

Original Research Article1
23 **AGRICULTURAL PRODUCTION ACTIVITIES, PROFIT EFFICIENCY NEXUS**
4 **LIVELIHOOD DIVERSIFICATION AMONG PUBLIC SERVANT HOUSEHOLDS**
5 **IN KWARA STATE NIGERIA**6 **Abstract**

7

8 Agricultural production activities are gradually becoming important livelihood diversification
9 among urban and peri-urban households whose main occupation is public service. The study
10 focuses on livelihood diversification through agricultural production activities among public
11 servants in Kwara State, Nigeria. Both primary and secondary data (production records) were
12 collected. Three hundred and thirty public servants comprising 150 fish farmers, 60 broiler
13 farmers and 120 arable crop farmers were randomly selected through field survey with the aid
14 of structured questionnaire. Data collected were analyzed using Herfindahl-Hirshman index
15 (HHI), net margin and stochastic frontier profit function regression analysis. Fish, broiler and
16 arable crop production were profitable with mean profit of ₦132,260 per 1000 fingerlings,
17 ₦912 per bird and ₦89,564 per ha and mean profit efficiency of 72.6%, 74% and 68%
18 respectively. The HHI of diversity revealed a significant level of income diversification to
19 agricultural production activities. These contributed about 40%, 36.5% and 29% to total
20 household income of public servants who engaged in fish farming, broiler production and
21 arable cropping respectively. Public servant farmers should form a formidable group to enjoy
22 economic of scale to purchase agricultural inputs and should be given adequate training
23 through their cooperative by inviting resource personnel.

24 **Keywords:** Urban households, agricultural activities, public servants, livelihood
25 diversification

26 **INTRODUCTION**

27 Agriculture is sub-divided into crop, livestock and fishery sub-sector. It is dominated in
28 Nigeria by small scale farmers who produce about 80% of the total food requirement but
29 offers a strong option for spurring growth, overcoming poverty, and enhancing food security
30 [1]). However, recent studies [2, 3, 4 examining agricultural drive in Nigeria found out that
31 the urban and peri-urban households are gradually diversifying to agricultural production
32 activities notably homestead livestock, homegrown crop and fish farming. This connote that
33 urban households has embrace many aspect of agriculture.

34 Although, Nigeria fishery production system was dominated by artisanal fishery sub-sector, it
35 is already operating at its output frontier which culminates in fish supply-demand deficit.
36 There is very little or no scope to increase the supply of fish especially from artisanal fishery
37 to meet the growing demand for fish protein required for its ever increasing population. The
38 expansion in brackish, coastal and inland water fishery, which was a major source of local
39 fish production growth till year 2000s has reach climax and started to decline thereafter [5].
40 Fish farming is expanding rapidly throughout the world and has a high potential for the
41 provision of valuable protein in less developed countries, especially Nigeria. It has been
42 projected that aquaculture production can increase fish production by 50 million metric tons
43 by 2050 [6].

44 Closely related to fish farming, poultry also serves as important source of animal protein and
45 has certain advantages as a means of bridging the protein demand-supply gap amongst
46 Nigerians. Apart from poultry and fish products, other sources of animal protein in Nigeria
47 are ruminants, piggery, snails and rabbits. However, ruminants are poor candidates for rapid
48 short-term increases in number. This is due to their low fecundity, long gestation and long
49 generation interval [7]. It is known that piggery multiply rapidly within a relatively short-time
50 with gestation period of 114 days. Unlike pork that has no national spread due to religious
51 beliefs, there are virtually no taboos that hinder the consumption of both poultry meat or eggs
52 [7] and fish products. Hence, both fish farming and poultry production has long been
53 recognized as one of the quickest ways of rapid increase in protein supply in the short-run.
54 Therefore, the need to meet animal protein requirements from domestic sources demands
55 intensification of production of fishes and poultry derived from prolific animals like poultry
56 birds and aquatic fish.

