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47th Annual
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(JOS 2022)

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ANALYSIS OF CFOP-LIVESTOCK INTEGRATION, PRACTICED BY FARMERS IN KADUNA STATE, NIGERIA

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ABSTRACT

The study analyzed the nature of crop-livestock integration practiced by farmers in Kaduna State, Nigeria. Data were collected from 351 farmers using a well-structured questionnaire. Descriptive statistics was used in the data analysis. Result showed that majority of the farmers (75%) practiced mixed cropping. 50%, 44%, 39%, and 33% of the farmers, reared goat, poultry, sheep and cattle respectively. The result of the nature of crop-livestock integration showed that most of the farmers, (45%) and (30%) practiced cereal-legume-livestock and cereal-livestock integration respectively. It is recommended that Government at all levels, NGOs and the private sectors should do more in the supply of inputs, provision of soft credit loans, and training of extension agents to help boost the production of farmers. Also, farmers should continually involve themselves in crop-livestock integration practices, this will enable them increase their food production level using limited resources available to them, this in turn will help improve their food security status. Lastly, the Government should provide enabling environment and facilities for farmers to carry out their farming activities.

INTRODUCTION

Nigeria's domestic economy is largely determined by agriculture which accounted for 21% of the Gross Domestic Product (GDP) in 2020 (National Bureau of Statistics, 2021). Nigerian agriculture is primarily rain fed and characterized by low productivity, low technology and high labour intensity (International Institute of Tropical Agriculture, IITA 2017). One best way to increase food production, reduce wide spread hunger, increase income and ensure food security for farmers, and still ensure utilization of resources and environmental protection without hampering economic growth, is encouraging smallholder farmers to continually involve themselves in integrated crop-livestock farming system. The Integrated farming system was introduced based on study and research results which were first known as cropping pattern, farming patterns and now the term farming system. Integrated farming system is a system consisting of a combination of plants and animals, where waste from one component can be used for other components (Daljit, 2016). Food demand is increasing day by day as food production is declining; this is as a result of the ongoing conversion of land to residential land and also drastic reduction of working farmers (Jaishankar *et al.*, 2017). In the face of expanding human population, food production has to be increased commensurately to enhance food security among farming households; hence the need to analyze the nature of crop-livestock integration practiced by famers in Kaduna state, Nigeria. The study identified the types of cropping system practiced, species of livestock reared and nature of crop-livestock integration practiced by farmers in the study area.

MATERIALS AND METHODS

The study was conducted in Kaduna State, Nigeria, which has 23, Local Government Areas with a total land area of 46,053Km². These Local Government Areas of the State are grouped into 4 Agricultural Development Project (ADP) zones, namely Maigana, Lere, Samaru-kataf and Birnin Gwari zones. The



State has an estimated population of about 9.1million people in 2019, based on an annual growth rate of 3.2% (NPC, 2006). The climate of the State is characterized by two distinct seasons; the rainy and dry seasons. (Kaduna State Ministry of Economic Planning, 2013).

A multi-stage sampling technique was employed in selecting farming households for data collection. The first stage involved random sampling of two Local Government Areas (LGAs) from each of the four (4) agricultural zones, making a total of eight Local Government Areas. The second stage was the random selection of two villages from each of the selected Local Government Areas. Finally, using Yamane (1967) Slovia formula, (as applied by Abdurahman *et al.*, 2016) the sample size based on an assumed 5% margin of error, 95% confidence and applying finite correction factor was determined, from the list of rural farmers obtained from Kaduna State Agricultural Development Agency (KADA)

in 2018. The Slovia formula is given as: $n_0 = \frac{N}{1+N(e^2)}$

Where: n_0 = sample size; e = 0.05; N = total number of observations.

A total of 351 farmers made up the sample size for this study. The study made use of primary data. The primary data were obtained through the use of a questionnaire administered to 351 household heads in the selected villages. Descriptive statistics was used to analyze the objectives.

RESULTS AND DISCUSSION

Cropping system practiced by the farmers

Table 1 shows the distribution of the type of cropping system practiced by farmers in the study area. Most (75%) of farmers practiced mixed cropping while 23% practiced sole cropping and a few, (2%) practiced relay cropping. In general, mixed cropping is the most practiced cropping system in the study area. This implies that farmers who practiced mixed cropping, are able to harvest multiple crops in a farming season, which in turn would help them to be food secure. This finding agrees with the findings of Amujoyegbe and Alabi, (2013) who in their study on cropping system analysis of two agro ecological Zone of Southwestern Nigeria, reported that mixed cropping and crop rotation was the prominent cropping systems among farmers in the derived savannah zone.

