don't bother at all (Adedapo et al., 2019). Tham-Agyekum (2010) argues that maintaining accurate farm records is crucial to running a successful farm. The data it generates is crucial in both short- and long-term planning and decision-making. Identification of agricultural issues, planning, and food security all benefit from the availability of high-quality data and well-managed data in agriculture. Data collection, analysis, record keeping, and application all pose significant difficulties for African farmers.

Promoting statistical farm records at the farmer level gives many advantages to diverse players and may provide solutions to genuine concerns impacting farmers, according to study by Minae et al. (2003) and Wilson (2011). Farmers in Africa need information to make choices about their businesses, thus they say a better strategy to foster the culture of record keeping, documentation, and data management is to boost the demand for information amongst farmers. These days, farms can make instantaneous choices because to the prevalence of sensors, applications, and computers that capture and analyze data in real time. Maintaining accurate books and records is crucial to running a successful company. One successful Ugandan farmer said that maintaining meticulous records has been crucial to the profitability of his farm (Kalyango, 2014). In this study, we define statistical farm records as a comprehensive account of data gathered from farms, its subsequent analysis, storage, and application to the strategic management of agricultural operations. Quality data is crucial, say Kuteesa and Miriam (2019), for boosting agricultural output, ending rural poverty, and bolstering food security. This information is useful for analyzing sector issues, making plans, and forming policies.

Today's farmers can't run their businesses as their parents did 30 years ago due to the explosive expansion of the agricultural sector. The modern farm manager cannot succeed without an in-depth familiarity with statistical farm records (Agustin and Arzeno, 2004). These scholars believe that maintaining thorough and accurate records of all agricultural operations is the first and most crucial step in ensuring the financial security and productiveness of one's farming enterprise. Since it indicates where the agricultural industry is headed, this study serves its intended function. The first Danish recording society was established in 1910, and by the late 1950s, the entire country had adopted a system of farmer recording and account keeping, bolstered by two to three visits per year from specialist advisers. This system was so successful that by the 1960s, planners believed that

farmers who kept records for longer than five years were unusually efficient, and their data should be used for planning (Dymond, 1901).

In Africa according to Chigbu (2013), the aspect of developing rural area is no longer matter of speculation but a matter of looking where is most affected today. The approach to achieving this goal has, however, remained problematic. Consequently, development experts have been caught up in mess of trying to bring pragmatic evident in the number of development models that have been adopted and abandoned over the years. Cameroon, like most African States, has used Parastatals, NGOs, National and Regional agencies as the principal sources of socio-economic development and where most statistical farm records are practice. The result has not been entirely a success story. On aggregate, Cameroon has registered a mixture of successes and failures. The importance of statistical farm records among smallholder farmers has remained very significance in the economy of Cameroon.

By and large, African countries have failed to develop a good structure for National Agricultural Statistical Systems (NASS) with well-defined objectives and clear strategic directions, despite the recommendations of the African Development Bank (AFDB), African Union (AU), Unions Nations Commission to Africa (UNECA), and Food and Agriculture Organization (FAO), 2011. FAO found in 2011 that NASS were not resilient, poorly organized, had inadequate resources, and were ultimately unsustainable. It is also pointed out that many NASS members argue for the interests of donors rather than national goals. As a consequence, less funding has been allotted, fewer qualified and motivated employees have been hired, and less financial and technical aid has been provided to support statistics production and development. The final consequence has been subpar data production, distribution, and use (Kuteesa and Kyotalimye, 2019).

In the case of Cameroon, (Garcia et al., 2018) said since 1984 till date there is no strong valid statistics of an average score of a small scare farmer. Rice has become the most rapidly growing food source for millions of people. Thus despite efforts, made by Cameroon Government through the Ministry of Agriculture and Rural Development which budget stood at 110 billion (Mbella, 2015), Cameroon produces just 100 thousand tons of rice on about 44,000 hectares per year but domestic demand stands at 300 thousand tons per year thus creating a gap of 200 thousand tons per year. Demands for rice importation keep rising. Farmers in Ndop Plain keep complaining that, their production and sales are not encouraging, which has affected their livelihood negatively and aggravated poverty within the farming communities. Many researchers have attributed the decrease in production as a result of inadequate statistical farm records (Tham-Agyekum *et al*, 2010; Dudafa, 2013; Mohammad *et al* 2020; Adedapo *et al.*, 2019 and Owiny, 2019). To this effect this study deems necessary to investigate to what extern are the rice farmers in Ndop plain keeping and using farm records, identify drivers and challenges of statistical farm records.

