

Profitability and constraints of quail egg production in Southwestern Nigeria

Abstract

The study was conducted in Southwestern Nigeria, to analyze the Profitability and constraints of quail egg production in the study area. A multistage sampling technique was used in selecting 90 respondents used for the study. The data obtained were analyzed using descriptive statistics and budgetary analysis. The result indicated that majority (66.7%) of the respondents fall below the age of 50 years, 70% were male, 81.1% of the respondents were married. Considerable number of the quail farmer had post secondary education (86.70%). The result further revealed that 56.7% used cage system of production and 48.9% had between 2-4 years of rearing experience this signify that quail farming is a new enterprise in the area. On average quail farmer invest ₦471, 120.49 in the businesses with total revenue of ₦865,584.35 gross margin value of ₦406,202.23 and net farm income of 394,463.43. The result further stated that quails business was found to be profitable with Operation expenses ratio, rate of return to investment, benefit cost ratio and profitability index to be 0.53, 0.84, 1.84 and 0.46 respectively.

Constraints to quails farming in the study area includes: poor marketing, high cost of feeds, poor quality of day old chick/high mortality rate among others. The study recommended that any measures geared toward reducing the cost of feeds will increase their profit margin.

Government on her part are advise to assist research institutes to come out with breed of quail that are prolific and disease resistant also a good system of marketing should be established.

Key words: Quail eggs, cost and profitability of production, constraints of production in Nigeria

Introduction

In Nigeria, agricultural activities comprising crop production, forestry, livestock and fishery recorded an average annual growth rate of about 5.7% and has remained the dominant sector of the economy with 41% share of the real GDP during the period between 2006-2010. The sector's activities are largely informal and dominated by use of simple technologies (National Bureau of Statistics, NBS, 2013). In the last two decades it has employed nearly 60% of its workforce because over 80% of the country's population living in the rural areas are directly or indirectly dependent on agriculture, most especially crop production and livestock farming, for their livelihood (NBS, 2005).

Livestock sub-sector plays crucial roles in rural economy and livelihoods because it provides employment opportunities and income for the ever growing Nigerian population. It also serves as a good source of animal protein such as meat, milk and egg that are rich in the essential amino acids required for body functions. Among the various sub-sectors of livestock, poultry production stands as a major sector in the livestock industry in Nigeria (Ijaiya et al 2013).

Poultry are domesticated birds kept by humans for their eggs, meat and feathers; sometimes they are kept as pets. Poultry birds include chicken, turkey, duck, quail and geese. Ojo (2003) reported that poultry birds are good converters of feeds into usable protein in meat and eggs, the production cost per unit is low relative to other types of livestock and return to investment is high, thus farmers need just a small amount of capital to start a poultry farm. Poultry meat is very tender. Its palatability and acceptability to consumers is very high. It has a short

46 production cycle (payback period), hence capital is not tied down over a long period. Poultry
47 egg is of the major product of poultry production. Chicken egg which is the most nutritious
48 and complete food known to man is more easily affordable by the common man than other
49 sources of animal protein (Orji *et al* 1981). An average boiled egg cost about ₦20 or ₦30,
50 hence boiled eggs are being sold (hawked) freely at motor parks, railway stations, market
51 places, schools and roadsides in Nigeria (Ojo, 2003).

52 Rearing of domestic chickens has hitherto dominated the poultry sub-sector of Nigeria. In
53 recent times, there are new entrants into the sector; one of the birds slowly gaining
54 prominence is the quail bird. Quail birds are hardy birds which are suited for commercial
55 rearing for meat and egg production under intensive management (Egbeyaleet *al* 2013),
56 quails are small game birds that are used for eggs and meat (Daff, 2013). There are two main
57 kinds of quails suitable for breeding namely “Japanese” quail (*Coturnixcoturnix japonica*)
58 and the “American” quail (*Coturnixcoturnix*). Japanese quail are from pheasant family and
59 are migratory birds which migrate between Asia and Europe. The Japanese quail originally
60 became domesticated around the eleventh century as a pet song bird, but has increased in
61 value as a food animal (Kayangget *al.*, 1984; Crawford, 1990). Quail (*Coturnixcoturnix*
62 *japonica*) was introduced to Nigeria in 1992 by the National Veterinary Research Institute of
63 Nigeria (NVRI, 1994) in Vom, Plateau State. The consumption of quail eggs and meat, and
64 quail farming in general, has been promoted by this institute, the Nigerian Television
65 Authority (NTA) and some national daily newspapers, especially The Nigerian Tribune.
66