Table 1: Distribution of farmers on the types of cropping system practiced

Cropping system	Frequency (f)	Percentage (%)
Sole cropping	79	22.51
Mixed cropping	264	75.21
Relay cropping	8	2.28
Total	351	100

Species of livestock reared by farmers

Table 2 shows the distribution of the farmers on species of livestock reared. Majority (50.14%) reared goats, while (43.59%), (38.46%) and (32.48%) reared poultry birds, sheep and cattle respectively. Only a few (3.42%), (1.99%), (1.99%) and (1.14%) reared ducks, rabbits, pigs and donkeys respectively. In general, livestock production was predominant in the study area, which shows that every farming household reared one form of livestock or the other. This finding agrees with that of Adewumi *et al.* (2015) who in their study on rural farm families' probable acceptability of small ruminant's milk for consumption in Ogun State, asserted that majority of the farmers reared goat and sheep. It also agrees with Adefalu *et al.* (2013) who in their stud on the perceived causes of livestock involvement in road accident: threat to livestock production among women in Oyo State, Nigeria, reported that majority of the farmers reared poultry.



Table 2: Distribution of farmers based on the species of livestock reared

Species of livestock rear	Frequency (f)	Percentage (%)
Cattle	114	32.48
Sheep	135	38.46
Goat	176	50.14
Poultry	153	43.59
Swine	7	1.99
Rabbit	7	1.99
Duck	12	3.42
Donkey	4	1.14
Others	3	0.85

* Multiple responses allowed

Nature of integration in the study area

Table 3 shows distribution of the nature of integration in the study area. Most (45.30%) of farmers practiced cereal-legume-livestock integration, while 31% practiced cereal-livestock integration. 11% practice vegetables-livestock integration, 6 % practiced legumes-livestock integration, 6% practiced root and tuber-livestock integration. A few (2%) each practiced forage and pasture livestock integration and other forms of integration respectively. In general, the result showed that every farming household were involved in one form of crop-livestock integration or the other. This implies that crop-livestock integrated system is predominant in the study area. This findings agrees with the one reported by Iyiola-Tunji *et al.* (2015) who in their study on evaluation of crop-livestock system among farm families at adoption villages of the Nation Agricultural Extension and Research Liaison Services asserted that the farmers were capable of accepting the crop livestock integration system, since they were already practicing some form of mixed farming. They also reported that vegetables-livestock and forage-livestock integration were reported to be low by farmers all across the three agro ecological zones studied. The study is also in line with Ezeaku *et al.* (2015) who in their study on integrated crop-livestock farming system for sustainable agricultural production in Nigeria revealed that cereal based-livestock system was a common practice among farmers.

Table 3: Distribution of farmers on the nature of integration

Nature of integration	Frequency (f)	Percentage (%)
Cereal-Livestock	107	30.48
Legumes-Livestock	22	6.27
Cereal-Legume-Livestock	159	45.30
Root and Tuber-Livestock	20	5.70
Vegetables-Livestock	39	11.11
Forage and Pasture-Livestock	8	2.28
Others	8	2.28

* Multiple responses allowed

CONCLUSION AND RECOMMENDATIONS

This study analyzed the nature of crop-livestock integration practiced by farmers in Kaduna State, Nigeria. The result revealed that the majority (75%) of the farmers practiced mixed cropping, 50%, 44%, 39%, and 33% of famers reared goat, poultry, sheep and cattle respectively. Furthermore, most



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45% and 30% of the farmers practiced cereal-legume-livestock and cereal-livestock integration respectively. It is therefore recommended that, Government at all levels; NGOs and the private sectors should do more in the supply of inputs, provision of soft credit loans, and training of extension agents to help improve the production level of farmers in the study area. Also, farmers should continually involve themselves in crop-livestock integration practices, this will enable them increase their food production level using limited resources available to them, this in turn will help improve their food security status. Lastly, government should also provide an enabling environment and facilities for farmers to carry out their crop-livestock farming activities.

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