Journal of Fisheries & Livestock Production

Baruwa et al., J Fisheries Livest Prod 2018, 6:1
DOI: 10.4172/2332-2608.1000265

Research Article Open Access

Socio-Economic and Enterprise Characteristics of Duck in Oyo State: A Study of Oyo State Chapter of Duck Farmers Association of Nigeria (DAN)

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Abstract

Duck production is a growing poultry enterprise in Nigeria and mostly reared in extensive management system. The objective of the study was to examine the socio-economic and farm characteristics and prioritize the constraints to duck production in an attempt to assess factors determining indigenous duck production in Oyo State, Nigeria. Taking Oyo State chapter of Duck farmers Association of Nigeria (DAN) as a case study, a total of 100 duck farmers were randomly selected for the study. Data on enterprise characteristics and constraints to production were collected and analysed using descriptive statistics and importance indices. Results of the analyses indicated that the mean age of duck farmers was 51 years, dominated by male (73.7%), married (85%), with mean educational level, household size, years of farming experience of 11, 7 and 10 years respectively. Majority (86%) of duck farmers were part time, reared duck either for family consumption (40%), income (13.3%) or both (46%). The enterprise characteristics showed that majority (97.3%) of the respondents reared Muscovy duck, purchased foundation stock (68.3%) and maintained the ratio of one drake to three duck-hens sex ratio for breeding (83%). The mean flock size was 14 with extensive management system of rearing. The findings also indicated that high mortality rate, consumption taboo, negative reaction from neighbour, theft and disease outbreak (in order of importance) were the most serious problems confronting duck farmers in the study area. These constraints, if addressed, would lead to increase in duck meat supply to meet local demand and export.

Keywords: Socio-economic; Farm characteristics; Production constraints; Oyo state

Introduction

The low protein intake has been responsible for reduced human productivity with high incidence of infant mortality, severe malnutrition and general weakening of human body which predispose people to diseases, low health status, and shorter lifespan [1]. The FAO [2] recommended minimum requirement of 34 g/head/day of animal protein for a healthy living of humans as against 3.8 g/head/day intake in Nigeria. Comparatively, this is far below the average animal protein intake per head per day in developed countries [3]. In spite of the relatively large stock of animal production of over 13 million cattle, 34 million goats, 24 million sheep, 3.4 million pigs, about 1.7 million domestic rabbits and 104.3 million local poultry and about 20 million exotic poultry, meat supply situation in Nigeria remained critical. Hence, one of the most serious nutritional problems in the developing countries (Nigeria inclusive) is the shortage of high protein food from animal sources.

From the foregoing, it is evident that livestock production in Africa is struggling to keep up with the demands of expanding human population due to the rise in urbanization and associated changes in dietary patterns of urban dwellers. This growing demand for livestock products in the developing world is reflected in the rapidly declining net trade balance in livestock products in Africa. This has led to the dearth of animal protein in the diet of a vast majority of Nigerians [4,5]. A panacea for this protein deficiency problem will be to embark on accelerated protein production from poultry species with high growth rate in meat production. Such species must be hardy and resistant to many common poultry diseases. The priority criteria should be the potential for quick income generation, high profit, simple management skill requirement and relatively short-term capital investment content [6]. One of such potential source of animal protein, which is not popularly produced in Nigeria, is the duck [7]. This study, therefore, attempts to focus on factors determining and constraints to duck production in an attempt to assess factors influencing indigenous duck production in Oyo State, Nigeria. This will motivate present and potential duck farmers to increase production in order to make it available to the final consumers at an affordable price

Research Methodology

The study was conducted in Oyo State of Nigeria. The state is situated between latitude 7.22° and 9.17° north of the equator and longitude 1.02° and 2.44° east of Greenwich Meridian. Oyo State has forest and derived Savannah vegetation in its southern and northern parts respectively. The 2006 National census gave the population of Oyo State as 5,591,589 [8]. Oyo state covers approximately an area of 28,454 km^2 and is ranked 14^{th} by size. Agriculture is the major source of income for the greatest number of the people of Oyo State and an important source of internally generated revenue in the state [9]. There is in existence in Oyo State a chapter of Duck farmers Association of Nigeria (DAN). The list of registered members of DAN in Oyo State was collected and this constituted the target and sampled population. A total of 100 registered members of DAN, Oyo State chapter were randomly selected for the study. A structured questionnaire was used to collect relevant information on socio-economic, enterprise characteristics and problems associated with duck production. Descriptive statistics (frequency distribution, percentages and mean) were used to analyse the socio-economic characteristics of duck