57 Furthermore, urban households including public servants also engage in vegetable production
58 in form of *Vernonia amygdalina* (bitter leaf), *Talinum triangulare* (water leaf), *Spinacia*

59 *oleracia* (spinach), *Amaranthus spinosus* (green amaranth), *Citrullus lanatus* (watermelon),
60 *Abelmoschus esculentus* (okra), *Lycopersicum esculentum* (tomatoes), *Lactuca sativa*
61 (lettuce), *Telfairia occidentalis* (pumpkin), *Citrullus lanatus* (watermelon) and *Capsicum*
62 *annuum* (pepper). Though, vegetable growing are diverse, complex and management intensive,
63 it raised the income of the farmers and reduce challenges of dry season unemployment.
64 Along with fruits and nuts, vegetables and melons have long been recognized as vital
65 components in the nutritional health and well-being of any nation [8]. Spurred largely by
66 irrigation potential of the State, demand by both rural and urban households, health and diet
67 concerns of Nigerian citizens and lack of storage facilities, increases in vegetable
68 consumption are daily expected [3].

69 **Problem Statement**

70 Global economy recession indicates the need for urban households' especially public servants
71 to diversify their income sources by combining primary earning and non-wage activities to
72 sustain their livelihoods. Incomes from non-wage source are increasingly becoming a
73 supplementary to urban households' income for public servants who reside in urban centres
74 in many parts of Nigeria. Weekly wages and monthly income is the most essential component
75 of public servant households' income. However, of recent this income exhibits a high
76 irregularity and outcomes are thus uncertain, because of drastic reduction in allocation from
77 Federal Government and global economic recession. Thus, many government establishments
78 at the three tiers are indebted to their employees running to months. Consequently, many of
79 these civil servants partly allocate their leisure time, off days and vacations to activities
80 which provide a supplementary income so as to cope with adverse shocks. Livelihood
81 diversification activities have become an important income-generating strategy for both urban
82 and rural small farm households throughout the developing world including Nigeria.
83 Diversification refers to the expansion of the range of activities outside their primary or main

84 occupation [9] and is seen as a dynamic adaptation process created through pressures and
85 opportunities [10]. Diversification may occur as a deliberate household strategy or as an
86 involuntary response to crisis; and can be used both as a safety net for the poor or as a means
87 of accumulation for the rich [11]. Evidence from literature [12, 13, 9] revealed that there has
88 been an increasing livelihood diversification to agriculture among urban and peri-urban
89 people including public servants. Most income diversification strategy are driven by socio-
90 economic objectives largely, nutrition improvement of rural and urban communities,
91 generation of additional family income, creation of employment and diversification of
92 income generating activities.

93 According to [10], participation in multiple activities by urban and farm (rural) families is not
94 new or only confined to the rural sectors of developing countries. Most rural and urban
95 families have truly multiple income sources which may indeed include off-farm wage work
96 in agriculture and wage from non-farm activities, rural non-farm self-employment, trading
97 and remittances from urban areas and from abroad [14]. Lately, many urban and rural
98 households including public servants play a significant role in the service sector mostly
99 casual labour in industries, craft, artisan work and, public and private institutions located near
100 their villages during the off-days, vacations, off-farm season to get work for sustaining their
101 livelihood such as cushion food shortage experienced by the households or settle domestic
102 obligation and buy back some inputs needed for farming operations [9]. It is obvious that
103 involvement of public servants in agricultural production has multiplier effects on both micro
104 and macroeconomic in Nigeria. For instance, such engagement could increase household
105 income and consumption of such produce which improves access to better nutrition, increase
106 self-sufficiency and promote overall agricultural development and productivity.

107 Considering the growing importance of the supplementary occupations among wage earners
108 in Nigeria, the study therefore, intends to estimate the profitability and determine profit

109 efficiency of agricultural production activities among public servant households and to what
110 extent has this livelihood strategies improved the well-being of their households in Kwara
111 State, Nigeria.

112 **MATERIAL AND METHODS**

113 **The study Area and Data collection**

114 The study was conducted in 2015 among public servants in Kwara State, Nigeria. The State is
115 located between latitude 7° 45' and 9° 30' N and longitude 2° 30' E and 6° 25' E with a land
116 mass covering about 32,500 square km. With an estimated population of about 2.4 million
117 people [15], the State's population was projected in 2016 to be about 3.17 million
118 representing 3.2% annual growth rate and an average density of ninety eight persons per sq.
119 km. Primary data were collected from public servants (workers) through interview and
120 structure questionnaire which was subjected to a pre-survey and secondary data through
121 production records. Three sets of questionnaire were administered to civil servants based on
122 the farming enterprise: Fish farming, broiler production and arable/vegetable crop farming.