67 Quails have early sexual maturity resulting in a short generation interval, high rate of lay,
68 much lower feed and space requirements than the domestic fowl (Hemidet *al.*, 2010, Ijaiyaet
69 *al* 2013). *Coturnixcoturnix japonica* make excellent quail for beginners because they start
70 laying eggs at a young age of approximately six weeks (Chelmonskaet *al*2008) and reach
71 table size by five weeks of age. They thrive well in small cages and can be reared at a cheaper
72 cost within a relatively short time (Ojoet *al* 2011). Quails have no known morbid diseases
73 and are resistant to most poultry diseases except respiratory disorder with very low mortality
74 rate. Hence they require less vaccination, they have a high rate of egg production, between
75 200 – 300 eggs in 360 days (Oluwatomi, 2010). Japanese quail birds have the capacity to lay
76 24 eggs each in one month and 288 eggs in a year, their meat and eggs are renowned for their
77 high quality protein, high biological value and low fat content. thus choice meat for
78 hypertensive patients, people with stress problems, digestive disturbance, gastric ulcer, liver
79 problems, bronchitis, depression, panic and anxiety illness, for a greater positive effect
80 (Tuleunet *al* 2011). They are tastier than chicken,

81 The average egg from mature female weighs about 10grams and contains 158 calories of
82 energy, 74.6% water, 13.1% protein, 11.2% fat and 1.1% total ash. The mineral content
83 includes 0.59mg calcium, 220mg phosphorous and 3.8mg iron (Shim, 2005). The vitamin
84 content is 300 iu of vitamin A, 0.12mg of vitamin B1, 0.85mg of vitamin B2 and 0.10mg
85 nicotinic acid. Quail eggs are very rich in Vitamin D, antioxidants which according to Sahinet
86 *al.* (2008) improve the quality of food from animal origin in terms of colour, oxidative
87 stability, tenderness and storage properties. The nutritional value of quail eggs is 3 to 4 times
88 greater than that of chicken eggs (Tunsaringkamet *al* 2013). Quail eggs are also known to
89 stimulate growth, increase sexual appetite, stimulate brain functions which improve
90 intelligence quotient and generally rejuvenate the body. Consumption of quail eggs fortifies
91 the woman’s body during pre and post-natal periods as well as after surgery and radiotherapy
92 (Onyewuchiet *al* 2013). It also improves the quality of breast milk. Furthermore, quails are

93 used as experimental animals for biological research and for producing vaccines against
94 many diseases in large scale (Haruna *et al.*, 1997).

95 With the characteristics of quail **birds**, there are some challenges facing its production.
96 Bakojiet *al.* (2013) revealed some **constraints and mitigations** facing quail egg production
97 which include stock procurement, high cost of feeding, pest and diseases, poor market,
98 among others. Since the introduction of modern poultry in Nigeria decades ago, it has passed
99 through many stages of development, each with its problems (Aromolaran and Bamigbose,
100 1999). Inadequate information and background knowledge on the primary determinants of
101 market supply and demand of eggs make many prospective poultry farmers skeptical to
102 venture into the business (Adewuyiet *al* 2009).

