ANALYSIS OF POULTRY FEEDS MARKETING IN OSUN STATE, NIGERIA

***KASSALI R., TANIMONURE V. A., OWABUMUWA J. O., AND ISIOYE A. A.**

Department of Agricultural Economics, Obafemi Awolowo University, Ile – Ife, Osun State, Nigeria

*kasskassali@yahoo.com

ABSTRACT

The study analyzed the efficiency in poultry feeds marketing in Osun State. A two-stage sampling technique was used to randomly select 100 respondents for the study. Primary data were collected using a well-structured questionnaire and data were analyzed using descriptive statistics, concentration ratio, operational efficiency and regression technique. The results show that the animal feed marketers in the study areas were adult but below 50 years of age, most of them were male (54%) and married (59%) and about 98% with formal education. The average year of experience in animal feed marketing was 8 years, and average monthly income was ₦ 65,000 (±29,864). With a concentration ratio of 30.2% the poultry feed market was adjudged to be of monopolistic competition type. Only 25% of the respondents achieved efficiency of 60% and above, denoting poor performance of firms. The factors that determined the efficiency in poultry feeds marketing were gender, marital status, number of shops operated, prices of layer mash, turkey mash, chicks feed and local feed. The study therefore, concluded that more women should be encouraged to venture into the business and that local feeds trading should be encouraged.

Keywords: ***poultry feed, market structure, marketing strategy, operational efficiency***

INTRODUCTION

Livestock feed making involves the processing of nutritive agricultural produce such as cereals, legumes either in raw or semi-processed forms, and mixed with other nutrients such as vitamins, minerals, etc., into forms that can easily be assimilated to enhance animal growth and performance (Loosli and Holden, 2012). Research on animal nutrition has also led to improvement in animal diet, productivity, production efficiency, thus increasing profitability in husbandry (Makkar, 2006).

Nigeria ranks 40th in global livestock feed production with over 5 million metric tonnes in 2015, representing 0.5% of the world output.

Demand for livestock feeds, as a result of demand for livestock products is increasing in developing countries, including Nigeria, due to increasing population growth, rapid urbanization and improved income (Steinfeld, 2003; Abdullah *et al.*, 2011).

Increasing livestock production in Nigeria to meet the fast-growing population's demand for animal products implies facing the challenges of adequately supplying livestock feeds, particularly concentrates, with high protein and energy contents making up between 70 to 90% of feed nutrients (Mafimisebi, 2002; Unang, 2003). According to Hendy *et al*. (1995), increased production of mono-gastric animals and animals with improved genetic traits coupled with intensive production systems,

are the basis for the demand for high quality concentrate feeds.

According to Munyori *et al.* (2014), supply of animal feeds is volatile as a result of the seasonality of the inputs, and the factors affecting the supply of animal feeds include, inefficient marketing system, low availability and poor quality of raw materials, processing methods used, handling and storage conditions, etc. Makkar *et al.* (2014) noted also that most of the fine ingredients, including vitamins, minerals, amino-acids and other feed additives are from imported sources.

Feed is one of the inputs used in poultry production, accounting for up to 50 - 70% of the cost of production (Dejene *et al.*, 2014). Hence, many livestock farmers ultimately resolved to the use of less nutritive locally available alternatives (Gura, 2008).

An efficient feed marketing system is rewarding for all the stakeholders along the poultry feed value chain. Current high prices of feeds coupled with the low quality of feeds and occasional scarcity, call for improvement in the performance of both the production and marketing of livestock feeds (Mafimisebi *et al.*, 2002). Meanwhile, poultry feeds market performance will be difficult to analyze if the feed market structure and conduct are not understood.

Market structure is defined by an ensemble of characteristics of the market measured by the number of consumers and degree of firms' market power described by product differentiation and price determination (Scherer and Ross, 1990; Harriss, 1993). According to Chavez (2014), market structure is based on the characteristics of a market relative to the buyers and sellers and their relationships. According to Imoudu and Afolabi (2002), market structure in Nigeria's agriculture is most often not of the perfectly competitive type due to collusive tendencies of sellers through the formation of marketing associations. Firms conduct however is related to its marketing strategies, innovations and advertising that are susceptible to enhance performance (Scherer and Ross, 1990). Market performance is the outcome of the behaviour arising from the interaction of market structure and market conduct. It is the assessment of how well the process of marketing is being carried out and how its aims are achieved.