2. LITERATURE REVIEW

This study looked at how statistical farm records could be used to improve farm output, which often falls short of what was expected. The ability to collect data on the farm, analyze it, and save it for later use is also highly valued. Farmers may utilize the collected data to inform their decision-making in a variety of contexts. Thus, agricultural productivity is higher among farms led by farmers with strong management and leadership skills. According to Wang et al. (2021), these jobs require the following knowledge from the farmer: Maintain and control the state of the art in agricultural technology. (ii) The cost of inputs; (iii) the price of finished goods; and (iv) the total amount spent on farming. Being in possession of insufficient information is seen as a key cause of the failure of markets; thus, systematic and accurate statistical farm records may guarantee that this information is accessible. James (1991) and Reddy et al. (2007) say that records are statements of facts or data that can be physical, financial, mathematical, or statistical. In this case, "farm records" means the organized information about a farm's day-to-day activities over a certain period of time. Inputs, outputs, daily activities, transactions, and an accurate accounting system that can give an estimated profit and loss statement at the end of the year may all be recorded in a farm's records. Jackson et al. (2010) say that keeping accurate records is important for the smooth running of any farming business. He gives the example of farmers needing to know how much money they've made over a certain time period in order to properly budget for the future and prepare for the farm's upkeep.

Depending on the use, farm records may be defined in a consistent manner. According to Torres (2001), a farmer keeps farm records to keep track of his or her revenue and expenditures. He elaborates by saying that keeping track of farms with the help of a study group may be an exercise in organizational skill. Nevertheless, Carrer et al. (2017) described farm records as a methodical way of documenting all farm-related activities and transactions. Nevertheless, the FAO Farmers' Handbook (2011) defines farm records simply as written verification of what occurred, is occurring, or is expected to happen on the farm. For the purposes of this work, we have adopted the definition of "farm records" as presented by Torres (2001), Batte and Forster

(2008), the FAO farmers' handbook (2011), and Robinson (2005), which states that "farm records is the act of gathering together all agricultural activities and transactions regarding all aspects of farm operations as written proof of what happened, is happening, or is anticipated to happen on the farm."

Okojie (2012) talks about the different kinds of agricultural records and says that they can be put into four main groups: First, there are the inventory records, which provide a full accounting of the farm's assets and liabilities as of a certain date. 2. Production records: tally of all inputs and all products from the farm, including animal counts Third, there are the records of expenditure and income, which are monetary valuations of output records. 4. Special or additional records: do not fall into any of the previous categories but are highly important for the farm and include things like a farm map. The frequency with which these agricultural records are updated varies with the different kinds of records stored. Most records are kept every day, but monthly, quarterly, and yearly summaries are made depending on the business, the type of record, the type of farmer, or the farm manager (Dennis, 2003). In order to keep track of their assets and liabilities, farmers take stock of their farm's possessions and liabilities on a regular basis, often at the start and conclusion of each growing season. All assets, liabilities, and obligations are valued and reported, not just the physical ones. Taking an inventory on a farm consists of two stages: One, a thorough inventory of all tangible items, including checking measures and weights as you go. After depreciating the farm's assets, liabilities, and debts, it's time to put a monetary value on the physical assets that remain. This may be done through the use of market value (or expenses). Tractors and agricultural equipment are examples of long-lived assets that degrade in value over time due to normal wear and use. Records of production are valuable sources of data on how various businesses produce and allocate their resources. This is helpful for gauging production efficiency and planning for productive changes on farms.

