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Implications of farm succession plans on sustainable poultry productivity in Oyo State, Nigeria

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Abstract. The significance of farm succession planning in sustaining smooth transitioning longevity of family farm operations, especially with the overly ageing farming population in sub-Saharan Africa (SSA), cannot be over-emphasised. The objective of this study was to examine the implications of farm succession plans on sustainable poultry productivity in Oyo state, Nigeria. A multi-stage sampling procedure was used to select 260 respondents (108 poultry farmers and 152 farmers' children who were between 15 and 25 years old), for the purpose in Egbeda and Oluyole Local Government Areas of Oyo State, Nigeria. Data were obtained using a questionnaire, which was administered through interview schedules. Most (86%) of the farmers had at a point or the other considered the succession of their farm. Results of an Ordered Logistic Regression showed that poultry farmers' succession plans were significantly influenced by farming status (part-time or full-time) (β=1.455; z=1.95), stock size (β=2.089; z=2.83), Generational Integration Process (β=4.049; z=6.00), gender of farmer (β=1.012; z=1.65) and profitability of farm over the last three years (β=0.036; z=1.75). From the children (potential successors) stand point, personal interest (z = 1.71), number of siblings (z=-3.01) and farm profitability in the last three years (z=3.63), had significant influence on their disposition towards farm succession. Age (z= -0.45), gender (z= 1.01), birth order (z= -0.66), parent's education level (z=0.38) of potential successors, did not have significant effects on their disposition towards farm succession. Profitability of the farm business was a major factor in farm succession on the part of both farmers and potential successors. Results suggest that more females should engage in poultry business and farmers should adopt GIP for farm succession.

Key words: Poultry Farm Profitability, Generational Integration Process

Introduction

The poultry industry is a very important component of the global livestock sector. It is reportedly the fastest growing and most commercialised component in the livestock sector (FAO, 2019). This could be attributed partly to the relatively short gestation period of poultry enterprise; thus giving a quick turnaround on investment. Poultry production is particularly important in West Africa where there is no religious and cultural restriction on the consumption of poultry products. Moreover there is an

expanding market in the rising urban and peri-urban population, owing to blossoming demand for animal food sources, including poultry and their products.

It is, therefore, imperative that the livestock industry, particularly the poultry component be boosted to neutralize this growing demand, through provision of eggs and meat for food security and nutrition sustainably. This is important as poultry can convert feed efficiently to these products (Fatoki *et al.*, 2020). It is, therefore, imperative to examine not only the current production systems and value chains, but also how these enterprises will be handed over to the next generation of farmers, for smooth continuity of production and sustained productivity. This process of handing over to the next generation is referred to as farm succession or Inter-generational farm transfer (Rodriguez-Lizano and Montero-Vega, 2020).

Farm succession, is increasingly viewed as crucial to the development and sustainability of global agriculture (Leonard *et al.*, 2017). Farm succession has been defined to be an integral part of a complete business plan for an agricultural enterprise (Mishra *et al.*, 2010), and has been reckoned for being very complex (Leonard *et al.*, 2017; Rodriguez-Lizano and Montero-Vega, 2020).

In most developed countries, the ideal type of farm family business, ownership and management are handed down within the family (Stiglbauer and Weiss, 2015). In many cases, the farmer starts a succession farm partnership with the potential successor, and gradually transfers the business over an agreed period of time. This ensures sustainability of the farm family business, devoid of unnecessary conflicts. Farm succession affects growth and sustainability of the agricultural sector (Leonard *et al.*, 2017; Zou *et al*., 2018). One important factor in the sustainability of a farm business is the ability to identify a successor to partake the supervision of the management of the farm. The importance of farm succession planning can, therefore, not be over-emphasised in light of agricultural sustainability, especially with the ageing farming population, presently on the rise globally (Ntshangase *et al*., 2016).

The youth are noted for their energy, enthusiasm and creativity; all of which have been recognised as part of the nation's greatest assets (FAO *et al.*, 2009; Kakwagh and Ikwuba, 2010). When these positive attributes are effectively leveraged, young people tend to play a key role in sustaining agricultural productivity. Evidence suggests that many young people in West Africa, and in Nigeria in particular, choose not to pursue livelihoods in agriculture, particularly as farmers (Ayanda *et al.*, 2012; Tijani, 2014). With the ageing farming population, it is important to encourage younger farmers to engage in agriculture.