In view of the importance of the poultry feeds industry to livestock production in Nigeria, especially in the area of dietary improvement, job creation, and foreign exchange savings coupled with the current challenges facing the industry, this study therefore, analyses the efficiency of poultry feeds marketing in Osun State. Specifically, the objectives of the study are to: (i) describe the socioeconomic characteristics of animal feed marketers; (ii) analyse the market structure, conduct and performance of the animal feed industry; (iii) assess the determinants of market performance; and (iv) identify the factors affecting the performance of poultry feeds marketing in the study area.

MATERIALS AND METHODS

The study was carried out in Osun State, located in southwest Nigeria. The state is bounded by Ogun State to the South, Kwara State to the North, Oyo State to the West and Ondo State to the East. The State runs an agrarian economy with a vast majority of the population making livelihood from farming activities. Two-stage sampling technique was adopted to select the respondents for this study. In the first stage, two Local Government Areas (Osogbo and Ife Central) were purposively selected

because of the high concentration of animal feed marketers. In the second stage, Animal Feeds Marketers Associations in the two LGAs were contacted to obtain the list of animal feed marketers, totaling 170 registered marketers, from which a proportionate random sampling of 60 respondents from Ife-central LGA and 40 from Osogbo LGA, was made, making a total of one hundred (100) respondents for the study. Primary data were collected using well-structured questionnaire. Information gathered include socio-economic characteristics of the feed marketers, types of feed marketed, feed sales, number of sales locations, feed prices, and constraints faced by the marketers. The data were analyzed using both descriptive and inferential statistics.

MARKET STRUCTURE ANALYSIS

The market structure was measured using concentration ratio approach. This determines the level of competition in the animal feed market. The ratio is calculated, following Kassali (2009) as follows.

$$CR_n = \sum X_n / \sum X_i$$

Where, CR_n = Concentration Ratio
$\sum X_n$ = Largest n firms' sales
$\sum X_i$ = Total sales

With, $0 < CR_n < 1$

OPERATIONAL EFFICIENCY ESTIMATION

Operational efficiency is an indication of how firms perform marketing functions at the least cost possible. It is therefore a situation whereby the costs of marketing are minimized per unit of output. It is computed based on the total sales to the total marketing cost of the firms in the industry and using the firm with the least as reference for computing the final efficiency score of each firm. It is estimated following Kassali *et al.* (2018), as follows.

Efficiency = Output/Input

$E_i = MS_i / MC_i$ (Local optimum)

$OE_i = (E_i/E_0) * 100$ (Global optimum)

$(i = 1, \ldots n)$

Where,

MS_i = Sales of the firm i^{th} of the industry;

MC_i = Total marketing costs of the firm i^{th} of the industry

E_i = firm's i^{th} efficiency

E_0 = most efficient firm in the industry

OE_i = Operational efficiency (with, $0 < OE_i < 1$)

MC_i includes rent, equipment cost, transportation cost, and cost of labor.

DETERMINANTS OF OPERATIONAL EFFICIENCY

OLS regression technique was used to examine the relationship between operational efficiency and the socio-economic characteristics of marketers including market structure and conduct elements. The model is specified as follows.

$OE_i = f$ (SEC, Structure, Conduct, e_i)

$$OE = a_0 + \sum \alpha_i X_i + \sum \beta_j Y_j + \sum \delta_k Z_k + e_i$$

Where, OE_i = Operational Efficiency of firm i

X_i = Vector of marketers' Socio-economic Characteristics

Y_j = Vector of market structure elements (feed type, quantity, etc.)

Z_k = Vector of market conduct elements (feed price, quantity, number of sales locations, promotion activities, etc.)

a_0 = constant

α_i; β_j = Regression parameters

e_i = error term

The empirical model of the regression analysis is thus specified as follows.

OEi = *f* (Product (number of the types of feed marketed (1=local, 0 otherwise)), Price (average price of feed), Place (number of shops run), Promotion (number of promotion strategies); Age, Sex, Marital status, Number of years in School, Number of years in business, Number of years in Association; e_i)

In view of the dependent variable, OE_i, censored between 0 and 1, Tobit regression would be most appropriate. But Tobit and OLS techniques provide the same results once the numbers of 0's is minimum (Wilson and Tisdell, 2002). In this study, there was no observation with 0 value (i.e., no zero sales), therefore the use of OLS, is appropriate also, as yielding same results as Tobit estimation, in this case.

