Trends in
Agricultural
Sciences

OPEN ACCESS

Effects of Fadama (NG-CARES) Program on Income of Poultry Farmers in South Western Nigeria

[1]Matthew Olufemi Adio, [2]Haruna Ibrahim Opaluwa, [3]Matthew Durojaiye Ayeni and [1]Falebita Promise Moyinoluwa

[1]Department of Agricultural Economics and Extension, Faculty of Agriculture, Federal University, Oye-Ekiti, Oye, Ekiti, Nigeria

[2]Department of Agricultural Economics and Extension, Prince Abubakar Audu University, Ayangba, Kogi, Nigeria

[3]Department of Agricultural Economics and Extension, College of Agricultural Sciences, Landmark University, Omu-Aran, Kwara, Nigeria

ABSTRACT

Background and Objective: The COVID-19 pandemic, lock downs and trade restrictions are a worldwide health emergency that has a significant impact on the economy. This study examined the effects of the NG-CARES program on poultry production in the study area. **Materials and Methods:** Multistage sampling techniques were used to collect data from 120 poultry farmers. Data were analyzed using Descriptive Statistics, Gross Margin Analysis and Logistic Regression to examine the socioeconomic traits of poultry farmers who participated in the NG-CARES program, assessed the extent of their access to the program, calculated their profitability as a result of the program, looked at how much money they realized during the program and estimated the barriers to their participation in the program. **Results:** The mean age of poultry farmers involved in the NG-CARES program was 48 years. 83.3% were married, 75.8% are educated and had mean farming experience of 10 years. The factors that influenced the use and access of the NG-CARES program were household size, poultry association, education, experience, age and marital status with pseudo-R^2 0.4491. The results of the gross margin indicated that NG-CARES beneficiaries had a higher average Gross Margin than non-beneficiaries, documenting a difference of about ₦1,270,710.00 and establishing that it increases the gross margins of poultry farmers. **Conclusion:** The study concluded that the NG-CARES had effects on the income of poultry farmers in the study area by enhancing the capacity of its beneficiaries to realize an increase in output, subsequently their income. Therefore, it should be replicated in other parts of the country.

KEYWORDS

NG-CARES, income, logistic regression, poultry farmers, endogenous switching regression (ECR)

INTRODUCTION

The COVID-19 pandemic is a worldwide health emergency that has a significant impact on the economy, basic services and the livelihood of the weak and disadvantaged[1-3]. The Poultryproduction sector globally,

ISSN: 2957-9449 (Online)
ISSN: 2957-9430 (Print)
https://doi.org/10.17311/tas.2023.317.324

Received: 20 Mar. 2023
Accepted: 04 Aug. 2023
Published: 30 Sep. 2023

was negatively affected by the lockdown. The effect on the sector includes cutting back on the export of feed-related raw commodities like soybean and corn, which caused a dry feed shortage in several developing nations[4].

In Nigeria, the pandemic caused many MSEs to close down, employment was lost and increase in the number of Nigerians living in poverty. In an attempt by the Government of Nigeria to ameliorate the effect of the pandemic, the Federal Government of Nigeria, on behalf of the 36 States and the Federal Capital Territory (FCT), requested and received assistance from the World Bank in the amount of USD 750 million for on-lending to the States and FCT in order to implement a two-year emergency response program, named Nigerian COVID-19 Action Recovery and Economic Stimulus (NG-CARES). Each State was given an ex-ante allocation of USD 20 million, the FCT received USD 15 million and the Federal CARES Support Unit received USD 15 million. The NG-CARES Program is a multi-sectoral initiative created to give poor and vulnerable people and households, smallholder farmers and MSEs who were negatively impacted by the COVID-19 pandemic immediate emergency support. It is a two-year financial support project that will be put into action between 2021 and 2023[5].

Since the commencement of the NG-CARES program, which is a new initiative of the Federal Government of Nigeria to support poultry farmers, a study on the effects of the intervention on poultry farmers is sketchy there by creating a gap that this study intends to fill. This study examined the effects of the NG-CARES program on poultry production in the Ifako Ijaye Local Government area of Lagos State. Specifically, the study examined the socioeconomic characteristics of poultry farmers, involves in the Fadama NG-CARES program, examined the level of access to the NG-CARES Program by poultry farmers and examined the effect of the NG-CARES on the income of poultry farmers.

The study thus provides real evidence of the impact of the NG-CARES program on the production of the poultry farmers who were beneficiaries of the intervention. It also provided information on the specific constraints the farmers are facing. This will serve as a guideline for the Government in replicating the program in other locations in the country.

