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FARM RECORDS, BOOKKEEPING AND AGRICULTURAL DATA: A CASE STUDY OF SMALL SCALE FARMERS IN NASARAWA STATE, NIGERIA

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Abstracts

This study investigated the characteristics of Nigerian small scale farmers influencing their attitude towards farm record keeping, measured the farmers' perception as regard importance of farm records, and determined the scope of written farm records kept and constraints facing farmers in keeping farm records. Structured and pre-tested questionnaires were used to elicit information from 155 respondents randomly selected from five farm centres in Nasarawa Local Government of Nasarawa State, Nigeria. Descriptive statistics such as average, ranking order, Likert scale and critical mean were used to analyze the data. The study shows a composite average of 55.7 years for age of the farmers, 17.8 persons per farm centre had no formal education, 13.5 years for experience, 1.2 hectare for farm size and extension contacts of 2.2 visits. Seventy-nine percent of the respondents kept no written farm records at all. The respondents accepted accurate record keeping as basis for successful farm management, knowing worth of farm, planning budget, determining profit, knowing financial progress, analyzing farm performance and preservation of information. The farmer had constraints in keeping farm records, for example; illiteracy, lack of skills, habit of mental record keeping, cumbersome nature of record keeping and expensive record keeping books. The farmers are aware of the important role farm records play in farm management, but they are constrained by some factors. Therefore, the study recommended that; young educated people should be encouraged to take up farming as profession; farmers should be encouraged to keep farm records by providing them adult education and training in the art of farm record keeping; farmers should be helped to increase their farm size and orientated to see farming as business. These would enable farmers to keep accurate farm records for a reliable agricultural data that would be used for policy formulation that would engender sustainable development and achievement of sustainable development goals (SDGs).

Keywords: Farm Records, Farm Record Keeping, Book keeping, Farm management

Introduction

Many agricultural programmes and policies failed in Nigeria because of insufficient information at planning stage. Therefore, for many agricultural programmes to achieve its aims certain information about farms, produce, farm operations, farm input costs, prices of outputs and farmers and their attitudes must be utilized in planning the programmes. This would enable the policy makers to understand the basic requirements and ingredients of various agricultural programmes when planning them. Consequently, this would result in adequate arrangement and also facilitate better execution and implementation and ultimately the success of the programmes. It is therefore, necessary for agricultural data to be sought, collected, analyzed and used in decision making process (Rahaman, 2013). In addition, formal and informal planning of agricultural activities need farm data (Reddy *et al.*, 2007). It is, however, sad to note that Nigerian agriculture which is characterised by considerable regional and crop diversity, particularly the food sector is fraught with unavailability of data. The diversity seems to make the analysis of the sector a bit difficult. Again, even where scanty information is available, it is grossly inaccurate. Therefore, the little available data on agricultural production in Nigeria has to be viewed with caution, because figures

are based on extremely small samples (Paul, 1988). Under these circumstances, a few systematic surveys have been done, in some part of the country because of lack of government trained personnel and funds. Even wherever and whenever surveys are attempted, poor roads often make access to rural areas both time-consuming and costly. Similarly, a complex intercropping production system makes crop production estimates difficult for most crops (Paul, 1988 and Burdick, 2002). Accordingly, there is lack of accurate data for: farm planning and organisation, agricultural economic planning, planning agricultural extension services, appraisal and evaluation of agricultural projects, government budget policies, and for preparation of food balance sheet by government agents, agricultural production forecast and pricing policy. As a result of these there are numerous problems agricultural programmes in Africa (Adegeye and Dittoh, 1988). Therefore, there is need not for farm data, but for accurate data at micro and macro levels. Accurate farm data is indispensable for eradicating hunger and reducing the number of under-nourished through agricultural development policies that are appropriate and efficient. Furthermore, the country needs a reliable statistical data on population characteristics, land and input use, productivity, price and prevailing economic and social situation to design efficient policies and effective agricultural investment projects. In the final analysis, farm records and books kept by farmers are the major sources of accurate agricultural statistical data; therefore, every farm and farmer should be registered with relevant information authorities (Rahaman, 2013). This has become more urgent, because past and current statistical data are needed to project into future since recommendations for future must be guided by current observations. Based on this problem statement the objectives of this study are to examine the socio-economic characteristics of the farmers that could influence their attitude towards farm record keeping, measure the perception of the farmers about the importance of farm record, determine the scope of farm records kept by farmers and determine the Problems facing farmers in farm records and bookkeeping.

