



Management and socio-economic determinants of profitability in dog breeding business in Oyo state, Nigeria

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Abstract

Dog breeding business has the potential to reduce unemployment among youths, especially fresh graduates of veterinary medicine. This study attempted to determine factors associated with making profits in dog breeding business in Ibadan, Oyo state, Nigeria. A semi-structured self-administered questionnaire was used to obtain information on demographic and management factors, tangible and intangible indicators of profitability in dog breeding. A criterion was designed to qualitatively define profitability in dog breeding. Descriptive statistics, univariate and multivariable analyses were done to determine predictors of profitability in dog breeding business. The mean age of respondents was 32.1 ± 7.7 years. The median year of practicing dog breeding was 6 (range 0 to 25). Using our profitability criterion, of the 70 dog breeders, only 13 (18.6%) was adjudged to have made profits from dog breeding business. In the univariate analysis, years of experience as a dog breeder (Odds Ratio (OR) = 6.4; 95% Confidence Interval (CI) 1.2 – 64.6), bitch becoming pregnant at every mating (OR = 6.5; 95% CI 1.5 – 40.9), the total number of dogs in the kennel (OR = 4.4; 95% CI 1.0 – 20.1) and going on vacation by breeders (OR = 4.1; 95% CI 1.0 – 20.5) were significantly associated with profitability in dog breeding. In the multivariable logistic regression, variables such as the bitch becoming pregnant at every mating (OR = 7.5; 95% CI 1.5 – 38.1), years of experience as a breeder (OR = 7.9; 95% CI 1.3 – 48.1), feed type (OR = 5.2; 95% CI 1.0 – 27.2) and having a University degree (OR = 10.2; 95% CI 1.0 – 106.0) were significant predictors of profitability in dog breeding business. Potential dog breeders should consider these factors before venturing into dog breeding business.

Keywords: Dog breeding, Education, Feed type, Profit, Oyo state, Veterinary medicine

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Introduction

The most abundant canid on earth today is the dog with a great importance in the environment (Green & Gipson, 1994; Brickner, 2002). Dog (*Canis familiaris*) has always accompanied man to different places all over the world since its domestication 15,000 years ago (Savolainen *et al.*, 2002). Dogs are useful and important domestic animals and pets in several ways which include: guarding of property and livestock; assisting the blind and other disabled people to maintain functionality; performing search and rescue missions and acting as sled animals; and in detecting explosives and drugs (Brickner, 2002; Horn *et al.*, 2013).

Dog breeding is the practice of mating selected dogs with the intent to maintain or produce specific qualities and characteristics. A person who mates dogs to produce puppies can be

referred to as a dog breeder (Seranne, 1980; Bir *et al.*, 2016). Several breeds of dogs have been bred ranging from the popular German Shepherd dog (Alsatian); Rottweiler, Boerboel to the less common golden retriever and Great Dane.

In Nigeria of today, many young Nigerians and pet lovers are into dog breeding for several reasons from socio-economic, security to psycho-social purposes. Their perceived economic and social worth thus depends on the community values attached to their use which varies from one place to another (Oboegbulem & Nwakonobi, 1989). The importance of physical health, behaviour and perceived aesthetic as reasons for dog breeding has also been stressed (King *et al.*, 2012).

While acknowledging the major contribution made by dog breeders in fulfilling the important needs of humans for animal companions, breeders have

long been aware that they still have to improve and expand better in the business of dog breeding (King *et al.*, 2012). Also, the employment crunch in Oyo state, Nigeria coupled with the sluggish trend in animal production in recent years has stimulated some people especially graduates and non-graduates to veer into dog breeding which has attracted interest partly because of an upsurge in security consciousness and new found love for pets by people who can afford them (Sansi, 1999). Dog breeding business is a potential tool for addressing unemployment among the youths, especially the teeming population of young graduates of veterinary medicine in Nigeria. Consequently, an evaluation of the dog breeding business and understanding of the factors necessary for successful venture is desirable to guide prospective graduates and people interested in veering into dog breeding. Therefore, this study aimed at evaluating the efficiency of dog breeding and to determine factors associated with profit making in dog breeding business in Ibadan, Oyo state.

