

EFFECT OF CONTRACT FARMING ON POULTRY FARMING HOUSEHOLDS FOOD SECURITY IN OSUN STATE, NIGERIA

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ABSTRACT

This study analyzed the effect of contract farming on food security of poultry households in Osun State, Nigeria. Primary data were used for the study and two stage sampling technique was used in selecting 180 households comprising of 90 contract and 90 non-contract farming households. A structured questionnaire was used for the purpose of extracting needed information from the farmers. Data were analyzed using Food Security Index, Propensity Score Matching and Likert scale. The results showed that the contract farming households were more food secured (76.9%) than the non-contract farming households (46.8%). The effect of contract farming on the households that participated shows that the calorie intake increased ($p < 0.05$) on the average by 1047 kCal/AE/day. This shows that the program has positive impact on the Target Group. The constraints to contract farming in the study area includes: Deferred payment on the part of contract firm, no reimbursement in case of production failure, bridge of agreement, biased terms, cheating, high defaulting rate. The study therefore recommends that there should be interest payment for delay in payment to farmers as part of the agreement to curb the issue of intentional delay of payment by the contracting firms and that agreement on risk sharing in case of failures in production should be included in the agreements so as to protect the farmer from being too vulnerable.

Key words: contract farming, poultry, food security

INTRODUCTION

The happiness of a nation is like a tree, farming is its roots, and commerce and industry are its branches and leaves. If the root is removed, the branches will die and the leaves fall off". That's how important agriculture is to any nation (Paddy, 2001). According to Agbor (2008), agriculture remains the single largest contributor to the Gross Domestic Product (GDP), employment and industrialization. The fundamental value of Agriculture in the development and growth of the Nigerian economy is indicated in its contribution to food security (Agbor, 2008).

Poultry production is one of the major subsectors of Nigerian agricultural industry. Poultry apart from supplying protein is also a good source of lipids and vitamins of high zoological value to man (Bamiro *et al.*, 2006). Animal protein is essential in human nutrition because of its biological significance. Due to the importance of animal protein, the various governments of Nigeria have been pursuing programs at national, state and community levels to boost the mass production of livestock products, to ensure the attainment of Food and Agriculture Organization

(FAO) recommendation of 3.5 g per caput of animal protein per day (Ojo, 2003). Despite all this efforts, poultry production in the country has still not been able to meet up with the demand of the teeming population. The local demand is about 1.5million metric tonnes while local farmers are producing 300,000 metric tonnes, creating a shortfall of 1.2 million metric tonnes of supply. This is because the sector is largely in the hands of small-medium scale farmers, who have a lot of challenges in accessing credit to boost their level of production and marketing of their output (Ijere, 1998). As a result, engage in contract farming with other firms to solve their production and marketing problems. Contract Farming can be defined as an agreement between farmers and processing and/or marketing firms for the production and supply of agricultural products under forward agreements, frequently at pre-determined prices (Eaton and Sherperd, 2011). It also refers to an agreement on agricultural production vis-à-vis buyers and farmers that institutes settings for the production and selling of farm house produce.

Generally, the farmers agree to deliver certain quantities of a specific product within a particular time frame and the buyer might also supply some inputs in return to the farmer. In Southern and Eastern Africa, contract farming is synonymously referred to as “Out grower Scheme” and can be used for several products (Guo, 2005).

Empirical studies in middle income economies give mixed investigations about the safety and membership outcome of contract farming (Bellemare, 2012; Guo, 2005). Although several authors still found out that partaking in contact farming increased farmers’ earnings (Barrett *et al.*, 2012; Bellemare, 2012; Warning and Key, 2002). However, many researchers recommended the inclusion of smallholder farmers in contract farming (Warning and Key, 2002). This is because majority of households in developing countries are food insecure, especially the rural farming households. Several evidences have suggested that majority of the world’s food insecure live and work in the rural areas (IFAD, 2001). This indicates that increasing income and livelihood of farmers through contract farming will go a long way to reduce food insecurity among smallholder farmers. Therefore, a study that examines the effect of contract farming on food security of farming households is pertinent.

The objectives of the study were to:

- ❖ examine the food security status of contract and non-contract poultry farming households;
- ❖ determine the effect of contract farming on food security of poultry farming households; and
- ❖ examine the constraints to contract farming among poultry farmers in the study area.