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Received March 20, 2018; **Accepted** April 04, 2018; **Published** April 07, 2018

Citation: Baruwa OI, Tijani AA, Alimi T (2018) Socio-Economic and Enterprise Characteristics of Duck in Oyo State: A Study of Oyo State Chapter of Duck Farmers Association of Nigeria (DAN). J Fisheries Livest Prod 6: 265. doi: 10.4172/2332-2608.1000265

enterprise and the constraints while importance indices was used to identify the relative importance of constraints.

Results and Discussion

Socio-economics characteristics of the respondents

The mean age of duck farmer was 51 years old (Table 1). At this age, farmers would have acquired a lot of experience and at the same time, they were still energetic to meet the rigours of farming. Majority (73.5%) of the respondents were male while few (26.5%) were female. This finding agrees with [10] that more male were involved in duck enterprise than female in Southwest Nigeria. Majority (85%) of duck farmers were married with average household size of 7. This may have positive effect on the availability of family labour. Majority (81.5%) of the respondents were literate, with the mean years of education of 11 years suggesting that many duck farmers in the study area had secondary education. The implication of this is that the costs of obtaining new technical and related information by the farmers will be reduced substantially when they can read and understand published materials and simplified farm journals which are increasingly becoming the modern vehicle of disseminating information.

About half (47.5%) of the respondents reared duck for both family consumption and income while 35.0 percent of the respondents reared duck mainly for family consumption (Table 1). This means that duck production was either motivated by family consumption, income or both. The mean year of experience in duck farming was 10 years. This shows that most of the respondents were not new in the business. Majority (50%) of the respondents belonged to cooperative society while 30 per cent belonged to religious based organizations. The low percentage (5%) of duck farmers that belonged to duck farming association is an indication that duck enterprise was not a popular business in the study area.

Parameter	Frequency	Relative frequency (%)	Mean
Age range (Years)			
2035	15	7.5	51
3650	89	44.5	
5165	80	40	
Above 65	16	8	
Gender			
Male	147	73.5	
Female	53	26.5	
Marital status			
Married	170	85	
Single	6	3	
Divorced	2	1	
Widowed	22	11	
Size of household			
Less than 6	110	55	7
06Oct	71	35.5	
Nov15	15	7.5	
Above 15	4	2	
Level of education			
No formal education	37	18.5	11
Primary education	51	25.5	
Secondary education	69	34.5	
Tertiary education	43	21.5	
Years in business			
01May	71	35.5	10
06Oct	73	36.5	
Nov15	25	12.5	
1620	17	8.5	
Above 20	14	7	
Purpose of rearing duck			
Family consumption only	70	35	
Family consumption & Income			
Income only	95	47.5	
Aesthetic	31	15.5	
	4	2	

Source: Field survey, 2015

Table 1: Socioeconomic characteristics of duck farmers in Oyo State, Nigeria.

The finding showed that ducks were either sold through open market, individual contacts or both. However, more ducks were sold through individual contacts. About 31 per cent of the sales were as duckling between 3-6 months while 27 per cent were sold at 6 months-1 year, 13 per cent at 1-2 years while 29 per cent of the respondents sell at any age. The higher percentage of sales as duckling is to supply production stocks for intending farmers while the matured birds are either sold for fetish purposes or mostly slaughtering for consumption. Most (86%) of the respondents were part-time producers. It is operated as part time because its labour requirement is not relatively high. This gives room for venturing into other enterprise if farmer so desired. Therefore, duck farming was a subsidiary source of income for almost all the farmers in the study area.

Enterprise characteristics of the respondent

The study showed that more than one breed of ducks was reared in the study area. Almost all (90%) the respondents in the study area reared Muscovy duck, while the remaining either reared Mallard (3%) or Pekin (2%) or both (5%) (Table 2). The farmers observed that Mallard ducks and Pekin are good egg producing breeds and do not go broody compared to Muscovy. This observation was confirmed by the report of that Mallard ducks are better layers than Muscovy ducks and can produce up to 300 eggs per year [11]. Muscovies are good mothers hatch and brood their duckling effectively. Muscovy duck and domestic fowl were used to incubate and hatch eggs laid by Mallard duck.