MATERIALS AND METHODS

This study was conducted between January and December 2022. Lagos State in South West Nigeria served as the study's location. Lagos State is the nation's largest urban region and in terms of land mass, the smallest of Nigeria's 36 States and home to approximately 15 million people and is perhaps the most economically significant state in the nation. It shares its western boundaries with Benin Republic, (Fig. 1)[6]. Its southern most tip is bordered by the Atlantic Ocean with 22% of its 3,577 km being lagoons and creeks. It is located between Latitude 6°27'11.00"N and Longitude 3°23'45.00"E. Lagos is one of the African cities with the quickest growth[7].

Data for the study were gathered using a multi-stage sampling strategy. The initial phase was the intentional selection of the Ifako Ijaye Local Government Area in Lagos State. This was justified by the fact that the Local Government was a participant in the NG-CARES Program and well-known for its livestock (poultry) output. The second stage also includes the selection at random of five communities that are livestock (poultry) farmers within the Local Government. These communities are Ogba-Ijaiye, Ifako, Iju-Ishaga, Obawole Fagba and Oke-Aro. The third step of the sampling process involves selecting 24 respondents at random. This resulted in a total of 140 respondents. However, 120 questionnaires were used for analysis based on correctness and appropriateness.

Profitability of poultry enterprise: Gross margin, net revenue and return on investment were determined as the profitability metrics of the poultry farmers.

Fig. 1: Map showing the delineation of local government areas in Lagos State[6]

Calculation of total revenue: Any money made from the sale of chicken and other items is included in the analysis' total revenue component. The calculations included all output, including that which was consumed by the household, sold to generate cash and distributed as gifts.

Estimation of total variable cost:
Mathematically:

- Total Cost (TC) is computed as Total Variable Cost (TVC)+Total Fixed Cost (TFC)
- Total Revenue (TR) is Production (Q) per unit price (P)
- Profit/Net revenue equals total revenue minus the entire expense
- Gross margin is equal to total revenue minus all variable costs
- Net profit is calculated as Gross Margin (GM)-Total Fixed Cost (TFC)
- Benefit is Total Revenue/Total Cost

Logistic regression: The labeling is based on the possibility that the value "1" will fall between 0 (definitely the value "0") and 1 (definitely the value "1"), the logistic function, as its name suggests, transforms log odds into probabilities. The alternative names are derived from the logit, or logistic unit, which is the unit of measurement for the log-odds scale. It offers the advantage of permitting the evaluation of various explanatory factors by expanding the basic concepts. The basic formula as used by Tolles and Muever[8] and adopted in this study is:

$$P = \frac{1}{1+e^{-(\beta_0-\beta_1X_1+\beta_2X_2+\cdots\beta_nX_n)}} = \frac{1}{1+e^{-(\beta_0+\sum\beta_iX_i)}}$$

The dependent variable in a binary logistic model, which is based on mathematics, has two possible values, such as pass/fail and is represented by an indicator variable, with the 2 values being represented "by 0" and "1.".Y is benefit (1 = benefit .0 otherwise)

Where:
X_1 is age of respondents, X_2 is sex, X_3 is marital status, X_4 is number of persons living within the household, X_5 is total years (education) spent, X_6 is farming experience, X_7 is access to extension services and X_8 is poultry association membership.

Statistical analysis: Descriptive statistics and stochastic frontier analysis were used in this study and the results were obtained at 1, 5 and 10% significant levels.

RESULTS AND DISCUSSION

Socioeconomic characteristics of poultry farmers involved in fadama NG-CARES program: The results in Table 1 showed the majority (53.3%) of poultry farmers selected in the Ifakoljaye Local Government area of Lagos State were female, while 46.7% are males. This suggests that females are more actively involved in poultry farming than males. This is in agreement with the study[9] which reported that female farmers are more involved in poultry farming. The result further indicated that the mean age of the respondents was 48 years. These results implied that the farmers were young, active and capable of performing operations involved in poultry farming. This is in agreement with the finding Agunloye *et al.*[10] who reported that people of this age could likely be a prospect for greater productivity and higher input. Moreover, the results revealed that the majority (83.3%) of the farmer were married. This result is in compliance with Mazza *et al.*[6], who stated that being married and having children enables the farmers to be more committed to their work. The majority of the respondents were married with an average household size of 5 children and other dependents living with them. The more people in a household, the less work the farmer has to do. This result complies with the findings of Aniedu[11] who reported the household size of the household supports farm labour thereby contributing to reducing costs. Whereas, it is creditable to note that in some instances, household sizes with many members may not certify increased productivity, in as much family labor which makes up most children of school age may constantly be in school. The result of education showed 18.3% of the respondents completed secondary