123 **Sampling Procedure, Sampling size and analytical techniques**

124 Multi-stage sampling procedure was used to select the three categories of agricultural
125 production activities engaged in by public servants. The lists of public servants who engage
126 in the three farming enterprises were sought from the 16 Local Government Area (LGAs) and
127 random sampling resulted in 180, 60 and 120 fish farmers, broiler production and vegetable
128 farmers respectively.

129 Herfindal index, farm budgeting and stochastic frontier models were employed to analyze the
130 data. The Herfindahl-Hirshman index measures the number of income sources or the level of
131 income diversification. A value of one indicates complete dependence on a single income
132 source while a value of $1/k$ represents perfectly equal earnings across income sources, where
133 there are k different income source categories analyzed [16]. Other studies use the inverse of

134 the Herfindahl index [17] because it measures not only the number of income sources but
 135 also the evenness of income shares, with the parameter determining the weight of the number
 136 of sources versus evenness in the distribution of shares.

137 The stochastic frontier profit function was defined as:

$$\pi_i = f(X_i; \delta) + \varepsilon_i \tag{1}$$

138 Where π normalized profit of the i th farms is, X_i is a vector of inputs used by farm i , and ε_i is
 139 a “composed” error term. The error term ε_i is equal to $v_i - u_i$. The term v_i is a two-sided
 140 ($-\infty < v_i < \infty$) normally distributed random error ($v \sim N[0, \sigma_v^2]$) that represents the
 141 stochastic effects outside the farmers’ control. The term u_i is a one-sided ($u_i \geq 0$) efficiency
 142 component that represents the technical inefficiency of farm. The distribution of the term u_i
 143 can be half-normal, exponential, or gamma and half-normal distribution ($u \sim N[0, \sigma_u^2]$) is used
 144 in this study. The two components v_i and u_i are also assumed to be independent of each
 145 other according to [18].

146 Empirical model specification for the determinants of profit efficiency was as follows;

$$\ln \pi_i = \beta_0 + \beta_1 \ln X_{1i} + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \beta_4 \ln X_{4i} + \beta_5 \ln X_{5i} + V_i - U_i \tag{2}$$

147 Where: π_i = Profit of the i th farmers (₦); X_{1i} – X_{5i} were defined in the results, and subscript i
 148 refer to the observation of i th farmers; \ln = Logarithm to base e . The inefficiency effects, V_i
 149 is a random error term assumed to be independently and identically distributed as $N(0, \sigma_v^2)$.
 150 U_i represents profit inefficiency and is identically and distributed as a truncated normal with
 151 truncations at zero of the normal distribution [19]. The U_i is defined as:

$$u_i = \omega_0 + \omega_1 Z_1 + \omega_2 Z_2 + \omega_3 Z_3 + \omega_4 Z_4 + \omega_5 Z_5 \tag{3}$$

152 Where: U_i = technical inefficiency of the i th farmers; Z_1 - Z_5 were defined in the results

153 A Foster-Greer-Thorbecke (FGT) index was used to determine the influence of income with
 154 or without agricultural earning on welfare of public servants given as:

$$158 \quad p_{ai} = \frac{1}{n} \sum_{i=1}^q \left(\frac{z-y_i}{z} \right)^\alpha \quad (4)$$

159 Where: P_{ai} is the threshold index for the i^{th} sub-groups, n is the total number of households,
 160 Y_i is the per adult equivalent income of i -th households, z is the poverty line, q is the number
 161 of the sampled household population below the poverty line and α is the aversion to poverty
 162 it ranges from 0 to 2 [20].