Majority (68%) of the respondents purchased foundation stock while less than 30% either received duck as inheritance (20%) or gifts (16%). Only 6% of the total respondents held duck in custody (Table 2**).** The study shows that more than half (55%) of the respondents hatched their replacement stock while 40% purchased replacement. There is a significant difference on the flock size distribution. The category 1-5 ducks has the highest percentage (45%) followed by the 6-10 (30%) and the least in the category 15 and above (8 %) with mean flock size of 14. The small flock size observed in the study area was due to the fact that most of the respondents sell their ducks between 6 months to 1 year leaving only the production stock. Majority (83%) of the farmers maintained the ratio of one drake to three ducks sex ratio for breeding. The extensive low input management system was the practice with a low proportion (2.0%) of respondents embarking on semi-intensive management system. This conformed to who observed that domesticated ducks are best maintained on free range because they are good foragers and that they find a considerable proportion of their own feed if allowed ranging freely. Most of the farmers reported that confinement would be difficult considering the watery nature of duck droppings. Under semi intensive system, ducks were put in an un-roofed wire mesh shelter and were restricted in a backyard all day. Some respondents housed their flock in one corner of the farmer's home yard, enclosed by wooden or bamboo. In an extensive rearing system 86% of the respondents provided night shelter in form of mud huts, uncompleted buildings and boxes. About 9% of the respondents

Parameter	Frequency (%)
Breed reared	
Muscovy	90
Mallard	3
Pekin	2
Muscovy and Pekin	5
Source of foundation stock	
Purchased	68
Inherited	20
Gift	16
Custody	6
Source of replacement	
Purchased	40
Hatched	55
Gift	4
Custody	1
Flock size distribution	
15 ducks	45
610 ducks	30
1115 ducks	17
Above 15 ducks	8
Management practices	
Extensive system	98
Semiintensive system	2
Labour source	
Hired labour	9
Family labour	91
Feeding practices*	
Grains	26
Maize shaft (Eeri)	74
Commercial feed	10
Swim unit	
Basin	37
Cemented pond	31
Natural source	30
Local pot sunken pond	2
Laying place*	
Hidden place	58
Laying nest	34
Anywhere	12
Parameter	**Relative frequency**
Brooding practices	**(%)**
Mother duck restricted	39
Duck & Day old kept in enclosed	46
Day old brood artificially	7
Duck and day old move around	7
Don't brood	1
Sources of fund	
Personal savings	76
Friends & relatives	11
Money lender	12
Formal institutions	1
Disease type*	
Botulism	58
Newcastle	15
Fowl cholera	10
Coccidiosis	12
Others	10

Source: Field survey, 2015

*Multiple responses

Table 2: Flock composition and management practices of duck farmers in Oyo State, Nigeria.

stated that no family members assisted. The number of family members that assisted ranged from one to four persons. The family members assisted in feeding and cleaning of the duck house. The remuneration of family members for the services rendered did not involve any cash outflow. All the respondents offered kitchen left over to the duck. About 26% of the respondents offered grains feed, 10% fed commercial feeds and supplements and 74% of respondents offered maize chaff ('eri') to their ducks. This was done to create a "home attachment" and was provided early in the morning and evening in order to condition the birds to coming back home after scavenging in the neighbourhood. All ducks reportedly scavenged and this could expose them to health hazards such as toxic materials and worm infections. Majority (70%) of the respondents provided water which was sourced from either taps or ground water sources (boreholes and wells). Swim units were provided for ducks and were: basin (37%), cemented sunken pond (31%), and local pot sunken pond (2%). For the remaining (30%) respondents, their ducks had access to natural sources of water in form of flowing stream (13%) and muddy area (17%). More than half (58%) of the respondents noted that ducks lay in hidden place. Ducks made use of available scrap or abandoned structures (such as cement blocks, tables or drawers) or improvised laying holes. This results in eggs being stolen or eaten by predators or carried away by run-offs during heavy downpour. About one third (34%) of the respondents provided laying nest for their duck in form of broken pots or nest boxes. The number of eggs per clutch ranged from 8-30 eggs. The mean clutch number per duck was two. The mean number of eggs was 14. This finding is not in consonance with Ola (2000) who reported 32 eggs per year for Muscovy duck.