The farm map and the production records are two parts of the farm's production documentation. (iii). Statistics on Animal Productivity iv. Documentation of material resources used, such as labor, seed, fertilizer, and so forth. Logs of what a family has eaten include the following: A farm's inventory consists of the following sections: (i) crops; (ii) farm equipment; (iii) farm structures; (iv) crop cultivation log; (v) daily time sheet; and (vi) a comparative inventory of farm goods. vii. a log of what crops were used for farm consumption The selection of replacement breeding animals and the elimination of infertile animals from the herd are two uses for production records. In fact, they serve as the basis for the documentation of the whole herd. I Breeding and weaning logs, which are part of the reproduction record. (ii) Medical history, including any illnesses and their corresponding treatments, as well as any fatalities and the dates of their occurrence. (iii) A log of the cull, including the date and the rationale behind it. Birth weight, weight at three and eight weeks of age, and litter size are all recorded in the production record (iv). Food used for livestock.

The monetary values of production records are recorded as part of the records themselves. These days, hired laborers are a common sight on both small and large farms in Nigeria. So, it is important to keep track of how much money is spent on hired labor for each agricultural operation in order to identify the proportional share of each input in total production costs and to evaluate the efficiency with which labor is being used. Payroll records typically include employee identification numbers, employment dates, job titles, pay periods, hours worked each week, and payment methods (cash and in-kind). There is a correlation between age, gender, farm size, education level, and years of experience in farming, as stated by Mariene (1995) and Davonish et al. (2000). Nevertheless, the research conducted by Devonish et al. (2000) revealed further evidence that farm record keeping was significantly correlated with farm assets, farm status, receiving credit, and net income. Hence, large-scale farmers are more likely to retain records than small-scale farmers.

Kuteesa and Kyotalimye (2019) say that a concerted effort is needed to promote the use of statistical farm records. This will allow the government to use creative and effective data management systems on a national scale. A thorough institutional review is needed because bureaucratic tendencies and problems with leadership in many institutions lead to underperformance and bad service, even though this kind of department would work best as part of the Agricultural Ministry. Second, it is possible to further support cultural documentation by establishing physical or digital platforms where scholars and the NGO community may unify methodologies and procedures for data collection. The community as a whole may benefit from identifying and sharing best practices via these channels, and innovative ideas can be developed further. Finally, businesses have been encouraged to put more money into developing digital tools by consumers' increasing demand for digital services including mobile phone apps, software design, local language adaptation, and remote transaction services. According to Baker et al. (2009), raising the need for information among African farmers who rely on it to run their businesses may be accomplished by encouraging the culture of record keeping, documentation, and data management.

Farmers generally see farm record keeping as a routine daily chore, despite the difficulties they experience that make it impossible for them to maintain accurate statistical data (Poggio, 2006). According to Minae et al. (2003), the absence of preserving farm records is most prominent in the lowest-resource African agricultural communities, owing to high levels of illiteracy and poor skill levels. Most farmers have many businesses and use a variety of agricultural techniques, so keeping track of everything takes a lot of effort. As a result, they have difficulties maintaining agricultural records due to time constraints (Johl and Kapur, 2001). They went on to say that there is little motivation to preserve records since subsistence farming is not profitable. As a result, farmers can't afford to hire accountants with specialized agricultural experience. According to Singh (2001), small farmers are not interested in agricultural record keeping since they realize that economies of scale will not apply to their operations. A barrier identified by Minae (2001) is the failure of extension workers and census takers to educate farmers on the need for maintaining detailed records. According to Johl and Kapur (2001), not enough farm management professionals are available to help farmers keep accurate records. Saying that farmers are wary of keeping records because doing so may expose them to higher taxes in the event of a prosperous year is an understatement. According to Utegi (2014), many African farmers are illiterate and don't want to pay for the help of clerks. Because of this, few people keep accurate written records. Instead, they use less reliable methods like keeping records and doing accounting in their heads. Farm data are of little utility unless they are analyzed correctly, as stated in a paper by Louisiana State University (2012). The paper goes on to say that there are a multitude of methods to analyze a farm's economic performance by looking at its records, but that the manager should prioritize analyzing the usage of and returns on the farm's scarcest resources whenever feasible.