163 **RESULTS AND DISCUSSION**

164 **Returns in fish farming of public servants**

165 The results of net margin and profitability analysis are presented in Table 1. The study
 166 confirmed that public servants engaging in agricultural production activities were not only
 167 satisfying the household's food need or subsistence, but also interested in selling their outputs
 168 to raise income. Thus, the farmers like any other entrepreneur had a profit motive. Therefore,
 169 efforts were made to determine the costs associated with farm enterprises and also revenue
 170 that accrues to their efforts. Both the variable and fixed costs of production were considered,
 171 because the bulk of farmers acquired homestead building, pond, pumping machine and a few
 172 of them dug boreholes.

173 The result revealed the average net returns of ₦132,260 per 1000 fingerlings invested with
 174 profit margin of about 26.5%. This implies fish that farming venture among public servants in
 175 Kwara State is profitable. The level of profit could be bridged up and perhaps, doubled
 176 (₦260,520) if the production season is repeated twice in a year as study found out that most
 177 of the fish reach table size or are sold in about 6 months of production. It suffices to note that
 178 variable cost (97%) carried the larger portion of total cost; cost of feed accounted for 71.7%
 179 and 70% of total variable cost and total cost respectively.

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185 **Table 1:** Costs and return estimate of homestead fish farming of public servants

Variables	Input-output items	Value (₦)	% of TVC	% of TC
A. Variable costs	1,000 Fingerlings/juvenile	30,000.3	8.39	8.15
(VC)	Feeds	256,320.9	71.73	69.66
	Chemicals: lime & fertilizers	5,650.5	1.58	1.54
	Drugs and anti-stress	4,570.0	1.28	1.25
	Cost of water pump (L)	27,640.4	7.73	7.51
	Hired labour	18,000.0	5.04	4.89
	Family labour	12,000.0	3.36	3.26
	Transportation cost	3,170.0	0.89	0.86
Total VC		357,352.1	100.0	97.11
B. Fixed costs	Pond	1,250.0	11.76	0.34
(depreciated)	Homestead building	1,758.0	16.54	0.48
	Pumping machine	3,509.7	33.03	0.95
	Pond excavation	2,250.0	21.17	0.61
	Miscellaneous expenses	1,860.0	17.50	0.50
TFC		10,627.7	100.0	2.89
C. Total TC		367,979.8		100.0
D. Revenue				
Unit price	1kg	520.0		
Average loss	Cannibalism & diseases: 38	19,760.0		
Average gain	Mostly Clarias: 962	500,240.0		
Total revenue		500,240.2		
Net margin		132,260.2		
Profit margin		26.44%		
Production period	6 months			

186 **Source:** field survey, 2014/2015

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188 **Profitability Analysis of broiler production of public servants**

189 The results of net farm income and profitability analysis of broiler are presented in Table 2.

190 Majority of the respondents (95%) were interested in selling their outputs to raise additional

191 income. The result revealed that the gross margin and net farm income per bird was ₦886

192 and ₦750 as well as profit margin and return on investment (ROI) of 45% and 1.8

193 respectively. The net margin analysis has shown that poultry production among public

194 servants is profitable. However, it is pertinent to show that both price of chick stock and cost

195 of feed account for about 70% and 60% of total variable cost and total cost respectively.

196 Furthermore, the variable costs gulped about 85% of total cost of broiler production. The

197 results are comparable to studies by [21, 22] that reported that broiler production are

198 profitable in Pakistan and Ondo State respectively.

199 **Table 2:** Average Cost and Returns of broiler production of 100 broilers

Variables	Values (₦)	% TVC or FC	% TC
A. Variable costs			
Price of chicks stock	21,000.0	27.6	23.4
Cost of feed	31,820.0	41.9	35.5
Cost of labour	11,000.0	14.5	12.3
Cost of vaccination	7,074.9	9.3	7.9
Cost of electricity	1,500.0	2.0	1.7
Other costs	3550.8	4.7	4.0
Total Variable Cost	75,945.7	100.0	84.8
A. Fixed costs			
Depreciation cost of poultry shed	7,250.5	53.3	8.1
Depreciation cost of other equipment	6,350.8	46.7	7.1
Total Fixed Cost	13,601.3	100.0	15.2
B. Total Cost (A + B)	89,547.0		100.0
Net Returns			
Quantity sold (broilers)	94		
Average loss	6		
Unit price	1750.5		
C. Total Revenue	164547.0		
Gross Margin	88601.3		
D. Net Farm Income (C-B)	75,000.4		
Profit margin (D/C*100)	45.6		

