Poultry farmers' knowledge, perception and willingness to adopt Cassava Leaf-Based Poultry Feed in Ajegunle and Ago-Iwoye Farm Settlements, Ogun State, Nigeria

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Abstract

This study investigated the poultry farmers' **knowledge, perception and** willingness to adopt cassava leaf-based diet as poultry feed in Ogun State, Nigeria. A multi-stage sampling procedure was used for selecting 75 poultry farmers from Ikenne and Ago-Iwoye farm settlements. Data were collected with the aid of an interview guide from the respondents before and after the on-farm feeding trial (OFT), and analysed using descriptive and inferential statistics. Results revealed that 16.7% of the respondents had high knowledge of cassava leaf-based poultry feed (CLBPF) before the OFT while 74.1% had high knowledge after the OFT. Favourable perception of CLBPF was observed in 37.0% and 59.3% of the poultry farmers before and after the OFT respectively. Before the OFT, only 20.4% of the poultry farmers were willing to use CLBPF while 96.3% were willing to use CLBPF in feeding their birds after the OFT. Based on severity of constraints, data indicated that farmers' constraints with regards to processing of cassava leaves during rainy season, the cassava leaf collection being tedious, and high cost of processing cassava leaves were significantly reduced after the OFT. Student-t test analysis revealed a significant difference ($p<0.01$) in the knowledge of the poultry farmers about CBLPF before ($\bar{x} = 32.45\%$) and after (78.61%) the OFT. It was concluded that on-farm participatory feeding trial had a positive influence on poultry farmers' knowledge, perception and willingness to use CBLPF. A more aggressive approach towards agricultural extension information dissemination to farmers on the usefulness of CLBPF was recommended.

Keywords: Cassava leaf-based feed, Knowledge, Perception, Poultry farmers, Willingness to adopt

Introduction

Poultry farming entails the domestication of birds such as chicken, ducks, guinea fowls, geese, turkeys, pigeons, quails and ostrich for meat and egg production (Wachira, 2011). The poultry industry remains the fastest and most economic means of bridging the animal protein deficit that developing countries like Nigeria are experiencing currently. This according to Nworgu*et al.* (2012) is because poultry farming offers the quickest returns to investment in livestock enterprise. The contribution of the poultry industry to national development in terms of the nation's economy, employment generation as well as source of animal protein in diets and revenue generation cannot be over-emphasised (Ogunyemi and Orowole, 2020; Dilger *et al.,* 2016). According to Alders *et al*. (2019), poultry plays a significant role in the economy through the provision of food while also creating wealth through job provision for the teeming population.

Poultry business is a profitable venture because poultry birds are good at converting feed into useable protein for meat and egg production; the production costs per unit remain relatively low, and the return on investment is high (Heise *et al.,* 2015). Therefore, poultry farmers do not require large capital to start a poultry business. Additionally, eggs are more affordable for the common person than other sources of animal protein (Abokiet *al.*, 2013). The quality and composition of feed also play an important part in the nutrition and development of the animals to be fed (Ani and Nnamani, 2011). No wonder, research (Thirumalaisamy*et al.*, 2016; Ebukiba and Anthony, 2019) has reported that feeding contributes about 70% of the total cost of poultry production. The success of poultry ventures, therefore, depends on adequate feeding of the birds with qualitative but cheap feeds.

Nigeria is currently the seventh largest population in the world with a population of over 200 million contributing 2.64% of the total world population (Worldometers, 2020). Despite the increasing human population, food production has not been following a similar trend and as such leading to food insecurity among most people especially the poor (Wiggins and Keats, 2013). Hence, poultry farming contributes meaningfully to the nutritional value of diets in form of protein supply through egg and meat consumption.

High cost of production resulting from increased cost of feed and feed ingredients as well as drugs has been a major impediment to poultry production in Nigeria. Animal nutritionists have concluded that replacement of expensive conventional feed ingredients with cheap but locally available substitutes would be suitable for reducing feed cost in poultry production (Adeyemi *et al.*, 2012; Thirumalaisamy*et al.*, 2016). Research efforts had been geared towards the development of alternatives to expensive feed ingredients such as soybean meal in poultry diets. In the light of these, are alternative feed ingredients like castor oil seed, mucuna, *Alchonia cordifolia* seed meal and rubber seed meal (Emenalome*t al.*, 2011; Ijaiya*et al.*, 2011) have been initiated. Other farm by-products used as alternative feed ingredients include maize straw, maize stover, cocoa husk, maize cob, wheat offal, maize bran, cocoa pod husk and cocoa bean shell as well as available roots and tubers (Adeyemi *et al*., 2012). Studies have also shown that the inclusion of cassava as a replacement to maize and soybean have the tendency of improving the performance of poultry birds. Tang *et al.* (2012) discovered that substituting maize completely with cassava pellets or chips resulted in significantly reduced growth, non-starch polysaccharide and crude protein digestibility and metabolised energy utilisation in broilers.