MATERIALS AND METHODS

Study Area

The study was carried out in Osun state. Osun state is an inland state in south-western Nigeria. Its capital is Osogbo. It is bounded in the north by Kwara State, in the east partly by Ekiti State and partly by Ondo State, in the south by Ogun State and in the west by Oyo State. The state consists of thirty (30) Local Government Areas and divided into three agricultural zones. It exhibits the typical tropical climate with prominent wet and dry seasons with fertile soil which encourages the production of crops and livestock. The rainy season generally occur between April and October while the dry season occurs between November and March. Osun State has tropical humid climate. The mean annual temperature for Osun State varies between 21.1 and 31.1°C. Annual rainfall is within the range of 1,000 mm in the derived savannah agro-ecology to 1,200 mm in the rainforest belt (OSSADEP, 2007).

Data and Sampling Techniques

The sampling frame used for selecting contract farming households was the complete list of contract farmers obtained from the Ministry of Agriculture through poultry association of Nigeria, Osun State chapter comprising 1200 farmers across the state as shown in Table 1. A two sampling technique was employed in selecting a total of 90 contract (Treatment group) and 90 non-contract (Control group) proportionately from Iwo, Osogbo and Ife agro-ecological zones of the state. The first stage was the purposive selection of the three agro-ecological zones in the state. The second stage was a proportional sampling of 180 respondents across the state.

Analytical Tool/Techniques

Food security index

The food security (Z) index as applied by Fakiyesi (2001) is given by the formula:

$$Z = \frac{Y_n}{R} \tag{1}$$

where Y_n is the n th household’s daily per capita calorie intake R is the recommended per capita daily calorie intake. Thus, $Z_n = 1$ for $Y_n > 1$ (i.e., food secure households) and $Z_n = 0$ for $Y_n < 1$ (i.e., food insecure households).

$$H = \frac{M}{N} \tag{2}$$

where H is the headcount ratio, M is the number of insecure household and N is the total sample. The nutrients content of both produced and purchased food items were used to derive calorie availability. A daily recommended level of 2470 kCal per capita and 65g protein per day defines the food security line, used in this study (Omotesho *et al.*, 2007).

Propensity score matching (PSM)

To compare the food security of contract and non-contract farming households in the study area, propensity score matching (PSM) method was used. The propensity score matching was estimated using Logit regression model and nearest neighbour matching algorithm was adopted using the estimated propensity scores to match non-contract to contract farming households.

Table 1: Proportional selection of farmers across Osun State

Agricultural Zone	Number of contract farmers (N)	Total number of selected farmers (n)
Iwo	420	63
Osogbo	500	75
Ife/Ijesha	280	42
Total	1200	180

Source: Field Survey, 2018

Propensity Score Matching (PSM) addresses the differences in groups prior to treatment by reducing the total collection of observed pre-treatment covariates into a single composite score that is then used to create a comparison group that is similar to the treated group with respect to observed covariates. Propensity Score Matching was first established in the seminal paper by Rosenbaum and Rubin (1983).

Average treatment effect on the treated assessed the impact of contract farming on food security of poultry farming households. The average treatment effect on the treated (ATT) was estimated using:

$$ATT = E Y_1(| P = 1) - E Y_0(| P = 0);$$

where p refers to participation in contract farming (with $p = 1$ for poultry farmers practicing contract farming, and $p = 0$ for poultry farmers not practicing contract farming), Y_1 is outcome (food security of poultry farming households practicing contract farming); and Y_0 is outcome of the non contract farming households. The difference in outcomes between the two matched groups can be interpreted as the impact of contract farming on the poultry farmers (Smith and Todd, 2001).

RESULTS AND DISCUSSION

Table 2 presents the distribution of the basic food items consumed by poultry farmer's households.

Cereals together with root and tuber products accounted for 69.97% of the households' weekly calorie intake. This was followed by fats and oils with 12.84%, animal products with 4.03% while fruits and vegetables contributed 3.08% to the total weekly calorie intake among the rural households. This study also shows that contract farmers and non contract farmers household's had an average weekly expenditure of N7,333.39 and N4860.21 on food items. The result indicates that contract farming households consumes more food items than the non-contract farmers due to the benefit of contract farming which increase their daily food consumption.

Table 3 presents the food security status of contract farmers and non contract farmer's households. About 77% and 47% of the contract farmers and non contract farmer's households were food secure respectively. The mean daily energy and protein available to the food-secure households for contract farmers and non contract farmers are (17019.02 kCal and 418.59 g) and (13721.71 kCal and 324.63 g), respectively while the daily per capita energy for food insecure households for contract farmers and non contract farmers households are 3683.77 kCal and 2800.35 kCal, respectively which shows that contract farming was of great benefit to contract farming households which resulted in the increment their calorie and protein intake.