3. METHODOLOGY

This study was carried out in the North West of Cameroon in 2022 specifically in Ndop Plain. Ndop Plain that is measured (35 x 20km) and a population of 143000 inhabitants (wotchoko et al, 2016), is bordered to the west, Noun Division to the east, Bui to the north and Bamboutos Division to south. The town lies between latitudes 5 ° 15 N and 6° 10 N and longitude 10° 15E and 10° 40E (Lucha *et al*, 2016). Registered rice farmers as per database of Upper Nun Valley Development Authority (UNVDA) is 11,285 active farmers (Fuh and Sama 2015). The main languages are Pingin, Bamunka, Bamunkun, Niemeng, Mbika, and Muka. According to Divisional Delegation of Agriculture and Rural Development for Ngoketunjia (DIDARDN), (2013), Ndop Plain has an annual rainfall that ranges from between 1500 – 17200mm.

The temperature range is 20°C to 35°C with an average yearly temperature of 26 – 28°C and the topography of Ndop is dominated by plains and erosion of volcanic materials from the surrounding mountainous chains, which makes the soil ferralitic and fertile, that promote the grow of food crops such as rice, maize, beans, yams, sweet potatoes, groundnut and vegetable crops such as; okra, carrots, tomatoes, cabbage, huckleberry and others (Mawo, 2015). A short dry season that starts from November to February and longer rain season that lasts for eight months (mid-march to late October). The planting of rice is during the month of July and harvesting is in November. The other months are dominated by dry weather (Nforniwe, 2015, Kometa and Mua, 2017).