Natalie and Mingan (2016) noted that cassava supplied the highest carbohydrates among staple crops and can completely replace maize as an energy supplying poultry diets. Cassava leaf is therefore an important feed source for poultry birds because cassava leaves are less competed for by humans and are readily available to farmers as additional feed supplement for poultry birds. Investigations made by Ngiki*et al.* (2014) have shown further that cassava leaf meal used at low levels in broiler diets as pigmenting agents or at

higher levels as partial substitutes for the conventional protein sources in poultry diets gave satisfactory results. Abu *et al.* (2015) also reported that up to 20% inclusion of cassava leaf meal and 20% cassava peelings could be used as a replacement for maize and soybean meal. Body weight reduces significantly when broilers are fed whole cassava.

Given the above, this study was conducted with the broad objective of investigating the poultry farmers' knowledge, perception and willingness to adopt cassava leaf-based poultry feed (CLBPF) in Ogun State, Nigeria. Specifically, the study sought to determine the knowledge level of the poultry farmers about cassava leaf-based poultry feed before and after the on-farm participatory feeding trials; ascertain poultry farmers' perception about cassava leaf -based poultry feed; ascertain willingness of the poultry farmers to adopt cassava leaf -based poultry feed; and identify the perceived constraints associated with poultry farmers adopting cassava leaf-based poultry feed. Two hypotheses stated as "there is no significant difference between the knowledge of the poultry farmers on the use of CLBPF before and after the on-farm feeding trials" and "there is no significant difference in poultry farmers' perception on the use of CLBPF before and after the on-farm feeding trials" were tested at 5% level of significance.

Materials and Methods

The study was conducted in Ogun State, Nigeria. The population for the study is constituted of the poultry farmers that are raising laying birds for eggs in the State. Multi-stage sampling technique was employed to select the respondents. The first stage was the purposive selection of Ikenne and Ijebu-Ode zones out of the four zones (Ilaro, Abeokuta, Ikenne and Ijebu-Ode) in the state. The second stage involved the purposive selection of one farm settlement from each of the selected zones. The two farm settlements that were purposively selected were Ajegunle Farm settlement in Ikenne zone and Ago-Iwoye farm settlement in Ijebu-Ode zone due to the high concentration of poultry farmers in the zones. Poultry farmers were invited to attend a workshop at the selected farm settlements. A total of 52 and 55 poultry farmers were sensitised on the use of cassava leaves as poultry feeds from Ajegunle and Ago-Iwoye farm settlements respectively. The third stage was the purposive selection of poultry farmers based on their interest in the research and willingness to release their farm facilities for the experiment. This resulted in the selection of fifty-four (54) poultry farmers from the two selected farm settlements.

Measurement of variables

Knowledge Level: The knowledge level of the poultry farmers with respect to cassava leaf-based poultry feed was determined by conducting knowledge tests for the poultry farmers before and after the on-farm feeding trials. Ten knowledge test questions were structured for the poultry farmers to answer to elicit information on the poultry farmers' knowledge about cassava leaf-based poultry feed. The correct response was given a score of 'one' and incorrect response 'zero'. The highest obtainable score was ten (100%) while the lowest score was zero (0%). The knowledge index was calculated as follows:

$$\textbf{Knowledge index} = \frac{\text{Numberof correct responses}}{\text{Total number of knowledge items}} \times 100\%$$

Poultry farmers that scored 50% or less were considered to have low knowledge while poultry farmers that scored above 50% were considered to have high knowledge.

Perception of poultry farmers about cassava leaf-based poultry feed

The poultry farmers' perception about cassava leaf-based diet as poultry feed was investigated with 10 item perceptual statements (self-developed) on a 5-points Likert scale to determine the perception of the poultry farmers. The score for scales ranged from 5 for strongly agree to 1 for disagree. The maximum point was 50 while the minimum was 10. The mean point was 30. Points above 30 were considered as positive or favourable perception while points below 30 were considered as negative or unfavourable perception.

Perceived constraints of the poultry farmers about cassava leaf-based poultry feed

The perceived constraints of the poultry farmers to cassava leaf-based diet as poultry feed were determined on 10 item self-developed statements at nominal level on 3 points rating scale of very serious (3) serious (2) not serious (1) were used to determine the seriousness of the constraints.