103 This was affirmed by the findings of Adepoju (2008) that the several problems such as high
104 cost of feed, other production costs, diseases and marketing problems plaguing the poultry
105 production industry made it difficult for existing firms to expand while new ones were
106 reluctant to go into the business. Murtala (2004) observed that the price of egg does not vary
107 proportionately with the rise in prices of feed and the cost involved in commercial poultry
108 production enterprise. Moreover, in line with Onyenweaku and Effiong (2006) and
109 Ashagidigbiet *al* (2011), some of the major problems of poultry production in Nigeria is that
110 of low productivity and inefficiency in resource allocation and utilization. Improvement of
111 efficiency and productivity can be some of the most effective methods to achieve increase in
112 poultry production. Costs and returns are important considerations as they are used to evaluate
113 the efficiency or performance of the business. Sanni and Ogundipe (2003) suggested that
114 poultry farmers should pay particular attention to major cost components by seeking a way of
115 maximizing effectiveness, quality, method and utilization of materials.

116 With the profitability potentials and health benefits of quail birds and its products, a lot of
117 poultry farmers are yet to spring up with intensified husbandry while those in it are
118 contemplating whether to continue or not. Therefore, there is need to fill this knowledge gap
119 and widen the scope of study on quail egg production by analyzing the actual costs and
120 returns of this relatively underutilized poultry species called quail with the constraint
121 associated with its production.

122 It is against this background that this study examined the profitability of quail egg production
123 with factors that affect it in the southwestern part of Nigeria. This study was designed to
124 provide answers to the following research questions: what are the socio-economic
125 characteristic of the quail egg producers? what are the costs and returns of quail egg
126 production? and what are the constraints facing quail egg production?

127 The objectives of the **study are** to: describe the socio-economic characteristics of the quail
128 egg producers in the study area; describe the constraints that face quail egg enterprise in the
129 study area and to estimate the costs and returns of quail egg production.

130

131 **CONCEPT OF PROFITABILITY**

132 Profit is an excess of revenues over associated expenses for an activity over a period of time.
133 Terms with similar meanings include 'earnings', 'income', and 'margin'. Lord Keynes
134 remarked that 'Profit is the engine that drives the business enterprise'. Every business should
135 earn sufficient profits to survive and grow over a long period of time. It is the index to the
136 economic progress, improved national income and rising standard of living. No doubt, profit
137 is the legitimate object. Thus, profit is not just the reward to owners but it is also related with
138 the interest of other segments of the society. Profit is the yardstick for judging not just
139 **the economic**, but the managerial efficiency and social objectives **also**.

140 Profitability is the ability to make profit from all the business activities of an organization,
141 company, firm, or an enterprise. It shows how efficiently the management can make profit by
142 using all the resources available in the market.

143 However, the term 'Profitability' is not synonymous to the term 'Efficiency'. Profitability is
144 an index of efficiency; and is regarded as a measure of efficiency and management guide to
145 greater efficiency. Sometimes, the terms 'Profit' and 'Profitability' are used interchangeably.
146 But in real sense, there is a difference between the two. Profit is an absolute term, whereas,
147 the profitability is a relative concept. However, they are closely related and mutually
148 interdependent, having distinct roles in businesses (Harward & Upton 1961).

149 Profit refers to the total income earned by the enterprise during the specified period of time,
150 while profitability refers to the operating efficiency of the enterprise. It is the ability of the
151 enterprise to make profit on sales. It is the ability of enterprise to get sufficient return on the
152 capital and employees used in the business operation.

153 The Agricultural Marketing Resource Centre (AMRC) on its analysis of agriculture and rural
154 development defined profit as the excess of income over costs. Profitability was described as
155 the measure of the returns a business creates after deducting operating costs and other
156 expenses from income divided by inputs. Though determining profitability may be the most
157 challenging task, it is also a very rewarding part of a new agricultural enterprise. The use of
158 the income statement and sensitivity analysis helps to determine profitability of an enterprise.
159 An income statement measures profitability by recording the costs of production and the
160 value of production for a set period of time, usually a year (AMRC, 2013). Chase (2008)
161 noted that producers often try to maximize their income by selling produce directly to
162 consumers, a situation where the highest price of the product can be received. Even though
163 this strategy may allow producers to achieve the highest gross revenue, it may not yield the
164 highest profit because of the differences in transaction costs.