Farm Record

As agriculture is becoming a complex business, the farmer cannot remember all the necessary information required in order to plan their farm business in a systematic manner (Reddy *et al.*, 2007). For example, a farm business large enough to adequately support a family is much too complex to manage from notes on a calendar or tablet or mental recalls. Hence, a detailed set of records is essential to making sound farm management decisions (Carkner, 2000). Therefore, to be systematic in thinking the farmer needs formal written plan based on farm records (Reddy *et al.*, 2007). In other words, a good farm plan should be based on actual recorded facts. This is because a good farm records provide adequate information for planning process. However, it is unfortunate to note that relevant farm records are not given importance by farmers in developing countries (Reddy *et al.*, 2007) such as Nigeria. This is as a result of illiteracy. For this reason, a traditional farmer does not keep records of past operations in written form, however, there is enough evidence to suggest that he does use the experience he has acquired from previous year operations (Olukosi and Erhabor, 2005) in planning and budgeting. This as well shows the importance of records.

Records are statements of facts or data concerning a specific subject matter which may be physical, monetary, and mathematical or statistics. In like manner, farm record pertains to information recorded on the day to day operation of a particular farm for a specified period of time. In general, the records of a farm may show assets and their purchase prices, date of purchase, inputs, outputs, and daily activities, transaction and proper accounting system to be able to have a complete estimate of profit and loss statement at the end of the year. Therefore, output of farm records for

example; balance sheets, cash flow, income statements and enterprise accounts provide the information necessary for farm business planning and management. Of course, by keeping a complete farm record on yearly basis, it is possible to have comparison between years and thereby determine the rate of growth of the farm business (Reddy *et al.*, 2007).

Again, good record keeping is essential to successful farm management. For instance, the farmers keep record to know the worth of the farm at any point in time. Also, it helps farmers to know how much a business earn over a period of time and facilitates planning and budgeting for running current operations (Mohammed, 1980). Equally important is, accurate financial and production records which help farmers analyze performance of farm operation and make necessary adjustment to operate more efficiently and, thus increasing profitability. In addition, farm records help farmers to define and evaluate operational success as measured by income generated for family living as well as other needs. In fact, financial success is measured by profitability; if the farm business is not profitable it is not sustainable. Furthermore, other uses of farm records include pricing products for sale at a farmers' market, estimating the value of a farmer's share in naira, evaluating land leases, deciding whether to hire services or buy equipment, avoiding embarrassment from dud checks, to know home consumption, control family expenditure and evaluating farm insurance. Similarly, farm record keeping is also essential for third-party audit and income tax management. Also, government agencies need farm record for developmental schemes and setting up production controls like the banks and other financial institutions need them for extending credit facilities. Equally, it aids farmers to determine the credit needs and support loan requests. As a matter of fact, properly kept records provide bankers financial information they need for making credit decisions, and it demonstrates the farmer's management ability. Additionally, availability of accurate farm record also aids government policies, research process and teaching. On the whole, it can be seen that farm records are used for many and varied purposes just as there are many types of farm records.

Firstly, production record is one of the types of farm records. Production records are items that relate to quantities of inputs and levels of production. For example, useful production records may include the following categories: farm and field maps (each field, plot or bed numbered and area shown); field history sheets (listing crops grown, soil amendment and/or pest or disease control inputs used) and input purchase records (including pesticide or fertilizer labels, seed packets and copies of orders showing product name and supplier, etc.). Also, production records include farm activity logs with such details as (planting; fertilizer or pesticide application; soil management practices; scouting of plant health or disease problems; pest monitoring; harvest; storage, equipment settings; weather conditions, etc). The activity logs should show what products are used, the location (field, plot or bed number), date and rate/quantity of application, settings, etc. Again, sales records (kind and quantity of products marketed); invoices should contain date, name of buyer, products, lot number, amount and price sold (Carkner, 2000). Other field records for crop production might include such items as: field identification, parcel size, cropping history, crops grown, cultural practices used and yield information, current field activities, soil test data and labour hours by activity. In particular, poultry records should include: chicken purchases and dates, mortality rates, feed records; quantities purchased, and quantities fed, production records; eggs per day, cull or damaged eggs, rodent control activities, sale of pullets or hens.