RESULTS AND DISCUSSIONS

Socioeconomic characteristics of the respondents

Table 1 presents the summary of the socioeconomic characteristics of the feed marketers in the study area. The result showed that most (45%) of the feed marketers were within 31 and 40 years of age with average age of 39 (± 18) years. This shows that, the feed marketers in the study area were still in their economic useful age. About 54% of the respondents were male, while 59% were married. About 49% of the animal feed sellers had between 13 and 18 years of formal education. In terms of experience, 47% of the marketers had in average 8.2 (±6.7) years of experience in feed business. The mean monthly income of the feed marketers was ₦65,000 (± 29,864), while majority (78%) earned below ₦40,000. The most prominent source of capital among feed marketers was personal savings (about 50% of the respondents).

TABLE 1. SOCIOECONOMIC CHARACTERISTICS OF THE RESPONDENTS

Variable	Frequency	Percentage
Age distribution		
20-30	19	19.0
31-40	45	45.0
41-50	20	20.0
51-60	13	13.0
Above 60	03	3.0
Mean	39±18	
Sex distribution		
Male	54	54.0
Female	46	46.0
Marital status		
Single	32	32.0
Married	59	59.0
Others	09	9.0
Years of formal education		
No formal education	2	2.0
6-12	47	47.0
13-18	49	49.0
Above 18	2	2.0
Years of experience		
1-6	47	47.0
7-12	37	37.0
13-18	07	7.0
19-24	09	9.0
Mean	8.2±6.7	
Monthly income		
Below ₦40,000	78	78.0
₦40,000-₦80,000	15	15.0
₦81,000-₦120,000	02	2.0
Above ₦120,000	05	5.0
Mean	65,000±29,864	
Source of capital		
Personal savings	50	50.0
Bank loan	07	7.0
Cooperative loan	32	32.0
Friends/relatives	11	11.0

Source: Data Analysis, 2018

POULTRY FEED MARKET STRUCTURE

Market structure of feed marketing in the study area was analysed using concentration ratio (CR) of the two, four and eight largest firms (sales) and results are as presented in Table 2. The CR_4 was 30.2%, meaning the nature of competition in animal feed marketing was of monopolistic competition type. This implies that the animal feed market consists of medium to large sizes firms trading in commodities with some degree of differentiation. Results also show that there is relative freedom of entry and exit to the poultry feed industry.

TABLE2. STRUCTURE OF POULTRY FEED MARKET

Concentration Ratio estimation		
CR2	**CR4**	**CR8**
19.4	30.2	40.6
Barriers to Entry or Exit Feed market		
Restriction	0	0
No restriction	100	100

Source: Data Analysis, 2018

ANALYSIS OF ANIMAL FEED MARKET CONDUCT

Table 3 presents the components of poultry feeds market conduct. The major determinant of scale of operation is cash availability (41%). The monthly average opening and closing stocks of animal feed marketers were ₦201,000 (±105,300) and ₦610,000 (±310,000), respectively. Most feed marketers (65%) sold less than 5 bags daily and the average number of feed bags sold was 6.3(±4.8). About 55% of the marketers indicated that demand is the main determinant of feed selling price. There is also a high degree of information on prices of feeds in the market as five sources of information were identified by the feed marketers, and the most prominent (68%) was market association.

TABLE 3. ANIMAL FEED MARKET CONDUCT

Variable	Frequency	Percentage
Determinants of Quantity of feed marketed		
Cash at hand	41	41.0
Stock inventory	16	16.0
Expected market demand	19	19.0
Predominance of livestock farmers	24	24.0
Previous Accounting year Opening stock (January)		
₦150,000 and below	48	48.0
₦150,001 - ₦300,000	32	32.0
Above ₦300,001	20	20.0
Mean	₦201,000.30±105,300	
Previous Accounting year Closing stock (December)		
₦1,000,000 and below	90	90.0
₦1,000,001- ₦2,000,000	09	09.0
Above ₦2,000,000	01	01.0
Mean	₦610,000.10±310,000	
Quantity sold daily		
< 5bags	65	65.0
5-15bags	24	24.0
>15bags	11	11.0
Mean sales	6.3±4.8	
Determinants of feed selling price		
Market demand	55	55.0
Cost of production	40	40.0
Quantity of feed available	05	05.0
Sources of marketing information		
Market association	68	68.0
Radio	04	4.0
Television	02	2.0
Newspaper	02	2.0
Feed Company	24	24.0

Source: Data analysis, 2018

OPERATIONAL EFFICIENCY OF POULTRY FEED MARKETING FIRMS

Table 4 shows the distribution of operational efficiency levels of feed firms. The average operational efficiency of the feed firms was 44.3%. Majority (75%) of feed marketers had efficiency of 60% and below, only 25% of the marketers had above 60% efficiency. The implication of this is that there is need to improve on the operational efficiency of feed marketing in the area.