Materials and Methods

Study design and study location

The study was a cross sectional survey done between January and November 2015. Data were obtained from 70 dog breeders across localities in Ibadan, Oyo state, Nigeria. Ibadan is located on latitude 7.3877800 and longitude 3.8963900 in decimal coordinates. The study points were located in the following Local Government areas:

Akinyele, Ona Ara, Lagelu, Ibadan North, Oluyole, Ibadan Southwest, Ido, Ibadan Northeast and Egbeda (Figure 1). The human population of Ibadan is about 2,559,853 of the 5,580,894 in Oyo state (NPC, 2006). Oyo state including Ibadan is homogenous, mainly inhabited by the Yoruba ethnic group who are primarily agrarian but have a predilection for living in high density urban centres (OYSG, 2016). In addition to crop and livestock farming activities in the study areas, there exist petty trading and presence of few industrial activities.

Questionnaire design and administration

A semi-structured questionnaire was designed, pre-tested and self-administered to obtain data on breeding facility and owner’s demography, demographic characteristics of dogs, management factors, inputs and intangible outputs. The questionnaire, containing 50 questions, was administered to dog breeders at their business premises, those visiting veterinary clinics, pet stores and at dog shows. The dog breeders were selected using a snow-balling sampling technique whenever visits were made to the aforementioned places. The dog breeders in Ibadan, Oyo state had no register; however, there were about 30 members on a social media platform used for puppies trading (Anon, 2015). We used that to project a sample size of 90 by multiplying the member size by three. However, we sent out a total of 120 questionnaires both by personal visit and mail and of these 90 were returned. Due to incomplete entries and missing data, 20 of the entries were excluded from data analysis; thus only 70 entries were analyzed

Statistical analysis

The data were entered into Microsoft Excel 2007 and analysed using Epi-info version 3.5.4. A criterion was designed to define profitability from the list of available variables from the intangible output section of the questionnaire. Thus, profitability was defined as the ability of a respondent to identify with profit making in the dog breeding business; possess special and sole preference for dog breeding in lieu of public service employment and affirm the capability of dog breeding to comfortably and financially support a family of four people. Descriptive statistics was done and the associations between the considered demographic and management factors; and some input variables with profitability in dog breeding business were assessed by determining the odds ratios. Fisher’s exact test was used to determine statistical significance at the 95% confidence level

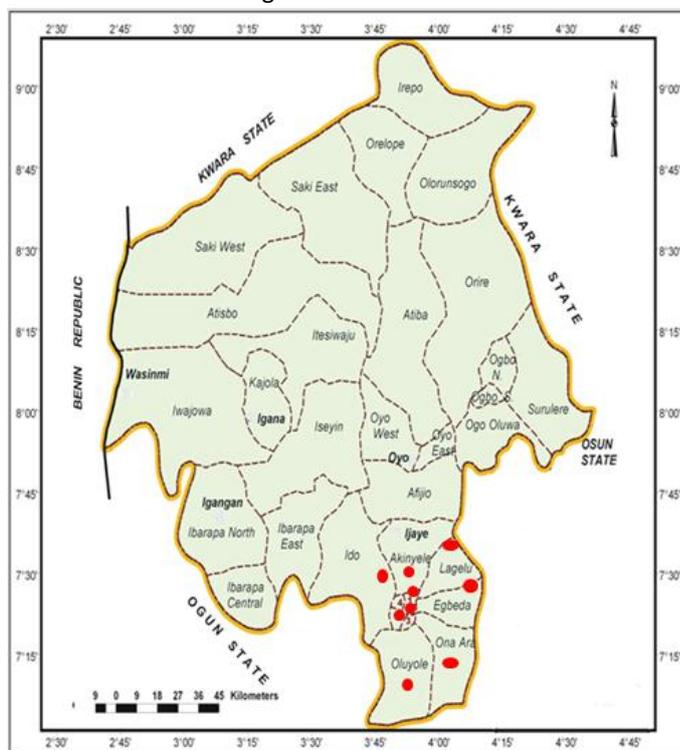


Figure 1: Map of Oyo state showing the study locations in Ibadan and surrounding localities