Secondly, financial record is another type of farm records. Financial records relate primarily to the income and expense transactions of the farm. They may consist of product sales, operating expenses, equipment purchases, accounts payable, accounts receivable, inventories, depreciation records, loan balances and price information. Indeed, details and data to be kept vary according to

purpose it is intended for. Therefore, it is advisable to keep records up to the point where the marginal cost of record keeping activities is equal to marginal return (Reddy *et al.*, 2007), and such records should possess the desired attributes of good records.

What are the characteristics of a good farm records system? A good farm records system should: provide necessary, accurate and updated information; be legible, readily accessible and user-friendly; and be flexible enough to provide information in a variety of ways; be readily understood and audited. Moreover, farm records should be easy to keep and provide essential information on a timely basis as well. In addition, it should contain an appropriate level of detail; especially, complex farming operations with many and varied enterprises, such as multiple crops and livestock, require more detailed records. In other words, farms with few enterprises, perhaps a single crop, require less detail. In general, a record keeping system should include: a business checking account to handle all business transactions, an income ledger to record all business income by calendar month, an expense ledger to record all business expenses by calendar month, an inventory that involves both the physical counting and valuation assignment, a depreciation schedule prorating the original costs of assets over more than one accounting period and a net worth statement or balance sheet summarizing assets and liabilities of the farm. Additionally, other records required are farm business records, an income or profit and loss statement that lists receipts and expenses by type (and the result is net profit or net loss) and cash flow statement measures the flow of funds into the business and the flow out of the business over the accounting period, enterprise records list receipts and expenses by enterprises. However, it is important to note that the type of records a farmer keeps and maintains depends on the type and the objectives of the enterprise.

Bookkeeping

Bookkeeping is the essential first step in organizing business transactions. Books, in this sense; are simply a record of money spent and the money earned. The information is written on a set of ledger sheets, which contain several columns, to keep track of where money goes and from what source it is earned. Essentially, bookkeeping deals with the financial aspects of farm records. In fact, some scholars refer to farm records as ‘farm records and account’ or ‘farm accountancy’. Financial accounting principles are applied in bookkeeping.

There are two kinds of bookkeeping systems: single entry and double entry. Most farm bookkeeping does not require the refinements or the work of the “double- entry” system. The elaborate double-entry” method with built-in cross checks and automatic balancing which requires two entries for every transaction: a debit and a credit are not usually employed in farm bookkeeping, because of its complexity. Single-entry bookkeeping is often adopted. The single-entry bookkeeping requires the farmer to make only one entry for every transaction, keeping paperwork, mathematics and balancing to a minimum. Nonetheless, the system still provides the basic information needed to manage farm and prepare final accounts (Carkner, 2000).

Again, accounting method refers to how transactions are recorded within the bookkeeping system. There are two accepted accounting methods: cash and accrual. Under cash accounting, all taxable income is recorded whether received in cash or as property when it is received. With the accrual accounting, income is recorded when earned and expenses are recorded when incurred, whether cash has changed hands or not.

It is important to realize that, in commencing record keeping, a number of decisions need to be made about farm record systems. These include the desired level of detail and number of enterprise accounts need to be determined. For example, an enterprise account might be a group of similar

crops like grains, a single crop like yam, or a service provided to others like tractor hiring. Also, determining the level of detail includes defining how many business enterprises to include under the farm business, deciding about home and living expense records, and about business interests outside the farm. Similarly, a decision needs to be made about the choice of accounting period. Should records be kept on a calendar basis or on a fiscal year? The time period selected should be the one that is the most suitable for the type of farm business. For example, some crop seasons end in wet season, and this may be the best time to balance accounts.

Another key point in decision making on the nature of bookkeeping depends on the farm business organisation. If a farm business is one-family operation without partners or employees only a bank account would be needed, a set of ledger sheets, and a few worksheets. If a farm sells its products on credit, a record files for each customer would be needed. If employees are hired; a payroll, a social security account and federal and state taxes files record would be needed. Partnerships (other than husband and wife) will have to keep track of each partner's contributions and withdrawals. Regardless of how complicated bookkeeping may be, the first step is to maintain a separate checking account for business. Therefore, business and personal finances must be separated, and having a business checking account will make keeping them separate much easier and consequently effortless postings.