200 **Source:** Field Survey, 2014; production and financial records

201 **Profitability Analysis of vegetable production of public servants**

202 The results of gross and net margin analysis are presented in Table 3. The arable crop farmers
 203 are primarily interested in selling their outputs to raise income and probably satisfied the
 204 household's food need or subsistence. Thus, the farmers like any other entrepreneur may
 205 have a profit motive. The result revealed the average net returns of integrated crop farming
 206 was ₦75,000 per ha with profit margin of about 46%. This also implies that crop farming
 207 venture among public servants in Kwara State is profitable. The level of profit could be
 208 bridged up and perhaps, more than doubled if farmers combine rainfed and dry season
 209 irrigation. It suffices to note that variable cost carried the larger portion of total cost (86%);
 210 labour accounted for about 44% and 37% of total variable cost and total cost respectively.

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214 **Table 3:** Average costs and revenue per hectare of integrated arable crop production

Variables	Values (₦)	% TR	% TVC or FC	% TC
Revenue from(₦):				
leafy vegetables	89,750.09	48.2	-	-
Fruity vegetables	64,650.9	34.7	-	-
Other crops	31,800.0	17.1	-	-
A. Total revenue	186,200.99	100.0	-	
Variable cost (₦)				
Seedling materials	4,520.8	-	6.4	5.5
Fertilizer	13,704.3	-	19.3	16.5
Organic manure	10,834.7	-	15.2	13.1
Chemicals	3,762.8	-	5.3	4.5
Labour	31,000.7	-	43.6	37.3
energy	7,256.1	-	10.2	8.7
B. Total variable cost	71,079.4	-	100.0	85.6
C. Gross margin(A-B)	115,121.6	-	-	
Fixed cost items				
Land charges	5,000.0	-	41.7	6.0
Depreciation	6,984.5	-	58.3	8.4
D. Total Fixed Cost	11,984.5	-	100.0	14.4
E. Total costs (B+D)	83,063.9	-	-	
F.Net margin/ha (A-E)	103,137.1	-	-	
Profit margin (F/A)	0.55	-	-	

215 **Source:** Field survey, 2014/2015; *ROI indicate Return on Investment*

216 **Profit efficiency and its determinants among public servant farmers**

217 Table 4 showed the frequency distribution of the profit frontier model of agricultural
 218 production activities in Kwara State. The result of the profit frontier of fish farming revealed
 219 that the estimated coefficient of the parameters of cost of feed ($P<0.01$) and cost of
 220 fingerlings ($P<0.05$) were positive while cost of family labour ($P<0.01$) was negative. This
 221 showed that a unit increase in prices of the positive coefficient inputs will lead to increase in
 222 the net margin of fish production and vice versa. The mean profit efficiency shows that
 223 farmers are able to obtain about 0.79 of potential output from a given one unit mix of
 224 production inputs. Therefore the fish farmers can expand their output further by a relatively
 225 high margin of 0.21 by adopting more superior and improve techniques and technology by
 226 the best practised farmer to attain the profit efficiency of one. Similarly, cost of hired labour
 227 ($P<0.05$), cost of feed ($P<0.01$) and marginally, cost of vaccine and drug ($P<0.1$) were

228 significant inputs in broiler production. However, cost of family labour ($P < 0.05$), cost of
 229 organic manure ($P < 0.01$) and to a lesser degree, cost of chemical fertilizer ($P < 0.1$) were
 230 found to be significant variables in profit efficiency of arable farmers.