165 Profitability analysis is a common tool used by many managers of different enterprises to
166 make decisions on whether to embark on an enterprise or not. Many studies have been done
167 concerning profitability of different enterprises in different fields. Few studies was done on
168 profitability of quail egg production in Nigeria; For example, a study that was carried out on
169 the profitability of quail bird and egg production in Imo state by Onyewuchi *et al.* (2013)
170 suggested quail bird and egg production is a profitable business and greater profits could be
171 achieved by enlarging the scale of operation, also Bakoji *et al* (2013) revealed quail egg
172 production as a profitable business in Bauchi Local Government Area, Bauchi State, Nigeria

173 **The challenges of quail production in Nigeria**

174 In spite of the exceptional attributes and advantages of keeping Japanese quail, its production
175 in Nigeria is still comparatively rudimentary. Among the major challenges of quail
176 production in Nigeria are high cost of concentrates, non-readily available market when the
177 farmers are to sell their stock and inadequate knowledge and information about the
178 advantages of eating quail meat and egg. Domesticated quail do not have the tendency for
179 brooding and hence eggs must be incubated under broody hen or by artificial incubation
180 (Naibi *et al* 2009). However, because of their short generation interval and an average
181 production of 250 – 280 eggs per bird yearly, artificial incubation is the surest choice for
182 commercial farmers. The high proportion of eggs discarded due to infertility and embryonic
183 mortality in hatcheries have been associated with low quality facilities and poor incubation
184 techniques (Chang *et al* 2001). Little is known about the factors that affect the fertility and
185 hatchability of quail eggs (Abatcha *et al.*, 2008). However, it is reasonable to expect that

186 many of the common factors known to influence incubation success in eggs of commercial
 187 poultry may likely affect quail eggs hatchability (Gonzalez *et al.*, 1999).

188 **Methodology**

189 The study was carried out in the southwestern region of Nigeria. The southwestern Nigeria comprises
 190 of Oyo, Osun, Ogun, Ondo, Ekiti and Lagos States. The zone lies between longitude 2° 42' and 6° 03'
 191 East of Greenwich meridian and latitude 5° 49' and 9° 17' North of the Equator (Balogun, 2003). The
 192 region is bounded in the North by Kwara and Kogi States and in the East by Edo State. In the West,
 193 the study area is bounded by the Republic of Benin and in the South by the Atlantic ocean. The four
 194 main agricultural zones in the region are the swamp on the Atlantic coast, tropical rainforest, the
 195 derived savannah in the middle and the guinea savannah in the North. Quail egg production is new in
 196 the region. The study employed multistage sampling technique with the first stage involving the
 197 purposive selection of three States from the study area based on prior survey on their quail egg
 198 production potentials through the Poultry Farmers Association and the National Veterinary Research
 199 Institute (NVRI) Ikire, Osun State. At the second stage, six Local Government Areas (LGAs) were
 200 purposively selected from each State based on their quail egg production. At the third stage, five quail
 201 egg farmers were selected from each LGA using snowball technique to have a total of ninety
 202 respondents.

203 Pretested structured questionnaire was used to collect data from the quail farmers, data
 204 collected included socio-economic characteristics of the farmers, price and quantity of inputs
 205 used and output produced and also problems associated with quail egg production. Data were
 206 collected from April to September 2015. Descriptive statistics was used to describe socio
 207 economic characteristics and also identify production constraints. A budgetary analysis was
 208 used to determine the profitability of production.