Posting is the process of recording information in ledgers. When goods are sold or bought or supplied, one must "post" the information on the ledger sheets. Posting on a regular basis keeps records current. Posting becomes difficult when a backlog accumulates. The keys to posting are: find a place to put all receipts and cancelled checks and post regularly. One should post more frequently if he has a busy sales or purchasing period. Try not to get behind. Post all ledgers in pencil, and keep an eraser handy. One should record all income in two places on a sales receipt and in an income ledger (Carkner, 2000). This study would examine the perception of small scale farmers about importance of farm records and bookkeeping and problems facing farmers in record keeping.

Nigerian Small-scale farmers

For Nigerian small-scale farmers; agriculture is a way of life and not business. Most of Nigerian small-scale farmers are illiterate, conservative in behaviour and adamant to change and attached to their customs and culture (Awolola, 2014, Simpa, 2014). These subsistence and semi-commercial farmers hold ninety-five percent (95%) of Nigerian farms and they produce 98% of food consumed in Nigeria and 99% of exported agricultural products (Awoyemi, 1981; Stock, 2009; Simpa, 2014). An average Nigerian farmer still use hoe and cutlass and they do not practice modern agricultural production techniques (Sadiq, 2013). Again, the small scale farmers lack of information, skills, modern farming implements, credit and improved input supply and as such they have not been able to fully harness the potential of the naturally endowed agricultural productive resources for optimum production. The consequence of these has been low output of agricultural production for consumption and export (Opara, 2010, Simpa, 2014).

Methodology

The study was conducted in Nasarawa State, Nigeria. It is located in Guinea savannah region and between latitude 08°33'5 N and longitude 08°33' E. The State has a land area of 27,117 Km² and population of over 1.8 million. The rainfall varies from 1311.73mm to 1451mm. The major crops grown include yam, cassava, maize, guinea corn, sesame, rice, groundnut and cowpea (Nasarawa State Ministry of Information, 2005; NPC, 2006).

Nasarawa State Agricultural Development Programme Zoning was adopted for the study and these are Western, Central and Eastern zones. A multi-stage random sampling technique was employed to select the samples. At the first stage; Western zone was randomly selected. At the second stage, Nasarawa Local Government Area was randomly selected from among the local government areas in the Western zone. At the third stage five farm centres were randomly selected from the Local Government Area. The randomly selected farm centres were Nasarawa, Laminga, Maramara, Udege and Loko. The sampling frame of each of the farm centre was listed and 10 percent of the sampling frames were randomly selected as the respondents at fourth stage. A total of one hundred and fifty-five respondents were used for the study. Pre-tested structured questionnaire was administered to the respondents. Data for 2014 cropping season were collected based on the objectives of the study.

Table 1: Selected Farm Centres and number of Respondents

Farm Centres	Sampling frame	Sample size
Nasarawa	300	30
Laminga	310	31
Maramara	290	29
Udege	330	33
Loko	320	32
Total	1550	155

Source: Field survey (2014)

Descriptive statistics such as average (composite mean), percentage, ranking order, a 5-point Likert Scale (very strong =5-points, strong =4-points, Neutral =3-points, not strong =2-points and not very strong = 1-point), and weighted average and critical mean (3.0) were used. The critical mean is the average of Likert points (i.e $5+4+3+2+1 =15/5$) (Simpa, 2014).

Results and Discussion

Description of Farmers' Socio-economic Attributes Influencing Farm Records Keeping