For hatching duck eggs, the farmers depend on broody ducks or hens, the natural "living incubator". Only one respondent (1%) used local hen to hatch his eggs. The hatchability percentage was reasonably high (despite the vagaries environmental conditions to which eggs were exposed) and this was between 60-100 per cent with an average of 84 per cent. This agrees with the hatchability percentage of 84 per cent reported by Chia, and Momoh (2012) in Muscovy ducks. Analysis shows that 46 per cent of the respondents left duckling with the 'mother' for 2 or 3 weeks in a dry place or house to protect them from predators. More than half (65%) weaned their ducklings at 3 months and only a few (5%) respondents weaned duckling at 5 months. This is because the duck did not have access to drake as expected. Only 7% of the respondents weaned at 1 month because there was generally access to drake. The 3 month weaning age is indicative of the number of flocks that can be produced per duck-hen per year.

Table 2 shows that majority (87%) of the respondents did not obtain loan for their duck enterprise. The main sources of financing were personal savings and loans from friends and relatives, which attracted no interest payments. Only about 13 per cent obtained loan for their operation. Only 1% sourced loan through formal institutions such as commercial bank. Low patronage of the formal institution may be due to high rate of interest charge by banks, lack of collateral securities and the fact that majority of the duck farmers were smallholders and part time farmers who might not venture into large scale duck production.

Constraints to duck production and management strategies

The identified problem sources and their ranking in order of importance are presented in Table 3. All the farmers considered the problems stated (excluding water shortage) as important problem sources as all appeared among the first six. Water shortage was considered inconsequential as farmers had access to water through well, nearby streams and boreholes to supply required water for

Problem sources	1	2	3	1	5	6	7	8	1*	2*
Consumption taboos	20	3	7	4	1	22	0	0	35	32
Disease outbreak	6	6	6	3	1	0	0	1	23	22
High mortality	27	17	7	6	0	0	0	0	57	57
Theft	8	10	6	4	1	1	2	6	38	30
Low profit	6	6	5	2	2	1	0	2	24	22
Feed problem	5	7	4	2	2	1	0	0	21	21
Reaction from neighbour	10	6	5	2	1	2	0	0	26	26
No space	4	5	2	2	2	0	1	0	16	15
Snake	2	3	2	0	1	0	0	0	8	8
Flood	1	1	0	0	2	1	0	0	5	5
Trampling	1	0	0	0	1	1	0	0	3	3
Piercing vegetable	0	1	0	0	1	1	0	0	3	3
Scarcity of water	0	0	0	0	0	0	1	0	0	0
Flight	0	3	0	2	0	1	0	0	6	6

*1 number of respondents that identified each problem source.

*2 proportion of total respondents ranking each problem source among the most important six.

Source: Field survey, 2015,

Table 3: Farmers' ranking of problem sources (n=100).

drinking, wading or swimming during dry season. Less than 10 per cent of the respondents considered piercing of vegetable leaves, trampling, flight, flood disaster and snakes as important problem sources. More than 20 per cent of respondents ranked low profit, disease outbreak, reactions from neighbour and theft as problem sources while 15 per cent, 21 per cent and 35 per cent ranked lack of space, feed problem, and consumption taboos, respectively, as being within the six most important problem sources in duck production. Analysis of ranking of problem sources by duck farmers using importance indices (Table 4) indicated that majority (27%) of the respondents rated high mortality as the most important problem source especially at the duckling stage. Consumption taboos being the second important source of problem in duck production, with reaction from neighbour being rated third. The fourth and fifth most important problem sources were theft and disease outbreak, respectively. Trampling on the duckling by the mother duck and chicken when the flock was kept together was rated as the least important factor in problems source. Problem sources cause adversity in output, prices and production units. These or any combination of the outcomes of the problem sources manifested in low farm income and reduction in the level of profitability.

For example thirty eight respondents (38%) mentioned theft as a problem source but thirty (30%) put it among the most important. There are several strategies that farm operators can use to reduce or solve the problem sources. A number of the problem management strategies and the proportion of duck farmers adopting each are indicated in Table 5. Re-orientation/enlightenment of consumers on the potential importance of duck meat, sales to herbalists for fetish and relative price reduction were the strategies used to counter consumption taboos. Out of 35 respondents that considered consumption taboo as a problem, only 45.7%, 27.6%, and 26.7% used enlightenment/re-orientation, sales to herbalists and price reduction respectively. More than 30% of the respondents used local treatment as one of the strategies to solve the problem of disease outbreak and high mortality. To solve the problem of snakebite and ant, trampling on the ducklings and piercing of vegetable leaves, all the duck farmers used the above-mentioned strategies (Table 4) to solve the problems highlighted. Most (66.7%) of the respondents provided supplementary feed (kitchen leftover, maize bran and maize chaff 'eri') to create a ''home attachment'', to solve the problem of flight, while the remaining (33.3%) of them cut the forewings of the birds to control flight.