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210 **Results and discussion**

211 Table 1: Socio-economic characteristics of quail egg farmers in the study area.

Characteristics	Frequency	Percentage	Mean
Age(years)			
≤ 30	13	14.5	45.36
31-40	20	22.2	
41-50	27	30.0	
51-60	19	21.1	
> 60	11	12.2	
Marital status			
Married	73	81.1	
Single	12	13.3	
Widowed	5	5.6	
Sex			
Male	63	70.0	
Female	27	30.0	
Household size			
≤ 5	56	62.0	4.82
6-10	32	35.6	
>10	2	2.2	
Level of education(year)			
5	5	5.6	16.90
< 6	7	7.8	
7-12	52	57.8	

13-18 19-24	26	28.9	
Production system			
Cage	51	56.7	
Deep litters	39	43.3	
Method of marketing			
Open market	11	12.2	
Individual contacts	78	86.7	
Farm gate	1	1.1	
Off-farm occupation			
No off-farm occupation	28	31.1	
Artisan	11	12.2	
Civil servant	34	37.8	
Clergy	2	2.2	
Politician	2	2.2	
Retiree	8	8.9	
Trading	5	5.6	
Quail production experience			
<2	30	33.3	
2-4	44	48.9	3.32
4-6	11	12.2	
>6	5	5.6	

212 Source:Field survey, 2015.

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214 **Constraints of quail egg production**

Constraints	Sum	No	Mean	Rank
Poor quality of day old chick/high mortality rate	227.00	90	2.52	3 rd
High cost of feeding	248.00	90	2.76	2 nd
Inadequate funds	224.00	90	2.49	4 th
Poor marketing	347.00	90	4.69	1 st
Short egg shelf life	25.00	6	0.27	7 th
Poor awareness	51.00	11	0.57	6 th
Wild nature of the birds	12.00	4	0.13	8 th
Early stoppage in laying	12.00	3	0.13	9 th
Campaign against quail egg by medical practitioners	90	30	1.00	5 th

215 Source:Field survey, 2015.

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226 **Enterprise budget (₦) for the production of quail egg for a cycle production (10 month)**
 227 **period**

S/N	Item	Mean amount (₦)	Percentage of revenue/costs
1	Revenue:		
i	Eggs (1459.321 @550 per crate)	802,626.55	92.73
ii	Spent layer (170 @ 370.34 per bird)	62,957.80	7.27
a	Total Revenue (TR)	865,584.35	100
2	Variable costs:		
i	Stocking	97,143.78	20.62
ii	Feeding	290,466.70	61.65
iii	Labour	57,291.11	12.16
iv	Transport	2,096.74	0.45
v	Medication	4,305.54	0.91
vi	Utility and other costs	8,078.25	1.72
b	Total Variable Costs (TVC)	459,382.12	97.51
c	Gross Margin (GM) = (TR – TVC)	406,202.23	
3	Fixed costs:		
i	Rent on building	6,273.33	1.33
ii	Depreciation on cage	3,790.74	0.80
iii	Depreciation on other fixed inputs	1,674.30	0.36
d	Total fixed costs (TFC)	11,738.37	2.49
e	Total costs (TC) = (TFC + TVC)	471,120.49	
f	Net Farm Income (NFI) = (TR – TC)	394,463.43	
g	Rate of return on investment (ROI)=f/e *100		0.84
h	Operating Expenses Ratio (OER) = b/a		0.53
i	Benefit Cost Ratio (BCR) = a/e		1.84
j	Profitability index (PI) = f/a		0.46