Table 2: Distribution of the basic food items consumed by rural households

Food items	Percentage calorie (100%)	Quantity consumed (kg) by contract farmers	Value (#)	Quantity consumed (kg) by non-contract farmers	Value (#)
Rice	11.58	3.56	550.00	2.98	549.00
Sorghum	6.79	2.12	78.26	2.00	76.26
Maize	7.72	2.23	91.60	2.45	97.60
Cowpea	9.69	3.36	436.20	3.03	423.20
Garri	7.77	2.56	189.50	3.08	220.50
Cassava flour	4.47	1.41	65.60	1.65	71.60
Yam	9.30	9.22	547.05	7.44	521.05
Yam flour	12.65	4.65	672.68	2.55	389.68
Meat	1.74	0.89	480.50	0.31	191.50
Fish	1.68	1.41	399.00	0.98	261.00
Egg	0.43	0.75	185.50	0.43	125.50
Milk	0.18	0.14	145.00	0.08	80.00
Palm oil	9.56	1.15	275.00	0.50	119.00
G/nut oil	3.28	0.45	110.80	0.41	98.80
Orange	0.48	1.30	130.00	0.72	70.00
Okra	0.19	0.27	38.79	0.25	32.79
Tomato	0.08	2.16	251.60	2.20	280.60
Onion	0.48	0.85	71.60	0.75	60.40
Vegetable	0.42	1.97	75.80	1.58	54.80
Melon	0.80	0.12	44.60	0.08	30.58
Pepper	0.63	0.61	119.68	0.65	126.70
Sugar	1.39	0.40	62.98	0.44	68.00
Bread	2.40	1.25	315.00	0.67	157.00
Others	6.29	4.70	1996.65	2.23	754.65
Total	100	46.63	7333.39	37.46	4860.21

Source: Field Survey, 2018

Table 3: Food security status of poultry farmer’s households

	Contract farmers		Non Contract Farmers	
	Food secure	Food insecure	Food secure	Food insecure
Household percentage	76.9	23.1	46.8	53.2
Mean adjusted household size	4.62	5.10	4.90	5.41
Household daily energy availability (kCal)	17019.02	10980.3	13721.71	10901.96
Household daily per capita energy	3683.77	2153.0	2800.35	2015.15
Household daily protein availability (g)	418.59	230.52	324.63	229.82
Household daily per capita protein availability	90.60	45.20	66.25	42.48
Head Count Ratio	0.769	0.231	0.468	0.532

Source: Field Survey, 2018

Impact of Contract Farming on Food Security of Contract Farmers

The result reveals that average treatment effect on the treated (ATT), which measures the impact of contract farming on the households of the poultry farmers that benefitted shows that their calorie intake increased on the average by 1047 kCal/AE/day as a result of participating in contract farming. The increase in the calorie intake of the beneficiaries was significant at 1%. This shows that the program had positive impact on the food security of the beneficiaries.

Average treatment effect of the program on the untreated (ATU) shows that if the non-participant had participated in contract farming, the improvement in their calorie intake would have been increased by 735 kCal/AE/day while Average Treatment Effect (ATE)

shows that if a respondent was to be picked randomly, the calorie intake would increase by 1021 kCal/AE /day, since ATT is greater than both ATU and ATE then it implies that contract farming has a positive impact on the calorie intake of the food security of the households of poultry farmers in the study area .

Constraints to the Contract Farming

Table 4 presents the distribution of contract farmers according to the constraints faced. Deferred payment on the part of contract firm that comes to buy the birds produced was the most severe constraint by the farmers, no reimbursement incase of production failure, bridge of agreement, biased terms, cheating, high defaulting rate were other constraints by the contract farmers.

Table 3: Treatment table

Variable	Sample	Treated	Control	Difference	S.E.	T-Stat
Food Security	Unmatched	1484.142	851.832	632.310	6749.3833	3.54***
	ATT	2892.196	1845.746	1047.045	8450.6160	3.39***
	ATU	2100.567	1365.178	735.390	-	-
	ATE			1021.646	-	--

Source: Field Survey, 2018; *** indicate the coefficients are statistically significant at 1% level. T-values are based on Bootstrapped standard error. ATT is average treatment effects on the treated, ATU is average treatment effect on the untreated and ATE is average treatment effects.