These socio-economic characteristics in Table 2 could influence the attitude of farmers towards farm record keeping. The composite mean for the information on farmers' age gave 55.7 years. This shows that the farmers are old. This justifies the finding of Simpa (2014) and Nmadu *et al.*, (2015) which states that only old farmers are left on the farm and young ones do not aspire to become farmers again. Majority of the farmers has no formal education at all with average of 17.8 persons per farm centre. The average of those that had primary and secondary education per farm centre was 8 and 4 respectively. Only 1.2 per farm centre had tertiary education. This indicates that majority of the farmers are poorly educated. This justifies the finding of Simpa (2014) which states that Nigerian small scale farmers are poorly educated. The average year of farming experience is 13.5 per farm centre and as such the farmers are well experienced as majority of them had more than ten years of experience. The mean farm size was 1.2 hectare per farm centre. This implies that the farmers are small scale farmers and this confirms the assertion that the size of small scale farm is between less than 1 and 4.9 hectares (Olayide, 1980; Reddy *et al.*, 2007). The average extension contact was 2.2 and indicates poor extension services and less information on new innovations and this is in accordance with the result of Nmadu and Simpa (2014). The average composite number of farm helps was 0.5 and this is very poor. This implies little or no division of labour and that the farmer might do every farm activities by himself. Family farming

is the major form of farming organisation that is common among the farmers with a composite of 29.6 per farm centre while group and cooperative farming had 0.2 and 1.2 farmers per farm centre

Table 2: Socio-economic Characteristics of the Small-scale farmers that could influence Their attitude towards record keeping

Socio- economic Characteristics	Nasarwa N =30	Laminga N = 31	Maramara N = 29	Udege N = 33	Loko N = 32	Composite mean N = 155
Average age (years)	51.5	65.4	48.9	61	52	55.7
Average formal education yrs						
No education	16	18	12	20	23	17.8
Primary	7	9	10	8	6	8
Secondary	5	3	4	5	3	4
Tertiary	2	1	3	0	0	1.2
Average years of experience	12.8	20.1	8.4	15.6	10.6	13.5
Average farm size	1.6	1.2	0.8	1.5	0.9	1.2
Average No. of farm helps	0.5	0.6	0.7	0.3	0.4	0.5
Average extension contacts in a season	3.1	2.6	1.5	1.7	2.1	2.2
Farming organisation						
Family farming	28	29	29	32	30	29.6
Group farming		1				0.2
Cooperative farming	2	1		1	2	1.2

Source: Field survey (2014)

Scope of Written Farm Records kept by farmers

Majority of the farmers kept no records at all; the composite mean shows that 24.6 persons per farm centre did not keep any record of any type as in Table 3. This conforms to the findings of Adegeye and Dittoh (1985) and Reddy *et al.* (2007) which states that small farmers do not keep written farm records. Only 2.6, 2.0 and 0.6 persons per farm centre kept scanty records for purchases, sales and inputs respectively. Scanty records for outputs, farm activities and inventory were kept by 0.4, 0.2 and 0.4 persons per farm centre accordingly. Only one person among the 155 respondents kept what can be so called a full farm records. The summary of Table 3 is shown in Table 4.

Table 3: Scope of Written Farm Records kept by farmers

Scope of Farm Records	Nasarwa N = 30	Laminga N = 31	Maramara N = 29	Udege N = 33	Loko N= 32	Composite mean
No farm records kept at all	23	25	22	24	29	24.6
Scanty records for purchases only	2	4	2	5		2.6
Scanty records for sales only	2	2	4		2	2.0
Scanty records for inputs only				3		0.6
Scanty records for outputs only	2					0.4
Scanty records for activities only			1			0.2
Scanty inventory records only	1			1		0.4
Full farm records					1	0.2

Source: Field survey (2014)

Table 4: Summary of scope of Written Records Kept by Farmers

Scope of Farm Records	Frequency	Percentage
No written farm records kept at all	123	79.2
Scanty records for purchases only	13	8.2
Scanty records for sales only	10	6.4
Scanty records for inputs only	3	1.9
Scanty records for outputs only	2	1.2
Scanty records for activities only	1	0.6
Scanty inventory records only	2	1.9
Full farm records	1	0.6
Total	155	100

Source: Field survey (2014)

Description of Farmers' perception of Importance of Farm Records Keeping

Table 5 describes the perception of farmers concerning the importance of farm records keeping. The importance were assumed and the ranked or weighed as follows: a base for successful farm management, to know the worth of farm, to provide for sound management decision making, usefulness in farm planning and budgeting, to help in determining which enterprise is most profitable, helps in analyzing the performance of the farm, preservation of information about farm business, helps to identify strong and weak points in farm management and usefulness in measuring farm financial strength were accepted as importance with weighted mean score of 4.6, 4.5, 4.4, 4.3, 4.4, 3.8, 4.2, 3.0 and 3.7 respectively. Other assumed importance that scored weighted critical mean of less than 3.0 were not accepted importance of farm records by the farmers. Such factors are; helps in planning government schemes, helps farmers to compare performance with others, providing bank information on farm for credit, helps in price determination and providing extension agents with data. This ranking reveals that the farmers assume variables that have direct effect on them as important.