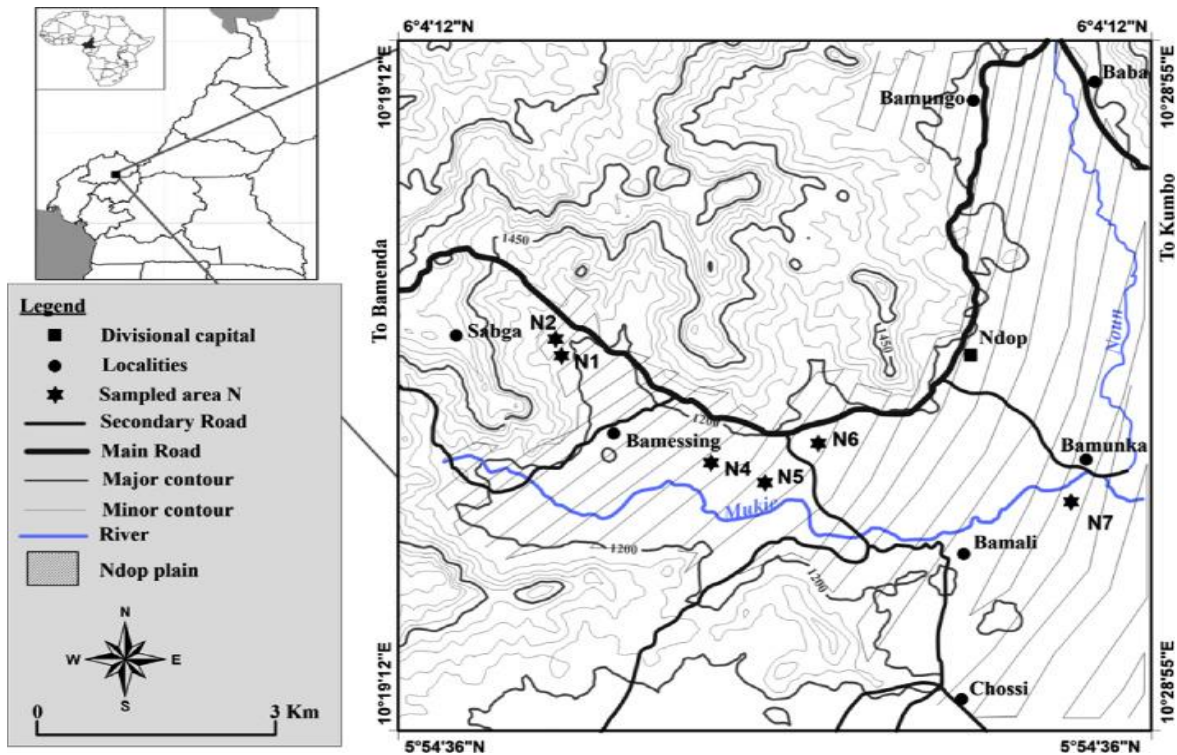


Figure 1: Location map of the study area

Source: Compiled by author

Empirical specification

To analyse the drivers and challenges of statistical farm records in Ndop Plain, Cameroon a simple probit model is used. Farm record is captured as binary and takes the value 1 if farmer is keeping farm records during the time of the survey and zero if otherwise. This farm records can be further kept electronically, written or mentally as the case maybe. It is the dependent variable of the model and can be affected by other variables which can be drivers or challenges and other demographic variables. Hence Statistical farm record is a function of other independent variables which can be shown by the following functional expression:

$$SFR = f(A, X, \varepsilon) \quad (1)$$

Where *SFR* is statistical farm records, *A* is a vector of other factors that affects *SFR* which can either be drivers, *X* stands for other demographic factors that jointly affect *SFR* and ε the error term that takes care of errors in the model. Literature and theory has shown that there are many factors that can promote or hinder farmers from taking farm records. Theories such as the Strategic Management theory of Porter (1980) have hinted this link. For purpose of data availability, the drivers of statistical farm records chosen for this study are technology, experience, training, use of experts and farm size while the challenges are input/output analysis and loss/profit analysis. These therefore constitute the main independent variables of the study on which conclusions will be drawn. To analyse their effect on *SFR* the functional expression needs to be transformed into an econometrical form which can be estimated. It is noted that *SFR* is binary and appeals to a LPDM.

We chose to use a probit model to capture this for purpose of simplicity in interpreting the marginal effects. The probability equation for our structural equation can be stated as in equation (1)

$$P(SFR = 1 \parallel X) = G(\alpha_0 + \alpha_1 A + \alpha_2 X) \quad (2)$$

Where *SFR*, *A*, *X* and ε are as earlier defined and α is the coefficient to be estimated. Specifically α_0 if the coefficient of the constant term, α_1 measures the drivers and challenges used in the study and α_2 measures the effect of other demographic factors such as age, level of education, marital status and gender on *SFR* in Ndop plain, North West Region of Cameroon amongst the rice farmers sectors.

Meaningful interpretations can only be made on the marginal effects of the coefficients which are the first derivative of equation (1) as follows:

$$\frac{d(FSR)}{d(A)} = \alpha_1 + \alpha_2 X \quad (3)$$

Where α_1 is the effect of the drivers and challenges on FSR and $\alpha_2 X$ expresses the effect of other demographic variables on SFR.

Data setting and computation of Statistical Farm Records Synthetic Variable

The data for this study was collected through a detailed structured questionnaire which was pretested to some experts in the field of agriculture and administered to some 500 smallholder rice farmers in Ndop plain, Cameroon. The questionnaire was carefully prepared and administered by the researcher and with the assistant of other three collaborators working in the UNVDA, under strict control of the researcher. Field visit to UNVDA and calls were made to some farmers' group presidents in order to carry out a pretest that involved oral questioning on rice farming issues in Ndop Plain, Cameroon. It is thanks to these visits and calls that the researcher was able to meet the farmers in training seminars that was organized for three days, by UNVDA in Ndop central subdivision. Descriptive statistics and regression analysis was performed using SPSS and STATA 14.0. Microsoft Excel, Microsoft word, Microsoft PowerPoint were equally used to bring out tables and entering of results.

In constructing the statistical Farm Records index, each respondent were asked if they kept some form of farm records or not in order to determine percentage record-keeping. Respondents either answered "YES or NO" to keeping farm records and if yes do they used the farm records. Respondents who answer "YES" to keeping records are then examined on the types of records kept. The probit is appropriate here in the sense that it estimate the marginal effects (dy/dx) of the effects of factors affecting farm records and so solving the problem of endogeneity which often arise as a result of the use of inappropriate variables in a regression or the interaction of the dependent variable and the error term (See Tambi and Mofow, 2019). Our result will therefore be in terms of percentage.