Table 1: Demographic and management data of respondents in Oyo state, Nigeria 2015

Variables	Frequency n = 70	Percentage (%)
Age of respondents (years)		
17-24	14	20.0
25-34	29	41.4
35-44	23	32.9
45-50	04	5.7
Academic qualifications		
Others	08	11.4
SSCE	06	8.6
HND	07	10.0
BSc.	31	44.3
DVM	08	11.4
MSc.	10	14.3
Number of years of experience as a dog breeder		
<1-5	33	47.1
6-10	31	44.3
11-15	02	2.9
16-20	03	4.3
21-25	01	1.4
Breed of dogs bred		
Alsatian	30	42.9
Rottweiler	30	42.9
Boerboel	22	31.4
Doberman pincher	01	1.4
American pitbull terrier	10	14.3
Mongrel	03	4.3
Others	21	30.0
Start-up dog population		
Nil	01	1.4
One	43	61.4
Two	20	28.6
Three	03	4.3
Four	03	4.3

because of the limited sample size. Multivariable unconditional logistic regression was used to determine predictors for profitability controlling for other covariates at $p < 0.20$. Chi square test for binomial variables was used to assess for collinearity among predictors that were significant in the univariate analysis before consideration for inclusion in the logistic regression. A manual forward selection method was used. The goodness of fit of the model was tested using the Pearson goodness of fit test. In the final model, only variables that were found to significantly affect the outcome at $p \leq 0.05$ were retained. The conversion from the Nigeria Naira (₦) to the United States of America Dollar (\$) was at the official rate of ₦ 280 to \$1.

Ethical approval

The study was not invasive, thus, no ethical approval was sought. However, consent from all study participants was obtained and data confidentiality.

Results

Demography and management parameters

The mean age of the 70 respondents was 32.1 ± 7.7 years; and 63 (90.0%) were male. Most (70.0%) had University degree. The median year of practicing dog breeding was 6 (range 0 to 25). Majority (61.4%) started dog breeding business with one dog. Alsatians (42.9%) and Rottweilers (42.9%) were the most reared breed of dogs (Table 1). Only 37.1% practiced dog breeding as the sole business. Almost all (96.0%) vaccinated their dogs against rabies; and canine distemper, hepatitis, leptospirosis, parvo virus and parainfluenza (DHLPP). The total number of dogs in the kennel ranged from 1 to 45; median number was 3. The number of puppies in a year per dog breeder ranged from 0 to 80; median number was 12. The number of dead dogs in a year ranged from 0 to 10; median number was 2. The number of bitches that conceived in a year ranged from 0 to 12; median number was 2. The median estimated cost on veterinary services in a year per dog breeder was 30,000 Naira (₦) (\$ 107) [range ₦ 0 to 200,

Table 2a: Univariate analysis of factors associated with profitability in dog breeding among 70 dog breeders in Oyo state, Nigeria 2015