Table 1: Socioeconomic characteristics of the poultry farmers

Sex	F	%	Year of farming	F	%
Male	56	46.7	1-10	79	65.8
Female	64	53.3	11-20	26	21.7
Total	120	100	21-30	9	7.5
Age	-	-	31-40	6	5.0
15-25	2	1.7	Land obtained	-	-
26-35	14	11.7	House compound	15	12.5
36-45	46	38.3	Gift	23	19.2
46-55	26	21.7	Inheritance	27	22.5
56-65	21	17.5	Purchase	36	30.0
66-75	9	7.5	Cooperative	-	-
76	2	1.7	No	33	27.5
Mean	48	-	Yes	87	72.5
Marital status	-	-	Extension service	-	-
Single	8	6.7	No	33	27.5
Married	100	83.3	Yes	87	72.5
Divorced	1	0.8	Beneficiaries	-	-
Widow	9	7.5	No	60	50
Separated	2	1.7	Yes	60	50
Household size	-	-	Source of awareness	-	-
1-5	67	55.8	None	60	50
6-10	50	41.7	Fadama extension agent	6	5
11-15	3	2.5	Radio broadcast	1	0.8
Mean	5.4	-	Other (co) farmers	3	2.5
Education	-	-	Poultry's Group association	50	41.7
No formal education	22	18.3	What respondent benefitted	-	-
Primary	7	5.8	None	60	50
Secondary	22	18.3	Capital	2	1.7
OND/NCE	24	20.0	Feed	23	19.2
HND/University	45	37.5	Drugs	1	0.8
	-	-	Cage	16	13.3
	-	-	Point of lay	18	15

Source: Field Survey, 2022, F and %: Frequency and percentage, OND: Ordinary national diploma, NCE: National certificate in education and HND: Higher national diploma

school education, 5.8% completed primary school education, 20.0% completed an ordinary national diploma and National Certificate in Education, 37.5% completed Higher National Diploma while 18.3% of them have no formal education and therefore can neither read nor write. Technical and economic efficiencies are increased by educational attainments among farmers and no doubt help in their making decision, especially with respect to their well-organized allocation and use of resources. This corroborates with Matanmi *et al.*[12] who reported that transformation and innovation could be enhanced through education. A well-informed person could be easily changed because he/she is trainable. The mean farming experience for respondents was 20 years. This is an indication that the farmers could be portrayed as being skilled and are therefore expected to produce higher returns. This is the resultant effect of the fact that efficient use of scarce resources by small-holder farmers is enhanced by farming experience. The result is in agreement with the findings of the study carried out by Ezeh *et al.*[13] whose findings revealed that in order to increase their productivity, farmers count more on their experience than educational attainment as a result of the level of engagement in poultry production.

Factors determining access to the NG-CARES program by poultry farmers: As reported by Drukker[14], Probit and Logit (Logistic) regression coefficient shows signs of the partial effects of each stimulus variable on the response likelihood of the prediction and variable. Based on the findings, Logistic regression revealed that there are some values are significant and positive (Table 2). They are educational level, age, marital status, household size, poultry association and farming experience. Educational level, farming experience and marital status are positive and significant at 10%, age is positive and significant at 5%, while household size, as well as poultry association, is positive and significant at 1.0%.

Age: Logistic regression result indicated actual age of respondents significantly influences the probability decision to access and benefit from the NG-CARES Fadama program, which is a statistically significant 5% probability level. The result is very cheering as the farmers are still relatively active in the study area. It implies the odds are supposed to change by a factor of 0.934 for an additional increase in age, all other variables being constant.The estimated coefficient result for household size was discovered to be positive and statistically significant. This result means that respondents that have large family sizes probably have access to and benefit from the NG-CARES Fadama program. The odds of being employed decrease by a factor of 0.23 for each additional young child, all other variables remain constant. This finding is expected because large household size is among the major determinants of production in any farming activity. This suggests that more labour will be available and it is one of the essential indices affecting the decisions of households to raise poultry birds. The results of Olajide *et al.*[15] confirm this and revealed that as much poultry production involves the use of much labour intensive, unavailability of labour is one of the major production challenges in Ethiopia.