4. RESULTS AND DISCUSSION

This study was aimed at analysing the drivers and challenges of statistical farm records among smallholder rice farmers in Ndop Plain, North West Region of Cameroon. This subsection presents descriptive statistics of the variables used to estimate this objective in part one and the estimated regression results using the simple Probit regression technique in part two.

4.1 Descriptive Statistics of Variable used

Table 1 presents the descriptive statistics of the variables used to analyse the drivers and challenges of statistical farm records in Ndop Plain, Cameroon. The table 1 below shows descriptive results obtained from the 2022 survey carried out in the Ndop Plain area on a sample of 470 rice farmers. The results show that on average 34% of the rice farmers surveyed were keeping farm records. This means majority of the rice farmers were not keeping farm records during the period of study. The percentage of farmers who keep records can be explained as a result that records can be kept mentally, electronic and paper which falls within the rank of both literates and illiterates. More to this, our study has proven that illiteracy is on the high rate among smallholder farmers. Most often some of the farmers keep records based on the fact that well define comparatives such as UNVDA, Common Initiative Groups (CIG), Farmer's groups and farmers themselves need information in order to solve post-harvest problems. Ranking on how these records are kept, the study revealed that most of the farmers keep their records mentally, this could be because most of the farmers do not own large scare of farms and it is easy to keep in the head.

Those farmers who keep records on papers are mostly farmers with larger farm size and farmers who provide information to their farming groups, research centers (IRAD), National Institute of Statistics, Ministry of Agriculture and Rural Development through comparatives such as UNVDA, this equally justify the level of illiteracy of farmers because mostly educated farmers are engage on paper recording. It is also revealed from results that the average farm size in rooms is 2.52 out of the 470 rice farmers surveyed, 94% of them had knowledge of yearly input and output. Also, on average, 57.9% of the rice farmers in Ndop Plain, North West Region of Cameroon were males. This means that males were more engaged in rice production than women during the period of the survey. This can also be explained as of the fact that the men were open, available and willing to work with the researcher.

Table 1: Descriptive Statistics of Variable used

Variable	Observation	Mean	Std. Dev.
Keep farm record on paper (1=yes and 0 otherwise)	470	0.340426	0.474357
Farm size (In categories of rooms)	470	2.525532	1.044014
Farm record used to keep input and output analysis (1= yes and 0 otherwise)	470	0.940426	0.236949
Male (1=yes and 0 otherwise)	470	0.578723	0.49429
Primary education(1=yes and 0 otherwise)	470	0.523404	0.499984
Secondary education(1=yes and 0 otherwise)	470	0.202128	0.402015
Higher education(1=yes and 0 otherwise)	470	0.102128	0.303139
Use of farm records (1=yes and 0 otherwise)	470	0.834043	0.372439
Makes mistakes in keeping farm record (1=yes and 0 otherwise)	470	0.255319	0.436505
Uses technology to better manage farm record (1=yes and 0 otherwise)	470	0.951064	0.215965
Received farm record training (1=yes and 0 otherwise)	470	0.944681	0.228846
Produces many types of rice (1=yes and 0 otherwise)	470	0.138298	0.34558
Improve farm record keeping by moving from manual to electronic (1=yes and 0 otherwise)	470	0.16383	0.370515

Source: Computed by author using field survey data 2022 and stata14.0

As far as education is concerned, results revealed that on average those who had primary education stood at 52.3%. This basic knowledge permits farmers to be able to read and write. The secondary and tertiary level school holders on average scored 20.2% and 10.2% respectively. This means most people involved in rice farming at the time had primary education. The drop in secondary and high school could be attributed inadequate finance and early marriage in Ndop Plain, North West Region of Cameroon, thirdly at the time of interview some farmers were in schools attending lectures both in secondary and high school and some had escaped from the Anglophone crisis to safer places.