Nevertheless, it has been reported that farms that are managed by younger farmers tend to have a higher propensity towards innovation and sustainability, as a result of the entrepreneurial skills exhibited by them (Zagata and Sutherland, 2015). The objective of this study was to examine the implications of farm succession plans on sustainable poultry productivity in Oyo State, Nigeria.

Materials and Methods

Study area

This study was carried out in Oyo State, Nigeria. Oyo State with its capital city in Ibadan, is the hub of poultry production in southern Nigeria (Liverpool-Tasie *et al.*, 2019). Located in the rainforest agro-ecological zone, Ibadan is the largest metropolis in terms of geographic area in Nigeria. Two peri-urban Local Government Areas (Egbeda and Oluyole), which are located between Latitudes $7^0$2'0"N, $7^0$20'0"N and Longitudes $3^0$43'0"E, $4^0$1'0"E and between Latitudes $7^0$3'0"N, $7^0$21'0"N and Longitudes $3^0$42'0"E, $4^0$3'0"E, respectively (Otokiti *et al.*, 2021) were the locations for this study.

Sampling procedure

A multi-stage sampling technique was adopted to obtain 108 commercial poultry farmers and 152 potential successors (household children), giving a total of 260 respondents for the study. The first sampling stage involved the purposive selection of Ibadan, being the capital city of Oyo State, the hub of poultry industry in southern Nigeria (Liverpool-Tasie *et al.*, 2019). During the second sampling stage, two peri-urban Local Government Areas (Egbeda and Oluyole), were randomly selected from the six peri-urban Local Government Areas (LGAs) of Ibadan. The third stage involved random selection of 120 commercial poultry farmers, from lists obtained from the poultry farmers' association in the LGAs. The number of farmers from the selected LGAs was based on probability proportional to size specified as:

$$S_i = \frac{P_i}{P}.N$$

Where: S_i = sample size for LGA; P_i = population of commercial poultry farmers in the LGA; P= population of commercial poultry farmers in Ibadan; and N = predetermined sample size for the study (120 poultry farmers).

The number of farmers was streamlined during interview visits to farmers with at least one farm-resident-child of at least 15 years of age. Thus, 108 out of the initially selected 120 poultry farmers, who met the criterion of having at least one resident child above the age of 15 years, were considered for this study. Age 15 was used as a bench-mark, following the recommendation of Cavicchioli *et al.* (2015) and also following the United Nations' (UN) definition of 'youth', as young people aged 15 – 24 years. This being the period between childhood and adult-hood, when they are expected to transit socially to becoming independent, responsible and productive (Evans and Skovdal, 2015).

Data were collected from selected farmers and children (potential successors) with the aid of a semi-structured questionnaire, through interview schedules. It is important to understand the factors which influence the willingness of potential successors to take over family farm business, as this will be crucial for the farm continuity (Cavicchioli *et al.,* 2018).

Data analysis

Generally, one of the major tools of analysis used in farm succession studies, is the binary choice dependent variable regression; which allows for quantification of whether and to what extent various independent variables increase or reduce the probability of intra-family succession (Cavicchioli *et al.,* 2015). Farm succession is usually measured using proxies, which include if the farmer has a succession plan or not (Mishra *et al.*, 2010); and if the farmer thinks that the next generation will take over farm (Cavicchioli *et al.,* 2015). Mishra *et al.* (2010) employed a Binomial Logit model to identify the factors which affect decision to have a succession plan; while Cavicchioli *et al.* (2015) set the dependent variable (succession) to be whether the farmer thinks the next generation will take over the farm. This expectation is then related using regression models, with all relevant and observable farmer, farm and family characteristics obtained from the data through the administered questionnaire.

This study employed the Ordered Logistic Regression model (also referred to as Proportional Odds Logistic Regression model) to examine the factors which influence the farmers' succession plan. This is an ordinal quantification, which gives a better possibility of the farmer providing response, which better describes reality than binary quantification that is a simpler approach of only two scenarios. Unlike Binary Regression, the Ordered Logistic Regression is distinguished because it permits more than two categories of dependent variable. However, like the Binary Choice Dependent Variable

Regression, it also utilises maximum likelihood estimation to compute the probability of categorical membership.