The willingness of the poultry farmers to adopt cassava leaf-based poultry feed

Willingness of the poultry farmers to adopt cassava leaf-based feed as poultry feed was measured at nominal level. Arbitrary figures such as; willing to adopt (1) not willing to adopt (2) were assigned to the items presented to poultry farmers.

Methods of data analysis

Data were analysed using frequency count, percentage, mean, and standard deviation and student-t test analytical techniques.

Results

The knowledge level of the poultry farmers about cassava leaf-based poultry feed before and after the on-farm participatory feeding trials

Table 1 reveals that majority (83.3%) of the poultry farmers had low knowledge of cassava leaf-based poultry feed before the conduct of the on-farm feeding trial while very few (16.7%) of the poultry farmers had high knowledge. However, after the on-farm feeding trial with the participation of poultry farmers, majority (74.1%) of the poultry farmers were knowledgeable about cassava leaf-based poultry feed while few (25.9%) had low knowledge.

Table 2 reveals that the higher proportion (63.0%) of the poultry farmers had unfavourable perception, while 37.0% had favourable perception about cassava leaf-based poultry feed before the on-farm feeding trials. After the on-farm feeding trial, a greater proportion (59.3%) of the participating poultry farmers had favourable perception, while 40.7% had an unfavourable perception about cassava leaf-based poultry feed.

Table 1: Knowledge of poultry farmers before and after the on -farm feeding trials

Items	Before feeding trials (%)	After feeding trials (%)
Low knowledge (≤50%)	83.3	25.9
High knowledge (51 - 100%)	16.7	74.1

Perception of poultry farmers about cassava leaf-based poultry feed (CLBPF)

Table 2: Perception of poultry farmers before and after the on-farm feeding trials

Items	Before feeding trials (%)	After feeding trials (%)
Unfavourable perception	63.0	40.7
Favourable perception	37.0	59.3

Willingness of the poultry farmers to adopt cassava leaf-based poultry feed

Table 3 reveals that the willingness of the poultry farmers to use cassava leaf-based feed was low (20.4%) before the on-farm feeding trials while their willingness to use cassava leaf-based feed became high (96.3%) after the on-farm feeding trials.

Table 3: Categorization of the willingness of the poultry farmers to adopt cassava leaf-based poultry feed

Items	Before feeding trials (%)	After feeding trials (%)
Willing to use CLBPF	20.4	96.3
Not willing to use CLBPF	79.6	3.7

Perceived constraints associated with poultry farmers adopting cassava leaf-based poultry feed after the on-farm feeding trials

Table 4 reveals that the perceived constraints associated with the use of cassava leaf-based feed by poultry farmers include: lack of knowledge about the nutrient content ($\overline{x}$= 2.56 and $\overline{x}$ = 2.18) before and after on-farm trials, lack of knowledge about the processing of the leaves ($\overline{x}$ = 2.38 and $\overline{x}$ = 2.16), processing of cassava leaves during rainy season ($\overline{x}$ = 2.27 and $\overline{x}$ = 1.84), the cassava leaf collection is tedious (= $\overline{x}$ 2.25 and $\overline{x}$ = 1.65) cost of processing the cassava leaves is high ($\overline{x}$ = 2.18 and $\overline{x}$ = 1.63) are the highest constraints perceived by poultry farmers about the adoption of cassava leaf-based poultry before and after the on-farm feeding trials.

Test of Hypotheses

There was a significant difference ($p<0.01$) in the percentage of farmers with knowledge about cassava leaf-based poultry feed before (32.45%) and after (78.61%) the on-farm feeding trials (Table 5). Results in Table 6 show that there is significant difference ($p<0.05$) in the

perception of the poultry farmers about cassava leaf-based poultry feed before ($\overline{x}$ = 28.96) and after (31.20) the on-farm feeding trials with mean difference of 2.24 and t-value of 2.492.