Table 5: Farmers' Perception of the Importance of Farm Records and Bookkeeping

Assumed importance	No of Respondents	Weighted score	Weighted Average (X)	Remark
A base for a successful farm management.	155	720	4.6	**
To know the worth of the farm	155	710	4.5	**
Provide a base for sound management decision making.	155	695	4.4	**
Useful in farm planning and budgeting	155	672	4.3	**
It help in planning government schemes	155	223	1.4	*
It helps in determining which enterprise is most profitable.	155	697	4.4	**
It helps in analyzing performance of farm	155	595	3.8	**
It preserve information about farm business	155	654	4.2	**
It helps to provide information for research	155	157	1	*
It helps farmers to compare performance with others	155	280	1.8	*
It provides bankers information on farm for credit decisions	155	250	1.6	*
It helps to identify strong and weak point in farm management.	155	470	3	**
It helps in price determination	155	385	2.4	*
It is useful in measuring farm financial progress.	155	575	3.7	**
It provides extension agents with data.	155	171	1.1	*
Total (X)				
Critical mean			3.0	$\geq 3.0 = **$ $< 3.0 = *$

Source: Field Survey (2014), **Accepted as important, * Not accepted as important.

Description of Constraints to Farm Records keeping by farmers

To achieve this objective, the respondents were allowed to make multiple choices and the corresponding percentages were ranked in descending order as in Table 6. Illiteracy, non-consideration of farming as business and habit of mental record keeping were ranked 1st, 2nd and 3rd constraints respectively. Lack of skills, traditional method of farming, smallness of farm size, cumbersome nature of record keeping and scattered farm plots/fields were ranked 4th, 5th, 6th, 7th and 8th positions among the constraints. Others were expensiveness of farm record books, tiredness, cost of keeping records, lack of interest and tax evasion which were ranked 9th, 10th, 11th, 12th and 13th respectively.

Table 6: Constraints to Farm records and Bookkeeping by farmers

Constraints	Frequency	Percentage	Ranking Order
Illiteracy	148	95.4	1 st
Non consideration of farming as business for profit making	145	93.5	2 nd
Habit of mental record keeping	140	90.3	3 rd
Lack of skills	138	89	4 th
Traditional methods of farming	133	85.8	5 th
Smallness of farm size	130	83.8	6 th
Cumbersome nature of farm record keeping	129	83.2	7 th
Scattered farm plots/fields	125	80.6	8 th
Farm record books are expensive	119	76.7	9 th
Tiredness	108	69.6	10 th
Cost of keeping records	99	63.8	11 th
Lack of interest	95	61.2	12 th
Tax evasion	26	16.7	13 th

Source: Field survey (2014)

Conclusion

The small scale farmers are old, poorly educated, experienced, practice family farming and lacks division of labour. The farmers kept virtually no written farm records, but they agreed that farm records could be important in successful farm management, planning budget, knowing farm worth, analyzing farm performance and measuring financial progress. However, they are not keeping farm records because of some constraints facing them such as illiteracy, lack of skills, and habit of mental record keeping, small scattered farm plots and expensive farm record books.

Recommendations

Based on the above conclusion this study recommends that:

1. Educated young people should be encouraged to take up farming as profession by making farming attractive and lucrative and provide them with improved extension services. Such young farmers would imbibe the habit of farm record keeping.
2. Adult education might be provided for the fairly old farmers and this may help them in record keeping.
3. Farmers should be encouraged to keep farm records by providing with training on farm record keeping and farm record books since they agreed that farm record keeping has some importance in farm management decision making.
4. Cooperative farming as type of farming organization rather than family farming should be encouraged and this would prompt the farmers to keep written farm records.

5. Farmers should be orientated to see farming as a profession and business ventures for profit making. This would prompt them to cultivate the habit of keeping written farm records rather than mental record keeping.

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