Variables	Profitable n = 13 (%)	Not Profitable n = 57 (%)	OR (95% CI)	P value
Location of practice				
Rural	10 (76.9)	32 (56.1)	2.6 (0.6; 16.1)	0.28
Urban	3 (23.1)	25 (43.9)		
Academic qualifications				
University degree	12 (92.3)	37 (64.9)	6.4 (0.8; 290.9)	0.09
Non-University degree	1 (7.7)	20 (35.1)		
Age of dog breeders (years)				
35 – 50	8 (61.5)	19 (33.3)	3.1 (0.8; 14.0)	0.12
17 – 34	5 (38.5)	38 (66.7)		
Years of experience as a breeder				
6 – 25	11 (84.6)	26 (45.6)	6.4 (1.2; 64.6)	0.02*
< 1 – 5	2 (15.4)	31 (54.4)		
Involvement in other business				
Yes	9 (69.2)	35 (61.4)	1.4 (0.4; 5.8)	0.84
No	4 (30.8)	22 (38.6)		
Sources of dogs used for breeding				
Outside Nigeria	8 (61.5)	17 (29.8)	3.7 (0.9; 16.6)	0.07
Within Nigeria	5 (38.5)	40 (70.2)		
Bitch pregnant at every mating				
Yes	10 (76.9)	19 (33.3)	6.5 (1.5; 40.9)	0.01*
No	3 (23.1)	38 (66.7)		
Practice artificial insemination				
Yes	2 (15.4)	5 (8.8)	1.9 (0.2; 13.4)	0.77
No	11 (84.6)	52 (91.2)		
Mating time				
Morning & Evening	9 (69.2)	24 (42.1)	3.0 (0.7; 15.2)	0.14
Once/ anytime	4 (30.8)	33 (57.9)		
Number of times of mating				
More than or equal 3	10 (76.9)	40 (70.2)	1.4 (0.3; 9.0)	0.91
Less than 3	3 (23.1)	17 (29.8)		
Feed type				
Canned food plus other food type	10 (76.9)	25 (43.9)	4.2 (0.9; 26.1)	0.06
Canned food alone/ others alone	3 (23.1)	32 (56.1)		

*significant at $p \leq 0.05$

000 (\$ 0 to \$ 714)]. The median estimated cost on vaccination in a year per dog breeder was ₦ 10,000 ((\$ 36) [range ₦ 0 to 220, 000 ((\$ 0 to \$ 786)]. The median estimated cost on feeding all the dogs in the kennel per day per dog breeder was ₦ 1,000 ((\$ 4 USD) [range ₦ 150 to 20, 000 ((\$ 0.5 to \$ 71)]. About 80% of dog breeders engaged the services of veterinarians. Most (70.0%) of the breeders do the business alone without engaging any kennel assistants.

Management and socio-economic factors associated with profitability in dog breeding business

Of the 70 dog breeders, 58 (82.9%) accented to making profits in dog breeding business; 32 (45.7%) would always prefer dog breeding business to taking up public service employment; 42 (60.0%) submitted that dog breeding business alone can comfortably cater for financial needs of

a family of four. Using our profitability criteria, of the 70 dog breeders, only 13 (18.6%) were adjudged to have made profits from dog breeding business. In the univariate analysis, years of experience as a dog breeder (Odds Ratio (OR) = 6.4; 95% Confidence Interval (CI) 1.2 – 64.6), bitch becoming pregnant at every mating (OR = 6.5; 95% CI 1.5 – 40.9), the total number of dogs in the kennel (OR = 4.4; 95% CI 1.0 – 20.1) and going on vacation by dog breeder (OR = 4.1; 95% CI 1.0 – 20.5) were significantly associated with profitability in dog breeding (Table 2a and 2b). However, variables such as the age of the dog breeders, involvement in other businesses, sources of dogs bred, the practice of artificial insemination, visiting veterinary clinic for oestrus detection, record keeping and location of dog breeding premises were not statistically significant at $p \leq 0.5$. In the multivariable logistic regression adjusting for other covariates that were significant

Table 2b: Univariate analysis of factors associated with profitability in dog breeding among 70 dog breeders in Oyo state, Nigeria 2015