Table 4: Perceived constraints associated with participating poultry farmers adopting cassava leaf -based poultry feed after the on farm feeding trials

Items	Before feeding trials ($\overline{x} \pm SD$)	After feeding trials ($\overline{x} \pm SD$
Lack of knowledge of the nutrient content	2.56±0.70	2.18±0.71
Lack of knowledge of how to process the leaves	2.38±0.72	2.16±0.78
Processing during rainy season is not easy	2.27±0.82	1.84±0.70
Cassava leaf collection is tedious	2.25±0.88	1.65±0.74
Cost of processing the cassava leaves is high	2.18±0.78	1.63±0.49
Lack of knowledge of cassava variety to use	2.13±0.95	1.55±0.81
Availability of the leaves	2.06±0.90	1.47±0.58
Processing the leaves is cumbersome	2.04±0.89	1.43±0.54
Lack of knowledge of the feed formulation	2.00±0.92	1.41±0.50
Lack of ready to use cassava leaf meal	1.79±0.89	1.24±0.43

Values are means ± standard deviation

Table 5: Differences in the knowledge of poultry farmers before and after the on-farm feeding trials

Variable	Mean±SD*	Mean difference	t	p -value
Knowledge before	32.45±10.167	46.16	22.790	0.001***
Knowledge after	78.61±17.611			

*SD = Standard deviation

Table 6 : Differences in the perception of poultry farmers before and after the on -farm feeding trials

Variable	Mean±SD*	Mean difference	t	p -value
Perception before	28.96±5.776	2.24	2.492	0.016**
Perception after	31.20±3.012			

*SD = Standard deviation

Discussion

It was indicated from the findings that majority of the poultry farmers knew that cassava leaf can be utilized as poultry feed to some extent even before the training was conducted. This could be linked to farmers' level of education which enabled them to have acquired some knowledge of the use of cassava leaves as poultry feeds. This supports the findings of Oyeyinka*et al.* (2012) that higher level of education exposes farmers to innovations about farm management practices. After the feeding trial, it was observed that higher proportion of thepoultry farmers had increased knowledge implying that poultry farmers' knowledge about CLBPF increased. This agrees with the position of Ibitoye and Onimisi (2013) who submitted that continuous training of farmers especially on-farm training is essential to assist farmers to understand new concepts and apply new knowledge in farming. This also agrees with the report of Famuyiwa*et al.* (2012) who stated that training programmes in agriculture are designed to develop the capacity of farmers to make them better entrepreneurs and decision-makers and to help them organize themselves into effective associations and institutions.

Furthermore, the study found that the proportion of farmers who were willing to adopt cassava leaf-based poultry feed increased tremendously after the on-farm feeding trial. The drastic increase in the willingness of the participating poultry farmers to adopt cassava leaf –based poultry feed is attributed to the fact that the on-farm feeding trials exposed the participating poultry farmers to the potentials and the benefits of cassava leaf–based poultry feed. Also, since they were involved in the trial, they were able to actively participate and make their decisions. This is because the on-farm feeding trial is a demonstration of results that have the potential to encourage farmers to adopt innovations. According to Olarinde*et al*. (2017), participation in research and demonstrations significantly increased adoption of the demonstrated technologies by 99%.

The farmers' perception of the use of cassava leaves as poultry feeds was also reported to be improved after the on-farm feeding trial as more poultry farmers favourably perceived the use of CLBPF after the trial. It was further indicated that the on-farm feeding trial had positive influence on the poultry farmers' perception of CLBPF. The implication of this is that participating poultry farmers reflected that adoption of CLBPF would be of great benefit to the participating poultry farmers. This agrees with Uguru*et al*. (2015) who pointed out that farmers are likely to adopt an innovation if there is a comparative advantage and higher profitability.

The results of the perceived constraint associated with the use of cassava leaf-based feed before and after the on-farm feeding trial by the participating poultry farmers indicated that the on-farm feeding trial resulted in reducing the severity of the constraints. This is in tandem with the findings of Ayoade and Akintonde (2012) that reported a positive and significant relationship between the constraints encountered and adoption level of agricultural innovation by farmers. Silva and Broekel (2017) also cited lack of resources, incompatibility and complexity of new technology as well as socio-economic and cultural constraints limiting

the adoption of technology by farmers.

Conclusion and recommendation

The knowledge level of the poultry farmers about cassava leaf-based feed was low before the on-farm feeding trials but increased thereafter. The on-farm participatory feeding trials had a great positive influence on the poultry farmers by increasing their knowledge about cassava leaf-based poultry feed. It is recommended that (i) Poultry farmers in Ogun State should collaborate with the Cassava Farmers Association (CFA) in order to harness the cassava leaves being discarded as waste during the harvesting of cassava roots to convert the waste to alternative feed ingredient for poultry; (ii) Extension agents should organize training and workshops in collaboration with poultry farmers with the view to disseminating information on innovations developed by researchers in the laboratories or research institutes; (iii) Regular on-farm research with the participation of the poultry farmers should be encouraged in order to alley the fears of the poultry farmers which were revealed in their perception about innovation.

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