Table 4: Constraints to the contract farming

Constraints	Not severe	Mild	Severe	Very severe	Mean	Rank
No reimbursement for production failure	10	20	66	192	3.20	2 nd
Deferred payment	5	32	72	256	4.06	1 st
Bridge of agreement	8	72	63	100	2.70	3 rd
Cheating	20	24	84	44	1.91	5 th
Biased terms	28	78	63	36	2.27	4 th
High defaulting rate	18	54	36	12	1.33	6 th

Source: Data analysis, 2018

CONCLUSION AND RECOMMENDATION

This study contributes to the scarce empirical evidence on contract farming in southwest Nigeria using a case study of poultry farming households. Participation in contract farming, lead to an increase in the food security of the farmer's households. Thus, this research has contributed in supporting empirical evidence on contract farming as a strategy for farmers to realize welfare gains from their production. Based on the findings of the study, the following recommendations have been put forward:

- There should be an agreement on risk sharing in case of failures in production so as to protect the farmer from being too vulnerable.
- Appropriate policy should be put in place by government to back up farmers involved in contract farming and also protect the interest of contractors to avoid default in meeting the terms and condition of the contract.

REFERENCES

- Akanbi G.O. and Alayande E. (2011). Home grown school feeding and health program in Nigeria: an innovative approach to boosting enrolment in public primary schools – a study of Osun State 2002–2010. *The African Symposium: An Online Journal of the African Educational Research Network*, **11** (2), 20-28
- Bamiro O.M., Phillip D.O.A. and Momoh S. (2006). Vertical integration and technical efficiency in poultry (egg) industry in Ogun and Oyo State, Nigeria. *International Journal of Poultry Science* **5** (12), 1154-1171
- Barrett C.B., Bachke M.E., Bellemare M.F., Michelson H.C., Narayanan S. and Walker T.F. (2012). Smallholder participation in contract farming: comparative evidence from five countries. *World Development*, **40**, 715–730
- Clover J. (2003). Food Security in Sub-Saharan African. *African Security Review* 12(1)
- Eaton C. and Shepherd A.W. (2001). Contract farming: Partnership for growth. *Agricultural Bulletin*, Volume 145, available at www.google.com/books
- FAO (2006). The State of Food Insecurity in the World. Food and Agriculture Organization of the United Nations. Viale delle Terme di Caracalla, 00153 Rome, Italy
- FAO (2010). Global Hunger Declining but Still Unacceptably High: International Hunger Targets Difficult to Reach. Economic and Social Development Department September 2010. Rome: FAO
- Global Hunger Index Report (2012). The Challenge of Hunger: Ensuring Sustainable Food Security under Land, Water and Energy stresses. IFPRI, Concern Worldwide, Welthungerhilfe and Green Scenery: Bonn / Washington, DC / Dublin October 2012
- Grantham-McGregor S.M. and Ani C. (2001). A review of studies on the effect of iron deficiency on cognitive development in children. *Journal of Nutrition*, **131**, 649-68
- Guo H. (2005). An analysis of the influencing factors of Chinese farmers' participation in contract farming. *Chinese Rural Economy*, **3**, 24-32
- Ijere M.O. (1998). Agricultural credit and economic development. *European Journal of Social Science Readings in Agricultural Finance*, **7** (2), Euro Journals, Inc. England
- Isaac O.A. (2009). Ensuring Food and Nutrition Security in Rural Nigeria: An Assessment of the Challenges, Information Needs, and Analytical Capacity. National Strategy Support Program (NSSP) Background Paper No 007, Abuja IFPRI
- Maziya-Dixon B., Akinyele I.O., Oguntona E.B., Nokoe S., Sanusi R.A. and Harris E. (2004). Background. Nigeria food consumption and nutrition survey, summary, IITA, Ibadan, Nigeria. pp. 9
- Ojo S.O. (2003). Productivity and technical efficiency of poultry egg production in Nigeria. *International Journal of Poultry Science*, **2** (6), 459-464.
- Okolo D. (2009). Regional Study on Agricultural Support, Nigeria's Case. FAO. <http://www.fao.org/tc/tca/work05/nigeria.pdf>.
- Olusanya J.O. (2010). Assessment of the food habits and school feeding program of pupils in a rural community in Odogbolu Local Government Area of Ogun State, Nigeria. *Pakistan Journal of Nutrition*, **9** (2), 198-204
- Paddy A. (2001). "Poultry Business Heads for Doom" *Nigeria Agricultural Magazine*, Nov/Dec
- Pollitt E. (1995). The relationship between undernutrition and behavioral development in children. A report of the International Dietary Energy Consultative Group (IDECG) workshop on malnutrition and behavior, Davis, California. December 1993. *Journal of Nutrition*, **125** (8 suppl): 2211S-2284S.
- Warning M. and Key N. (2002). The social performance and distributional consequences of contract farming: An equilibrium analysis of the Arachide de Bouche Program in Senegal. *World Development*, **30** (2), 255-263