The farmers in the present study were grouped into three categories, based on the stage of their succession plan; namely 1 - No plan; 2 - Potential successor identified but not confirmed; and 3 - Successor identified and confirmed.

If we take into consideration outcome Y with K independent (predictor) variables (X_1, X_2, X_3.....X_K), then the ordered logistic regression is expressed as:

$$\text{Logit } (P(Y \leq j \mid X)) = (\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots + \beta_K X_K)$$

Where: β are the regression coefficients; and j represents the cut-off point between different categories of the dependent variable.

The same set of coefficients (β) was used for each cut-off point thus reflecting the 'proportional odds' assumption of the model.

One of the necessary conditions for succession is the willingness of the potential successor to take over the farm business (Cavicchioli *et al.,* 2015). Thus, it is crucial to examine the willingness of potential successors in taking over family farms. In order to get a better perspective of the sustainability of the poultry farm enterprise, the viewpoint of the potential successors in the farmers' households on farm succession were examined. Thus, the dependent variable (Y) for the child-level data analysis was set to be whether the child was willing to take over farm (Y= 1) or not (Y= 0). The dichotomous nature of response prompted the use of the logistic regression model to determine the extent of influence of factors which affect the probability that a potential successor is willing to take over the poultry farm. However, once the factors which had statistically significant effects on succession were identified through logistic regression, their Marginal Effects (MEs) in increasing or decreasing the probability of succession were computed. The MEs show the change in probability (Y) when an independent variable changes by one unit. It is the immediate change of Y with respect to X (independent variables).

Results and Discussion

Farm succession

A total of 64.81% of the farmers had succession plans for their farms (Table 1), even though not all had been confirmed and finalised. In some cases (35.19%), it was overlooked and brushed aside by farmers until the time of retirement came, or never even considered at all. Arowolo *et al.* (2015) found that 95.9% of poultry farmers in parts of southwest Nigeria had commendable disposition towards succession planning for their farms. This underscores the significance of awareness of farmers of the importance of farm succession. Fasina and Inegbedion (2013) found that 80% of the poultry farmers in Ogun State, in Nigeria, had an intra-family succession plan; while the remaining 20% had plans for non-family members to succeed them**.**

The three categories of farmers that were identified, in relation to their disposition towards farm succession in the present study, are (i) those who had a confirmed successor; (ii) those who had not given succession any serious thought at the time of this study; and (iii) those who had an unconfirmed potential successor. Thirty-five per cent of the farmers had not yet envisioned planning the succession of their farm; while 48.15% had identified, but not confirmed their farm successors. The remaining 16.66% had clearly identified and confirmed their farm successors. In light of these results, it is important to examine the factors that influence succession plans of these farmers.

Table 1. Socioeconomic characteristics of poultry farmers involved in the study

Variable	Frequency	%
Sex		
Male	90	83.33
Female	18	16.67
Age		
35-54	43	39.82
55-64	49	45.37
65 and above	16	14.81
Education of farmers		
None	2	1.85
Primary 1^0	9	8.34
Secondary 2^0	24	22.22
Tertiary 3^0	73	67.59
Poultry farming experience		
Below 5	2	1.85
5-10	34	31.48
11-20	40	37.04
Above 20	32	29.63
Household size		
1-5	66	61.11
6-10	32	29.63
Above 10	10	9.26
Farm Size (Flock size)		
1,000 – 2,500	68	62.96
2,501 – 5,000	33	30.56
Ã 5,000	7	6.48
Mode of poultry farming		
Full-time	26	24.07
Part-time	82	75.93
Adoption of GIP by farmers		
Yes	57	52.78
No	51	47.22

The z test statistic for Generational Integration Process (GIP) was 6.00 with an associated *p*-value of 0.000, making it statistically different from zero at 0.05 alpha level (Table 2) in estimating succession plan. The ordered logit for farmers who engaged their children in GIP having a confirmed successor was 4.0494 higher than farmers who did not engage their children in GIP when other variables in the model were held constant. GIP had a positive and significant effect on farm succession among farmers. This implies that poultry farmers who engaged their children in GIP had a higher probability of having a confirmed successor than farmers whose children were not engaged in GIP. GIP activities such as