Variables	Profitable n = 13 (%)	Not Profitable n = 57 (%)	OR (95% CI)	P value
Number of employed assistants				
Nil (self-run)	7 (53.8)	42 (73.7)	0.4 (0.1; 1.8)	0.28
1 or more	6 (46.2)	15 (26.3)		
Total number of dogs in the kennel				
6 – 45	6 (46.2)	9 (15.8)	4.4 (1.0; 20.1)	0.05*
1 – 5	7 (53.8)	48 (84.2)		
Number of dead dog/puppies in a year				
0 – 1	5 (38.5)	28 (49.1)	0.7 (0.2; 2.6)	0.70
More than one	8 (61.5)	29 (50.9)		
Facility used for dog breeding				
Owned	8 (61.5)	39 (68.4)	0.7 (0.2; 3.3)	0.86
Rented	5 (38.5)	18 (31.6)		
Visit vet. clinics for oestrus detection				
Yes	7 (53.8)	22 (38.6)	1.8 (0.5; 7.6)	0.48
No	6 (46.2)	35 (61.4)		
Keep records of breeding activities				
Yes	9 (69.2)	25 (43.9)	2.8 (0.7; 14.1)	0.18
No	4 (30.8)	32 (56.1)		
Motivation to dog breeding business				
Interest & love for it	8 (61.5)	23 (40.4)	2.3 (0.6; 10.3)	0.28
Other reasons	5 (38.5)	34 (59.6)		
Estimated cost on veterinary services (Naira)				
Greater than 30,000	5 (38.5)	26 (45.6)	0.8 (0.2; 3.2)	0.97
Less or equal 30,000	8 (61.5)	31 (54.4)		
Veterinary service providers				
Veterinarians	11 (84.6)	45 (78.9)	1.5 (0.3; 15.3)	0.97
Non-veterinarians	2 (15.4)	12 (21.1)		
Go on vacation by dog breeder				
Yes	9 (69.2)	20 (35.1)	4.1 (1.0; 20.5)	0.05*
No	4 (30.8)	37 (64.9)		

*significant at $p \leq 0.05$

at $P < 0.20$, the bitch becoming pregnant at every mating (OR = 7.5; 95% CI 1.5 – 38.1), years of experience as a breeder (OR = 7.9; 95% CI 1.3 – 48.1), feed type (OR = 5.2; 95% CI 1.0 – 27.2) and having a University degree (OR = 10.2; 95% CI 1.0 – 106.0) were significant predictors of profitability in dog breeding business (Table 3).

Discussion

We reported factors such as bitch becoming pregnant at every mating, years of experience as a dog breeder, type of feed given to dogs and having a university degree as significant predictors of profitability in dog breeding. Dog breeders who were successful at every mating i.e. resulting in pregnancy, were about eight times more likely to make profit than those who do not. This could be because majority of the dog breeders practiced natural mating. Natural mating has been found to produce higher birth rate than artificial

insemination (Farstad, 1984). However, conducting artificial insemination twice with optimal timing has been reported to yield a higher whelping rate (Thomassen & Farstad, 2009). More so, those who have more than five years of experience were eight times more likely to make profit than beginners in the dog breeding business. Years of experience in most business enterprises has been identified with success in a venture (Steiner & Solem, 1988; Beckman & Marks, 1996; Schutjens & Wever, 2000). Dog breeders who complement feeding of canned foods with other food types had five times higher likelihood to make profit than those who solely feed either canned feed or other feed types. Nutritionally complete and balanced commercial feed has been reported to contribute to longer and healthier life span in pets (Laflamme *et al.*, 2008). More so, there has been an increase in demand for home-made foods (Laflamme *et al.*,

Table 3: Unconditional logistic regression of factors associated with profitability in dog breeding among 70 dog breeders in Oyo state, Nigeria 2015

Variables	OR	95%CI	P value
Bitch pregnant at every mating			
No	1 (ref.)	1.5 – 38.1	
Yes	7.5		0.02
Years of experience as a breeder			
< 1 – 5	1 (ref.)		
6 – 25	7.9	1.3 – 48.1	0.03
Feed type			
Canned food alone/ others alone	1 (ref.)		
Canned food plus other food type	5.2	1.0 – 27.2	0.048
Academic qualifications			
Non-University degree	1 (ref.)		
University degree	10.2	1.0 – 106.0	0.05

2008) that have also been reported to be healthy for pets (Stromberk, 1999; Laflamme *et al.*, 2008). These assertions could possibly explain the profitability in dog breeding experience among dog breeders who feed a combination of both feed types. In addition, dog breeders that had university education were ten times more likely to make profit than those who do not. Higher education was also reported among demographic factors found to be associated with small business success (Cooper *et al.*, 1989; Kraus *et al.*, 2008).