The result further implied that educated poultry farmers in the study area are likely to access the NG-CARES Fadama program. The result could be likened to the reality that educated farmer is exposed to and readily adapt to adopting new techniques or innovations and this will lead to greater profit. This resonates with Olajide *et al.*[15], who revealed that the participation of farmers in agricultural activities is influenced positively by education. The coefficient of experience of poultry farmers was positive and significant at a 1.0% level of probability. This is an indication that a positive connection exists between the poultry farming experience, access and use (benefits) of the NG-CARES Fadama program. This means that the more experience the respondents had will lead to accessing the NG-CARES Fadama program. This is consequent upon the fact that experience enhances the efficient use of scarce resources by small-holder

farmers. This outcome is in resonance with the results of Ezeh *et al.*[13] as they reported that in order to increase their productivity farmers count more on their experience than educational attainment as a result of their level of involvement in poultry production.

Moreover, the result establishes that membership in a poultry association significantly affects the probability of accessing the NG-CARES Fadama program. The coefficients revealed that respondents who belong to poultry cooperatives are likely to raise more poultry birds than those that do not. The major reason for this is that access to poultry associations assists small-scale farmers to support the acquisition of inputs and other production equipment, hence enhancing farmers to produce more. Thus, as farmers have access to poultry associations, they are more likely to produce market-oriented birds.

Effects of NG-CARES program on poultry farmer's profitability: The results in Table 3 indicated that NG-CARES beneficiaries had much more gross margin than non-beneficiaries, showing an N1,270,710.00 difference. This result confirms the findings of Benjamin *et al.*[16] which establish that credit improves the gross margins of the smallholder farmers.

Constraint militating against poultry production during the NG-CARES program: Table 4 is a presentation of the constraints faced as reported by the respondents. The result revealed that the major constraints faced by poultry farmers included the high cost of feed (50.8%), Medication (29.2%), capital

Table 2: Binary probit and logit regression result of factors determining access to the NG-CARES program by poultry farmers

		Binary probit result				Logistic result		
Variables	Coefficient	Std. Err.	p-value	Mfx	Odds ratio	Std. Err.	p-value	mfx
Age	-0.042	0.022	0.060**	0.060	0.934	0.0354	0.073*	0.074
Sex	-0.113	0.310	0.716	0.716	0.815	0.444	0.708	0.707
Marital status	0.394	0.238	0.098*	0.097	1.913	0.763	0.104	0.101
Household size	0.315	0.117	0.007***	0.007	1.677	0.344	0.012**	0.013
Total years (education) spent	0.118	0.069	0.091*	0.007	1.247	0.150	0.072*	0.071
Experience	-0.059	0.023	0.010*	0.010	0.905	0.0359	0.012*	0.012
Access to extension service	0.505	0.448	0.259	0.245	2.295	1.827	0.297	0.279
Poultry association cooperative	2.023	0.439	0.000***	0.000	34.877	30.089	0.000***	0.000
_cons	-1.934	0.843	0.000	-	0.0311	0.0475	0.023	-
No. of obs.	120	-	-	-	120	-	-	-
LR chi2 (8)	74.72	-	-	-	74.12	-	-	-
Prob>chi^2	0.0000	-	-	-	0.0000	-	-	-
Pseudo R^2	0.4491	-	-	-	0.4455	-	-	-
Log likelihood	-	-	-	-	-46.119397	-	-	-

***,**,*: Represents 1, 5 and 10% significant level, respectively Std. Err: Standard error, Mfx: marginal effects after regression and p-value: Level of significance

Table 3: Profitability of NG-CARES fadama farmers in poultry production

Variables	Beneficiary (N)	Non-beneficiary (N)
Birds (broiler+layers)	450,000.00	500,000.00
Labour	165,000.00	150000.00
Drugs	125,000.00	95000.00
Feeds	700,000.00	750,000.00
Total variable cost	1,440,000.00	1,495,000.00
Fixed cost	228,000.00	100,000.00
Total cost	1,668,000.00	1,595,000.00
Total revenue (TR)	2,950,290.00	4,148,000.00
Profit	1,282,290.00	2,553,000.00

Table 4: Distribution of constraints militating against poultry production during the NG-CARES program

Constraints	Frequency	%	Total
High cost of feed	61	50.8	120
Medication (drugs)	35	29.2	120
Capital	5	4.2	120
Theft	1	0.8	120
Predators	3	2.5	120
Government policies	15	12.5	120

Field survey, 2022

(4.2%), government policies (12.5%), theft (0.8%) and predators (2.5%) thereby reducing the poultry production. The main obstacle to efficient and sustainable production in the sector is the high price of inputs, particularly medication and feed. Poultry producers are not the only ones that confront this problem.