Table 2. Parameter estimates of ordered logistic regression for the poultry study conducted in Oyo State, Nigeria

Succession Plan	Coefficient	Standard Error	z	P> |z|
GIP	4.0494	0.6752	6.00	0.000
Age	0.2397	0.1611	1.49	0.137
Formal training in poultry farming	1.0228	0.6325	1.62	0.106
Poultry Farming Experience	0.1984	0.2147	0.92	0.356
Farm Profit over 3 years	0.0364	0.0208	1.75	0.080
Farm Ownership	0.1381	0.1997	0.69	0.489
Education	-1.4356	1.7780	-0.81	0.419
Number of children	-0.1623	0.1340	-1.21	0.226
Farming Status	1.4545	0.7457	1.95	0.051
Farm Size (Stock size)	2.0889	0.7371	2.83	0.005
Gender	-1.0116	0.6130	-1.65	0.099
/cut1	4.9859	3.9895		
/cut2	8.3319	4.0954		

Number of obs = 108; LR chi^2 (11) = 89.60; Prob> chi^2 = 0.0000; Pseudo R^2 = 0.4074; and Log likelihood = -65.1524

inclusion of children (potential successors) in farm decision-making process introduces an improved level of understanding between farmer and child/children and helps to enhance management capacity of the potential successor (Rodriguez-Lizano and Montero-Vega, 2020).

About 52.78% of the farmers indicated that their children were involved in activities of the farm business (Table 1). This greatly underscored the importance of GIP in the sustainability of a farm business. This is similar to a study by Fischer and Burton (2014), who found that GIP was an important determining factor for generational agricultural succession. According to Rodriguez-Lizano and Montero-Vega (2020), GIP is the relation between various generations of a family, which begins from the birth of a new generation (children, grandchildren), until the death of current heads (father or mother). In line with this definition, it is expected that a good agricultural GIP will lead to higher probabilities of a successful generational succession. In this regard, Rodriguez-Lizano and Montero-Vega (2020) demonstrated that regardless of socioeconomic conditions, GIP was the determinant, that is, integration of the children in farm activities.

Farming status is the ordered log-odds estimate of comparing full-time to part-time poultry farmers on succession plan, given the other variables are held constant in the model. The ordered logit for full-time poultry farmers having a confirmed successor was 1.4545, higher than for part-time farmers when other variables in the model were held constant. This difference between full-time and part-time farmers on succession plan, was found to be statistically significant (z = 1.95; p = 0.05) when controlling for other variables. Full-time poultry farmers in this case, had no other income-generating employment, making poultry farming their only source of income.

On the other hand, part-time poultry farmers had additional on-farm and, or off-farm employment as supplementary source of income (Table 2). This corroborates the finding of Adebo (2019), who noted that the farming status of farmers had effect on their dedication to the farming enterprise. It is therefore, expected that full-time farmers will be very dedicated to the success and sustainability of their farm enterprises and ensure smooth farm succession.

The ordered logit for farmers who had larger stock size (above 2,500 birds) having a confirmed successor, was 2.0889 higher than farmers who had smaller size (2,500 stock and lower). Farm size which in the study refers to the stock size, is the on-farm bird population. This had a significant relationship with the succession plan (Table 2). The higher the flock size, the higher the probability of having a confirmed successor relative to the probability of having no succession plan. It could be that farmers, having invested so much time, energy and capital into establishing a large farm, would desire it to be transferred to the younger generation within the family. In this way, the farm wealth is retained within the family. This finding agrees with that of Stiglbauer and Weiss (2015), who found that farm size increased the probability of succession. Bertoni and Cavicchioli (2016) opined that farms with greater levels of capital had better levels of succession.

Farm profit over the past three years had significant effects on farm succession plan (Table 2). The financial status of the farm over the past three years can be a proxy for the farm's competitiveness and profitability. The Ordered Logit of farmers having a confirmed farm successor, rather than having no succession plan, increased by 0.036 with at least three years of positive financial performance. Since this can be a proxy of farm competitiveness and productivity, strategies that aim at farm product marketability and competitiveness should be implemented/improved. This will encourage planning and execution of farm succession.