From the table it can also be seen that on average, 83.4% of those who kept farm records were actually using farm records. This means that farmers who were able to keep farm records knew the importance and uses of farm records in their activity. Descriptive statistics also revealed that on average, 25.5% of the farmers who used farm records were liable to make mistakes when keeping the records. Also, on average, 95.1% of the farmers were for the fact that with improvements in technology, the practice of statistical farm records will be improved upon. On average, 94.5% of the rice farmer stood for the fact that training on farm records will improve the keeping of statistical farm records in the Ndop Plain area.

As far as the type of riced produced is concerned, 13.8% of the rice farmers were able to produce more than one type of rice during the survey period. This means that majority of the farmers were producing only one type of rice. As concerns the movement from manual to electronic keeping of farm records, 16.4% of the farmers agreed to the fact that a shift from manual record keeping to electronic record keeping can improve statistical farm records practices and productivity.

4.2 Main Estimate of Drivers of Farm Records

Using the Probit regression model to analyse the drivers and challenges of statistical farm records, the results obtained are presented on table 4.2 below.

Table 2: Main Estimate of Drivers of Farm Records

Variables	Farm Records	p-values
Use farm record for input and output analysis	0.154	-0.275*
Male	0.045	0.080*
Primary education	0.063	0.079

Secondary education	0.0789	0.240***
Higher education	0.093	0.014
Use of farm records	0.054	0.137**
Make mistakes in keeping records	0.051	-0.014
Use technology to keep farm record	0.1034	0.210**
Has farm record training	0.272	0.0791
Produces many types of rice	0.066	0.0002*
Improve farm record by moving from manual to electronic record keeping	0.06547	0.086
Pseudo R2	0.0030	
Prob>chi2	0.0467	
Observations	470	

Source: Computed by author using field survey data. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Regression results revealed that, the knowledge of yearly input and output reduces the probability for a farmer to keep farm records by 0.275 standard scores compared to farmers who did not have knowledge on yearly input and output. This result is statistically significant at 10% level. The ability for farmers who have knowledge on input and out to abandon statistical farm records is high because most farmers are interested in knowing what they harvest, without calculating the expenditure. Also, being male increases the probability of keeping farm records by 0.08 point compared to their female counterparts. The variable gender (male) is also statistically significant at 10% level. As concerns level of education, it is positively associated with statistical farm records. All the dummies of educational level are positive indicating that level of education increases the probability of statistical farm records. The coefficients for primary and higher education are statistically insignificant even at 10% level while the coefficient for secondary education is statistically significant at 1% level.

Results on table 2 also revealed that the use of farm records by farmers increases the probability of record keeping by 0.137 points compared to when a farmer does not make use of farm records. This result is statistically significant at 5% level. Also, when farmers make mistakes in keeping farm records, this reduces the probability of keeping farm records by 0.014 points compared to when farmers are not liable to mistakes. Also, technology and training increase the probability of keeping farm records by 0.21 and 0.079 points respectively. The coefficient for technology is statistically significant at 5% level while the coefficient for training is statistically insignificant. When more than one type of rice is produced, the probability to keep records will increase by 0.0002 points, although this is statistically insignificant. Movement from manual way of keeping records to electronic record keeping increases the probability of keeping records by 0.066 points.

4.3 Challenges faced in keeping Farm Records

As shown in Table 3 below among those who either kept farm records or not, indicated the challenges the rice farmers in Ndop Plain faced as farm records keeping is concern. The survey shows that, 74% percent of those who kept record do not make mistake during record keeping process, while 25.53% of the rice farmers who kept records said, they make mistake during farm record keeping. This result is in line with the study of Owiny (2019), who investigated the extent to which farmers keep farm records and its impact on agricultural productivity in Pakwach district. The percent of those who said, mistake making is not a major challenge are those who have attended a certain level of education, farm record keeping training and more to that having experience. Among these challenges is record being bulky in nature, thus 94.47 % of farmers confirm that bulky nature of farm records is not a challenge.