228 Source: Data analysis, 2015

229 The mean age of the farmers was about 45 years of a standard deviation (11.86) with
 230 minimum age of 22 years and maximum age of 70 years. The age distribution showed that
 231 about 66.7% of the respondents were below 50 years of age implying that the respondents
 232 were not too old to face the challenges which quail egg farming in a developing country like
 233 Nigeria requires (Table 1). This finding agrees with the findings of Yusuf and Malomo
 234 (2007) and also with that of Afolabiet *al* (2013). About 81.1% of the respondents were
 235 married, 13.3% single and 5.6% widowed, the finding is almost in consonance with that of
 236 Bakojiet *al* (2013). Majority (70.0%) of the quail egg farmers were male, this agrees with
 237 Afolabiet *al* (2013) who reported that more male were involved in poultry egg production.
 238 The heavy participation of male could be due to the rigor and stress which many female
 239 farmers might not be able to cope with. Majority (62.2%) of the farmers had less than or
 240 equal to five persons (≤ 5) in their household, with mean household size of 5
 241 persons. Majority (86.70%) of the respondents had post-secondary education, while those who
 242 had only secondary and primary educations were 5.60% and 7.80% respectively. The mean
 243 level of education was 16.90; this indicated that majority of the farmers were literates, this
 244 agrees with the findings of Afolabiet *al* (2013) which indicated that high literacy is evident
 245 among poultry farmers in Ogun State. Cage system was commonly used in the study area. It
 246 had the highest percentage (56.7%) This was also confirmed by Yusuf and Malomo (2007).
 247 Majority (86.7 %) of the farmers in the study area sold their quail egg and spent layers
 248 through individual contacts while 12.2% and 1.1% of the respondents sold their quail eggs
 249 and spent layers through open market and farm gates respectively. civil servants with 37.8%

250 had the highest frequency of 34 of the respondents while those without off-farm occupation,
 251 artisans, retirees, traders, clergy men and politicians have 31.1%, 12.2%, 8.9%, 5.6%, 2.2%
 252 and 2.2% respectively, this is similar to the result of Bakojiet *al* (2013) where it was shown
 253 that 66.67% of the sampled farmers are civil servants majority (48.9%) of the farmers having
 254 between 2 and 4 years of experience which shows that the enterprise is still new in the study
 255 area.

256 Constraints

257 With the aid of a likert scale poor marketing/unstable pricing system is identified as the major
 258 problem facing the quail egg production enterprise in the southwestern region of Nigeria; this
 259 is supported by Owen and Dike (2013) in their study on Japanese Quail (*Coturnixcoturnix*
 260 *japonica*) Husbandry, followed by high cost of feed, this is another important constraint that
 261 bore into farmers' profit and their coping strategy for this problem is formulation of local
 262 feed. Poor quality of day old chick/high mortality rate is another important problem that is
 263 managed with good brooding system; inadequate funding, Campaign against quail egg by
 264 medical practitioners, Poor awareness, Short egg shelf life, Wild nature of the birds and Early
 265 stoppage in laying.

266 Costs and returns (₦) to quail egg enterprise

267 The mean value of the total variable and fixed costs were ₦459,382.12 and
 268 ₦11,738.37 respectively while the mean value of the total cost was ₦471,120.49. Net income
 269 was ₦394,463.43 which was measured by subtracting total cost from total revenue indicating
 270 that the enterprise is profitable. Subtracting the total variable cost from total revenue, the
 271 gross margin equals ₦406,202.23. The value of sales from egg accounted for 92.73% of the
 272 total revenue while spent layers covered 7.27%.

273 Profitability ratios included in this study are profit index which gives a value of 0.46
 274 indicating that from every ₦1.00 generated from the enterprise, a net income of ₦0.46 is
 275 earned; the rate of return gives 0.84 which implies that from every ₦1.00 invested into the
 276 enterprise, a net income of ₦0.84 is realizable and the operating expenses ratio whose value
 277 is 0.53 shows that from every ₦1.00 generated from the enterprise ₦0.53 is invested as a
 278 running cost into the investment. Also, there is a benefit cost ratio of 1.84, implying that for
 279 every ₦1.00 invested on quail egg production, ₦1.84 is realizable as income. All these ratios
 280 confirm that quail egg farming is a profitable enterprise.

281 Conclusion

282 Quail-egg production was a profitable in the study area and most of the farmers identified
 283 poor marketing system as the major problem followed by high cost of feeding, poor quality of
 284 day old chick/high mortality rate, inadequate fund and so on. There is need for farmers to
 285 reduce their cost of feeds because doing this will increase their profit margin, government on
 286 her part are advise to assist research institutes to come out with breed of quail that are prolific
 287 and disease resistant also a good system of marketing should be established.

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