Gender of farmer was significant in affecting farm succession plan (Table 2). The ordered logit for male farmers having a confirmed successor was 1.0116 lower than for female farmers. This is in agreement with Cavicchioli *et al.* (2015), who reported that farms operated by female farmers had a greater probability of intra-family succession than those operated by male farmers. Thus, the engagement of more females will contribute positively to sustainable poultry productivity in the study area.

There was no significant effect of farmers' age on succession (Table 2). This agrees with the findings of Cavicchioli *et al.* (2015) and Bertoni and Cavicchioli (2016), who observed that farmers' age played no significant role in farm succession. However, the result was contrary to that of Mishra *et al.* (2010), who studied the factors that influence succession decisions among farmers and found that farmers' age had positive significant effect on the probability of having a succession plan.

In the present study, there was a negative but non-significant effect of farmer's education on farm succession (Table 2). Farmers' level of formal education has been found to have positive and negative effects on farm succession by several researchers. For instance Mishra *et al.* (2010) as well as Bertoni and Cavicchioli (2016) found a negative effect of farmers' education on family succession; while Stiglbauer and Weiss (2015) found a positive significant effect of farmers' education on the probability of succession. Thus, in the present study location, level of farmers' education is not a notable significant factor to consider in the appraisal of farm succession.

The number of children possessed by the poultry farmers had a negative, but not significant effect on farm succession plan (Table 2). This is contrary to the study of Bertoni and Cavicchioli (2016), who indicated that the number of farmers' children had positive significant effect on farm succession. This difference in result could be due to the data of children considered in the analysis. Whilst this current study considered data of all the farmers' children in the analysis, Bertoni and Cavicchioli (2016) considered data of farmers' children aged over fifteen years old. Other factors which had no significant effect on farm succession plan of the poultry farmers in this study included farming experience, formal training in poultry farming and farm ownership.

Farmers' children

Most (67.76%) of the youth-respondents were between 19 and 25 years of age (Table 3). Birth order refers to the order a child was born, relative to their siblings in the family. The birth order categories

Table 3. Socio-demographic characteristics of farmers' children (15-24 years old)

Variable	Frequency	%
Sex		
Male	82	53.95
Female	70	46.05
Age		
15-18	49	32.24
19-25	103	67.76
Position in family (Birth order)		
First	33	21.71
Last	21	13.82
Only child	6	3.95
Others	92	60.52
Education level		
Secondary	62	40.79
Tertiary	90	59.21
Enjoy participating in farming activities		
Yes	53	34.87
No	99	65.13
Willing to take over farm		
Yes	63	41.45
No	89	58.55

in this study are firstborn (oldest child), last-born (youngest child), only-child and others (middle child). Those in the middle child category were children who were somewhere between the firstborn and the last-born (youngest child).

Although 41.45% of the children indicated willingness to take over farm and engage in agriculture as an occupation, only about thirty-four percent (34.87%) indicated that they enjoyed participating in farm activities (Table 3). Thus, only the latter proportion of the children enjoyed farm activities and were willing to succeed their parent. More than half of the population of the children indicated that they did not enjoy farm activities and were, therefore, not willing to succeed their parents as farmers. This implies that some of the children who indicated willingness to take over farm did not enjoy farm activities, but were under obligation to their families.

Following the result from the children strictly, less than 35% of poultry farms in the study area will have successors; while majority (about 65%) will be at risk of not having a successor for continuity of the farm business. This figure does not compare favourably with that of Rayasawath (2018) who reported that 62.2% of youths in Thai farming households were willing to take up agricultural occupation and thus contribute to the succession of older farmers. It has been noted that many young people in southwestern Nigeria are not encouraged to engage in agriculture (Ayanda *et al*., 2012). This is reportedly due to discouraging circumstances, such as bad road networks and unstable electricity supply affecting the agricultural sector (Tijani, 2014). Factors which significantly influenced the children's willingness to take over farm from parent in this study were performance of farm in the last three years, number of siblings and interest in farming (Table 4).