The fact that majority of the rice farmers said they do not faced challenge of bulky farm records could be because these farmers carry out farm record keeping on daily bases and have small scare farm which has help in reducing their work load. 93.62 % are of the fact that inadequate finance is not an obstacle to them. Hence this could be because most of these farmers are smallholder farmers who owned only small piece of land and it is not too demanding to them. Sometime farm records get lost has been seen as another disturbing challenge rice farmer faced in Ndop Plain. This result is correlating with the other results of this study, where majority of the farmers testify that most of their records are kept mentally and on papers which are easy to forget or misplace. 87.23% percent farmers who said they done have problem with farm records getting lost, these could be those farmers who have practiced keeping farm records electronically. Quite tiresome to keep farm records has proven to be the highest challenge of rice farmers in this area, recording 48.30%. The farmers with problem of quite tiresome to keep farm

records are mostly those with many rooms of rice farms and little knowledge in farm record keeping. Lastly 1.49 said they have more one challenge keeping farm records, that is Make mistakes in keeping records, Records being bulky, Inadequate finance, Records sometimes get lost, Quite tiresome to keep farm records. 98.51% of the rice who kept farm records were of the fact, they have specific problem that they faced.

Table 3 Challenges faced in keeping Farm Records

Variable	Observation	C	NC	%C	%NC
Fundamental errors in record keeping	470	0.2553 (120)	0.7547 (350)	25.53	74.47
Bulky records	470	0.553 (26)	0.9447 (444)	5.53	94.47
Inadequate finance	470	0.638 (30)	0.9362 (440)	6.38	93.62
Records Misplacement	470	0.1277 (60)	0.8723 (410)	12.77	87.23
Burdensome to keep farm records	470	0.4830 (227)	0.5170 (243)	48.30	51.70
Farmers faced all of the above challenges	470	0.149 (7)	0.9851 (463)	1.49	98.51

Source: Computed by author using field survey data. **N/B:** C =Challenges, NC= Non-Challenge, %C=Percentage Challenge, %NC= Percentage Non-Challenge

5. CONCLUSION AND RECOMMENDATION

The study was focused to identify and discuss the drivers and challenges associated with statistical farm records among smallholder rice farmers in Ndog Plain, North West Region of Cameroon. More attention was given to registered rice farmers who are easy to be identified and supervised by well-known comparatives such as, Upper Non Valley Development Authority (UNVDA) in the North West Region of Cameroon. Farming like any other business requires proper planning and utilisation of available resources and maximum output. Thus to achieve this, statistical farm records practices need to be promoted among farmers in these communities.

The present study indicates that 34% of the rice farmers surveyed were keeping farm records. This means majority of the rice farmers were not keeping farm records during the period of study. Mentally, electronic and paper remain the major means through which records are kept in Ndog Plain, thus the study revealed that majority of the farmers practiced mental records keeping which are easy to forget or make mistakes. More to this, our study has proven that literacy is on the high rate among smallholder rice farmers in Ndog Plain.

Farmers keep records based on the fact that well define comparatives such as UNVDA, Common Initiative Groups (CIG), Farmer’s groups and farmers themselves need information in order to solve post-harvest problems. From the analysis of this study, the main drivers of farm statistical record are; gender (male), level of education, use of farm records which is significant at 5% level, technology and training increase the probability of statistical farm records and significant at 5%, Moving from manual way of keeping records to electronic record keeping increases the probability statistical farm records by 0.066 points although insignificant. While the main challenges statistical farm records are; farmer’s knowledge on yearly input and output, farmers make mistakes in keeping farm records which reduces the probability of keeping farm records by 0.014 points.

Based on findings and recommendation put forth by other researchers such as Bruce (2016) and others, who mainly recommended an online websites and smartphone Apps that can be able to provide rapid updates and interact with other farmers, this study has gone a long way to introduced an APP that will permit farmers cultivating rice to be able to perform statistical farm records practices on their daily farm activities. Users of this APP are able to introduced new seeds and exchange ideas with other farmers. Hence this initiative will bring science and farming community together and turn information into farming knowledge, since it is going to encourage more farmers to keep records and permit easy access to researchers and institutions concerns with statistics to collect information about smallholder rice farmers.

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