Problem sources	Importance ratings	Most important		
	Mean	problem source	Index*	Rank
		%		
Consumption taboos	1.77	20	35.4	2
Disease outbreak	1.01	6	6.06	5
High mortality	2.93	27	79.11	1
Theft	1.36	8	10.88	4
Low profit	0.96	6	5.76	6
Feed problem	0.91	5	4.55	7
Reaction from neighbour	1.2	10	12	3
No space	0.67	4	2.68	8
Snake	0.37	2	0.74	9
Flood	0.15	1	0.15	10
Trampling	0.09	1	0.09	11
Piercing of vegetable	0.08		0	
Scarcity of water				
Flight	0.22		0	

*Mean × Percentage

Source: Field survey, 2015

Table 4: Relative rankings of problem sources in duck production in Oyo state, Nigeria.

Conclusion and Recommendations

The study was carried out in Oyo State, Nigeria with the objective of examining the enterprise characteristics and constraints of indigenous duck production**.** Information on enterprise characteristics, problems associated with duck production were collected and analysed using descriptive statistics and importance indices. The descriptive analysis of the enterprise characteristics showed that majority of the respondents reared Muscovy duck (90%), purchased foundation stock (68%) and maintained the ratio of one drake to three duck-hens sex ratio for breeding (83%). The mean flock size was 14 with extensive management system of rearing. Higher percentage of the farmers provided swim units (70%), weaned their ducklings at age of 3 months (65%) and ducks lay in hidden place (58%). Most of the respondents in the study area did not obtained loan (87%) for their duck enterprise. Majority of the respondents used local veterinary services (81%) and reared ducks with other poultry species (80%).

Problem encountered	Strategy	Proportion of farmers
Consumption taboos*	Enlightenment/reorientation	45.7
	Sales of duck to herbalists	27.6
	Relative price reduction	26.7
Disease outbreak &	Immediate disposal	18.2
Mortality*	Veterinary services	30.3
	Improved hygienic condition	16.7
	Local treatment	33.3
Theft	Good housing	32.2
	Surveillance	24.9
	Local insurance	31.1
	Improvised feed	64.1
Low profit	Sales to herbalists	25
	Frozen	10.9
	Local feed	43.6
Feed problem	Cooperative loan	56.4
	Housing/fencing	47.2
Reaction from neighbour*	Sales of stubborn ducks	20.8
	Removal of feaces	16.7
	Giving ducklings to neighbor	15.3
No space	Larger space	38.6
	Reduction in duck/duckling population	61.4
Snake bite & ant	Clean surrounding	100
Trampling	Separate feeding arrangement	100
Piercing vegetable	Cage/fencing	100
	Cutting of forewings	33.3
Flight*	Fed at constant time (home attachment)	66.7

Source: Field survey, 2015

*Multiple responses

Table 5: Farmers use of problem management strategies.

The findings indicated that high mortality rate, consumption taboo, negative reaction from neighbour, theft and disease outbreak (in order of importance) were the most serious problems confronting duck farmers in the study area. Re-orientation/enlightenment, confinement cum good housing and traditional veterinary care were the most common strategies employed.

Recommendations

Based on the findings of this study, the following recommendations are made in order to improve production of indigenous duck in the study area: (1) Since the study had identified that almost (90%) of the respondents reared Muscovy duck (local duck), research should be directed towards improving the genetic pool of Muscovy in order to enhance production (2) The findings indicated that high mortality rate; negative reactions from neighbour, theft and disease outbreak were the most serious problems confronting duck farmers in the study area. This arises from the extensive management system practiced; though ducks are difficult to rear under full intensive management system, livestock extension officers should educate duck farmers on the need to shift from the present free-range system to semi-intensive systems with improvement in nutrition and health. More intensive researches into nutrition, health and other management practices are required in order to maximize the potentials of the duck.

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