Table 4. Parameter estimates of logistic regression model in the poultry study in Oyo State of Nigeria

Variable	Coefficient	Standard error	z	P > {z}
No. of siblings	-1.2722	0.4237	-3.00	0.003
Age	-0.0093	0.0205	-0.45	0.650
Interest in farming	0.8802	0.5143	1.71	0.087
Sex	0.1245	0.1237	1.01	0.314
GIP	0.5675	0.3777	1.50	0.133
Birth order	-0.0102	0.0155	-0.66	0.510
Farmer's Education	0.1123	0.2939	0.38	0.702
Farmer's farming status	0.6134	0.4809	1.28	0.202
Farm performance in the last 3 years	1.3439	0.4059	3.31	0.001
Farm size	0.0322	0.1084	0.30	0.766
Constant	-2.1952	1.8777	-1.17	0.242

Number of obs = 152; LR chi2 (10) = 32.95; Prob > chi2 = 0.0003; Pseudo R^2 = 0.1593; and Log Likelihood = -86.9792

A child who had personal interest in farming had a 21.17% probability of taking over farm (Table 5). It was found that while some (34.87%) of the children enjoyed taking part in farm activities, others did not, but took part in the activities as a family obligation and respect for parents, other things being equal. Culturally in southwest Nigeria, a child living with his/her parents is obliged to do chores in obedience to the parents and support of the household. These might include household chores and, or farm chores. These are considered as duties of the child, whether or not he enjoys doing them. A child who enjoys doing a particular task will naturally take interest in it and will be specially committed to it.

Table 5. Marginal Effects after Logit {Y = Pr (succession) (predict) = 0.40226} in the poultry study in Oyo State, Nigeria

Variable	dy/dx	Standard error	z	P>|z|
Interest in farming	0.211653	0.12344	1.71	0.086
Farm performance in the last 3 years	0.306832	0.08447	3.63	0.000
No. of siblings	-0.30588	0.10178	-3.01	0.003

Variables that have statistical significant effect on willingness to take over farm are those with P > {z} values lower than 0.1

A potential successor had a 30.68% probability of taking over farm, if the farm had a good financial standing (Table 5); in this case, if the farm had been profitable in the last three years. The sample mean for the number of children in the household was five, thus making average siblings of potential successors four. Marginal effects after logit regression indicate that an additional sibling above four decreases the probability of succession by 30.59%. This implies that the probability of taking over farm by a potential successor will decrease by 30.59% with every additional sibling above the fourth. A similar result was obtained by Cavicchioli *et al.* (2015) who found that the willingness of a farm child to take over the farm decreases as the number of children in the household increases. This implies that the more children that are in the household, the less likely a child will boldly declare

interest in taking over farm. This may be attributed to the risk of rivalry among the children if one indicates interest as successor.

Conclusion

The proportion of young people considered as potential farm successors, who were willing to take over poultry farms from their parent was found to be low (41.45%), causing some concern as it relates to the future productivity and sustainability of poultry industry in Oyo State particularly, and in Nigeria as a whole. This is bound to have effects on future supply and availability of poultry products which could impact the economy. The Generational Integration Process (GIP) gave the farmer opportunity to see the performance of each child on the farm and assess their attitude, interest, diligence and other characteristics to facilitate the choice of a successor; while the child who was involved in GIP, also had the opportunity to evaluate his/her interest in farming on a long term basis and subsequently decide whether or not to take over farm. In light of this double-edged advantage of GIP, it is recommended that the poultry farmers adopt GIP as part of their business plan and implement as early as possible.

The financial performance of the poultry enterprise is crucial to its survival and sustainability. This is highlighted in the results of the study as the performance of the farm in the last three years was significant in affecting farmers' succession plan and children's willingness to take over poultry farm. It is therefore, important for farmers to implement strategies that promote profitability and competitiveness of their poultry business. These of course, can be supported by relevant policies by the government.

Though there were few (16.67%) of the poultry farmers who were females in this study, gender had significant effect on farm succession. Thus, more females need to be encouraged to participate in poultry business. As in a relay race where the baton is handed over safely by an athlete to the next member of the team, poultry farm operations and resources must of necessity be handed over to successors for successful sustainability of the poultry industry. Thus, productivity can be sustained and even improved in the study area to maintain status as hub for poultry industry in southern Nigeria.

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