231 **Table 4:** MLE Results of Frontier Profit Function of agricultural production activities

Variables	β	Fish farmer	Broiler farmer	Crop farmer
Cost Function				
Constant	β_0	Coefficient (t-v) 0.321 (2.2**)	Coefficient (t-v) 0.099 (2.0**)	Coefficient (t-v) 0.607 (1.79*)
Cost of hired labour (X_1)	β_1	0.005 (1.2)	0.341 (2.2**)	0.219 (1.1)
Cost of family labour (X_2)	β_2	-0.542 (2.7***)	-0.007 (1.1)	0.693(2.0**)
Cost of feed (X_3)	β_3	0.861 (9.4***)	0.457(4.1***)	-
Depr. of capital items (X_4)	β_4	0.145 (0.88)	-0.002(0.68)	-0.329(0.59)
Cost of vac. And drugs (X_5)	β_5	-0.109 (0.78)	0.298(1.95*)	-
Cost of fingerlings ¹ or day old chicks ² or seed ³ (X_6)	β_6	0.519 ¹ (2.18**)	0.399 ² (2.90***)	0.027 ³ (0.32)
Cost of pesticide (X_7)	β_7	-	-	0.523(1.0)
Cost of chem. fertilizer (X_8)	β_8	-	-	0.276(1.74*)
Cost of organic Manure (X_9)	β_9	-	-	0.187(2.98***)
Cost of investment (X_{10})	B_{10}	0.427 (1.87*)	0.065(1.3)	0.004(0.43)
Inefficiency variable				
Constant	Z_0	0.410 (2.1**)	0.099 (1.50)	0.003 (2.9***)
Age	Z_1	0.04 (1.1)	0.061 (0.79)	0.205 (1.3)
Adjusted household size	Z_2	0.312 (1.04)	-0.402 (1.98*)	-0.005 (0.63)
Farming experience	Z_3	0.528 (1.0)	-0.207 (1.29)	0.284 (0.87)
Social organization	Z_4	-0.651(2.79***)	0.309 (0.73)	-0.056 (1.86*)
Credit	Z_5	-0.501(1.3)	-0.822 (4.9***)	-0.452 (2.0**)
Education	Z_6	-0.282 (4.7***)	-0.562 (2.8***)	-0.723 (8.1***)
Diagnostic Statistic				
Sigma-square (σ^2)		0.008 (1.90*)	0.206 (1.85*)	0.427 (3.9***)
Gamma (γ)		0.421 (2.4***)	0.311 (3.9***)	0.241 (6.0***)
Log likelihood function L/f		56.5	49.5	53.6
LR test		-142.7	132.9	93.0
Mean efficiency		78.5	73.0	64.9
No of observation		150	60	120

232 *Asterisk indicate significance ***1%, **5%, *10%*

233
 234 The inefficiency sources also in Table 4 showed cooperative membership and level of
 235 education were the significant factors affecting fish production, credit and education play a
 236 crucial role in both broiler and arable crop production thus, as these variables increase, the
 237 profit inefficiency of the farmer decreases. The distribution of profit efficiency estimates
 238 from the stochastic frontier model in Table 5 shows that both fish and broiler farmers'
 239 efficiency were concentrated in the range of 0.41-0.80 totaling 77.4% and 68% respectively.

240 However, arable crop efficiency of public servant farmers tilted averagely towards range of
 241 0.41-0.60.

242 **Table 5:** Distribution of profit efficiency estimates from the stochastic frontier model

Class	Fish farmer		Broiler farmer		Arable crop farmer	
	F	%	F	%	F	%
0.01-0.20	3	2.0	4	6.6	22	18.3
0.21-0.40	12	8.0	7	11.7	15	12.5
0.41-0.60	64	42.7	16	26.7	61	50.8
0.61-0.80	52	34.7	25	41.7	17	14.2
0.81-1.00	19	12.6	8	13.3	5	4.2
Total	150	100.0	60	100.0	120	100.0