There was a marginal significant association in the univariate analysis between total number of dogs in the kennel and profitability in dog breeding business: breeding with more than five dogs in the kennel was about four times more likely to be profitable. Large firm size has been identified to be associated with business success (Bates & Nucci, 1989; Schutjens & Wever, 2000). Though the total number of dogs in the kennel was no longer significantly associated with profitability in dog breeding business after adjusting for other variables, this is adduced to the association between years of experience as a dog breeder and the total number of dogs in the kennel; however, its relationship to profitability in dog breeding business is worth mentioning.

Going on vacation by the dog breeders was also marginally significantly associated with profitability in dog breeding business: dog breeders who go on vacation were four times more likely to have made profit than those who do not. Higher family income and tertiary education have been cited as factors associated with decision to want to go on vacation (Hwa, 2002; Mohsin, 2008). However, going on vacation was no longer significantly associated with profitability in dog breeding business after adjusting for other covariates, because of its collinearity with years of experience and total number of dogs in the kennel. Its association with profitability in dog breeding business is noteworthy.

Variables including location of practice, ages in years of dog breeders, involvement of the breeder in other businesses, practice of artificial insemination, number and times of mating the dogs, ownership of facility used for dog breeding business, number of dead dog/puppies in a year, keeping records of breeding activities and type of motivation were not statistically associated with profitability in dog breeding business in this study. Saleem (2012) also reported no significant association between small business success and variables such as location of practice and age of the business owner. More so, Lussier (1996) had earlier submitted that there is no generally accepted list of variables responsible for either success or failure in most ventures.

Adequate financial resources have been identified as critical to small business success (Steiner & Solem, 1988; Saleem, 2012); though, majority of the dog breeders in Ibadan started dog breeding business with one dog and most were in business by themselves without kennel assistance. This portrays the possibility of starting and maintaining a dog breeding business with little capital.

The most reared breeds of dogs were the Alsatians and Rottweilers in Ibadan, Nigeria; however, in the United States of America the most popular breed of dog was the Labrador retriever (Smith, 2016). The intelligence, security agility and affordability of the Alsatian and Rottweiler breed of dogs by clients could have informed this preference by the dog breeders in Ibadan and possibly because of the agrarian nature of the study areas (OYSG, 2016). Almost all dog breeders vaccinated their dogs against rabies; and distemper, hepatitis, leptospirosis, parvovirus and parainfluenza (DHLPP). Imported vaccines such as Forte-Dodge (US) products Duramune® Max 5 and Rabvac™; and Pfizer (US) products Vanguard® and Defensor® are commonly used by dog breeders in Ibadan. Vaccination coverage of about 60% to 70% in dogs has been reported to control dog rabies and significantly reduce request for human post-

exposure rabies prophylaxis (Cleaveland *et al.*, 2003). Dog breeders incur some costs on vaccination and veterinary services in order to ensure that either the stud dogs or bitches are in good health condition. This is in consonance with the ethics of the dog breeding practice world over especially in developed countries such as the United States of America (SHCA, 2009). Most of the dog breeders engaged the services of veterinarians in contending with reproductive challenges such as agalactia, dystocia and irregular conception. Partnering of dog breeders with professionals – veterinarians – in the dog breeding business is a healthy development in the interest of both the dogs, dog breeders and population at large (Cleaveland *et al.*, 2003). Good management practice is a possible contributor to business success (Hills & Narayana, 1990; Saleem, 2012). The study revealed that young adults are those already engaged in dog breeding business in Ibadan, Oyo state. The dog breeding enterprise is a potential venture for more unemployed young adults or fresh veterinary graduates to be self-employed (Sansi, 1999). This study might have been limited by information biases. Some of the dog breeders were unwilling

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