CONCLUSION

The NG-CARES program has demonstrated effectiveness in empowering the poultry farmers in Ifako Ijaye Local Government to better their livelihood. It is therefore realistic to state here that the NG-CARES Fadama program should be considered an effective mechanism for channeling development assistance. The study, therefore recommends that other agricultural projects to be implemented should take a cue from the NG-CARES Fadama program, the management and implementation process that is beneficial to the poultry association.

SIGNIFICANCE STATEMENT

Poultry has played a crucial role in advancing human prosperity in both social and economic senses since the beginning of civilization and the domestication of animals. Since then, poultry systems have undergone a significant transformation. In light of current global challenges like population growth, environmental change, the COVID-19 pandemic and the urgent need to ensure that everyone has access to wholesome food, managing sustainable livestock production is now more important than ever. The study thus provides real evidence of the impact of the NG-CARES program on the production the poultry farmers to know specific constraints the farmers are facing to serve as a guideline for the Government in replicating the program in other locations in the country.

REFERENCES

1. FAO, 2019. The Future of Livestock in Nigeria. FAO, Rome, Italy, ISBN: 978-92-5-131661-0, Pages: 46.
2. Arafat, S.M.Y., S.K. Kar, V. Menon, C. Kaliamoorthy and S. Mukherjee *et al*., 2020. Panic buying: An insight from the content analysis of media reports during COVID-19 pandemic. Neurol. Psychiatry Brain Res., 37: 100-103.
3. Hassan, T.A., S. Hollander, L. van Lent and A. Tahoun, 2019. Firm-level political risk: Measurement and effects. Q. J. Econ., 134: 2135-2202.
4. Suleiman, A., I. Bsisu, H. Guzu, A. Santarisi and M. Alsatari *et al*., 2020. Preparedness of frontline doctors in Jordan healthcare facilities to COVID-19 outbreak. Int. J. Environ. Res. Public Health, Vol. 17. 10.3390/ijerph17093181.
5. Gabriel, H.T.L. and C.M.C. Ho, 2020. Effects of the Coronavirus (COVID-19) pandemic on social behaviours: From a social dilemma perspective. Technium Social Sci. J., 7: 312-320.
6. Mazza, M., O.O. Ekumankama and C.A. Okezie, 2015. Effect of second national fadama development project on farmers productivity in Imo State, Nigeria. J. Nat. Sci. Res., 5: 69-74.
7. Joseph, O.O., 2019. Determinants of the socioeconomic profile of Fadama III project beneficiaries in three states of Niger Delta area of Nigeria. Int. J. Agric. Sci., 4: 29-34.

8. Tolles, J. and W.J. Meurer, 2016. Logistic regression: Relating patient characteristics to outcomes. JAMA, 316: 533-534.
9. Chiekezie, N.R., E.C. Nwankwo and M.U. Ozor, 2022. Analysis of small scale broiler poultry production in South East Nigeria, West Africa. Int. J. Anim. Health Livest. Prod. Res., 6: 1-16.
10. Agunloye, T.O., O.O. Fasina and O.M. Akinnagbe, 2017. Effects of national fadama III programme on the scope and scale of beneficiaries' farming activities in South West, Nigeria. J. Agric. Ext., 21: 79-90.
11. Aniedu, O.C., 2016. Socio-economic determinants of the adoption of improved yam production technologies in Imo State, Nigeria. J. Agric. Social Res., 16: 25-31.
12. Matanmi, B.M., A. Falola, J.O. Animashaun and T.O. Atanda, 2017. Effect of Fadama III program on dry-season vegetable growers in Kwara State, Nigeria. Kasetsart J. Soc. Sci., 38: 163-168.
13. Ezeh, O.C.K., C.I.C.O. Emerole and C.O. Anyiro, 2014. Comparative analysis of technical efficiency of small holder Fadama II and Fadama III cassava farmers in Imo State. Niger. J. Rural Ext. Dev., 8: 26-37.
14. Drukker, D.M., 2003. Testing for serial correlation in linear panel-data models. Stata J., 3: 168-177.
15. Olajide, B.R., R.O. Raheem and G.A. Oyedele, 2014. Livestock Fadama users' access to information on selected livestock technologies in Oyo Agricultural Development Programme (ADP) zone. Afr. J. Livest. Ext., 14: 48-52.
16. Benjamin, S. and D.E. Antwi, 2020. The effect of credit-use on the profitability of smallholder maize-farming in Ghana. Global Sci. J., 8: 1049-1067.