243 Note:

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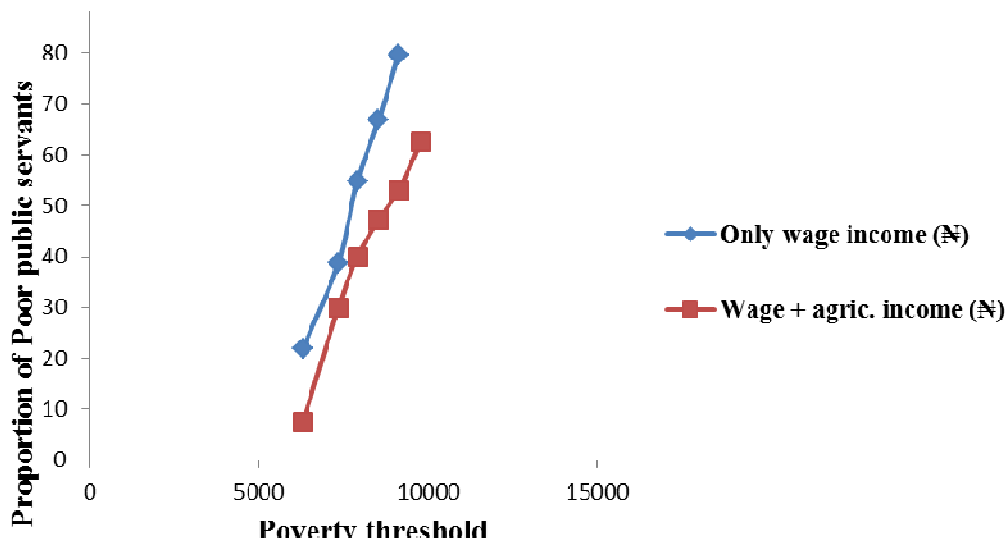
245 **Measuring livelihood diversification with and without agricultural income**

246 The Herfindahl-Hirshman index (HHI) of diversity revealed a significant level of income
 247 diversification to agricultural production activities. These contributed about 40%, 36.5% and
 248 29% to total household income of public servants who engaged in fish farming, broiler
 249 production and arable cropping respectively. Figure 1 presents the Cumulative Distribution
 250 Function (CDF) for households with and without access to agricultural income activities at
 251 different levels. The CDF of public servants households without access to agricultural income
 252 stochastically dominated the CDF of households with access to additional income. This
 253 shows that households with no access to farm income would have more poverty incidence,
 254 depth and severity than households with access to additional income over the range of the
 255 poverty line. The second order stochastic dominance also holds true.

256 **Implications of the Livelihood Diversification Strategy**

257 The result implies that agricultural production activities were profitable among public
 258 servants in Kwara State attesting to the fact that Nigeria has a huge agricultural endowment
 259 of human, materials and natural resources. Despite this, the nation faces a lot of challenges
 260 including that of attaining food security and self-sufficiency in virtually all food commodities
 261 which they have production comparative advantages. Engaging in agricultural production by
 262 urban and peri-urban households enables households to have diversified incomes, enhance

263 their food security, increase agricultural production and most importantly reduce shocks of
 264 unpaid salary and arrears. Thus, it is very important for adequate institutional framework to
 265 be put in place by all the three tiers of governments to encourage homestead agricultural
 266 production activities among public servants and urban households in general since such
 267 engagement could increase household income, consumption of such produce would improves
 268 access to better nutrition, increase self-sufficiency, create employment and promote overall
 269 agricultural development and productivity.



270

271 **Fig. 1:** Dominance analysis by level of Income Earned by Household Heads

272 **CONCLUSION AND RECOMMENDATIONS**

273

274 It could be concluded that proceeds from both farming units {net margins (profit)} has
 275 proved to be a strong relief in term of finance, employment and such household may likely
 276 not experience cycle of seasonal food shortage, experienced by majority of households in
 277 Nigeria, and, likely to overcome caloric and nutrition insufficiencies, and earned more and
 278 stable income to fulfill their domestic obligations. Urban farming households should form a
 279 formidable social organization to benefit from economy of bulk purchase of fish input supply,
 280 fish farm advisory services, increased access to micro-credit, and access to modern fish pond
 281 techniques. Production of quality and affordable inputs such as fish and poultry feeds, feed

282 pellets locally could spurs more people to invest in aquaculture and broiler production and
 283 reduce cost of production since most farmers depend on imported quality feeds which are
 284 expensive and not affordable. Finally, in view of the fact that urban households are now
 285 diversifying to agriculture suggests also that any agricultural policy or project aimed at
 286 improving the livelihood strategies and standard of living of the urban households should
 287 promote these agricultural activities in urban centres.

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