TABLE 4: OPERATIONAL EFFICIENCY OF ANIMAL FEED MARKETING FIRMS

Efficiency range (%)	Percentage	Cumulative Percentage
20 and below	23.0	23.0
20.1 – 40	20.0	43.0
40.1 – 60	32.0	75.0
60.1 – 100	25.0	100.0
Mean	44.3	

Source: Data Analysis, 2018

DETERMINANTS OF OPERATIONAL EFFICIENCY IN FEED MARKETING

Table 5 presents the determinants of operational efficiency in animal feed marketing, using the socioeconomic characteristics of the feed marketers and the elements of marketing mix strategies used by animal feed marketers. The significant F-statistic of 5.48 indicates a significant regression ($p < 0.01$). The coefficient of determination (R^2) of 0.608 implies that about 61% of the variations in operational efficiency of feed marketing were explained by the explanatory variables. Out of the fifteen included predictors, only seven (sex, marital status, number of shops run, layer mash price, turkey mash price, chicks feed price and local feed) were statistically significant. Sex was statistically significant at 10% but negative, indicating that female marketers are increased source of efficiency by 9.5%. That is females are more efficient in feed marketing than their male counterpart. More female in the industry would therefore improve efficiency of animal feed marketing.

Marital status is also significant at 10% but has a negative effect on operational efficiency. That is, married marketers are less efficient than singles. Any additional married feed marketer will reduce operational efficiency by 7.2%. The number of shops run by the marketers was also statistically significant but negative, when a marketer increased the number of shops by 1 unit, the operational efficiency will fall by 5.03%. It is therefore, suggested that marketers should maintain one shop for efficient management of their business. Both the prices of layer mash and chicks feed were significant and had positive relationship with operational efficiency, a unit increase in price will increase operational efficiency by 0.01% and 0.006%, which could be as a result of relatively high demand for these products. However, turkey mash was negative, implying that an additional increase in its price will reduce operational efficiency by 0.01%. Furthermore, the sale of local feed was significant and positive, meaning a unit increase in the sales of local feed increases operational efficiency by 0.03%, which is an encouraging factor for local feed

manufacturers and marketers. This is in line with Oguntade and Mafimisebi (2010), who noted that livestock feeds marketing efficiency improves with quantity of feeds traded.

TABLE 5. DETERMINANTS OF OPERATIONAL EFFICIENCY IN FEED MARKETING

Variable	Coefficient	Standard error	t-value
Constant	13.016	29.176	0.446
Age	0.320	0.288	1.110
Sex	-9.509**	4.999	-1.902
Marital status	-7.19**	3.692	-1.946
Formal education	0.280	0.803	0.348
Experience (years)	0.727	0.754	0.965
Membership in Association	-1.012	0.714	-1.419
Number of feed shops owned	-5.049*	2.986	-1.691
Growers mash price	-0.006	0.005	-1.167
Layers mash price	0.011***	0.003	3.200
Broiler mash price	0.006	0.005	1.280
Turkey mash price	-0.010***	0.002	-4.835
Chicks feed price	0.006*	0.003	1.767
Local feed	0.032**	0.016	2.021
Number of promotion activities	1.151	3.706	0.311
Fish feed	-2.969	2.000	-1.484
F-value	5.481***		
R^2	0.608		

Source: Data analysis, 2018 ***, **, *; significant at 0.01, 0.05 and 0.10 levels, respectively

CHALLENGES FACED BY POULTRY FEED MARKETERS

Table 6 presents the challenges faced by marketers in poultry feed business. The major problem to poultry feed marketing was the seasonality of the demand (55%), besides inadequate capital (19%), high cost of transportation (12%), among others. This is an indication that profit of the feed marketers can be affected by season, besides the scale of production and in line with Kassali (2009)'s findings in egg marketing.

TABLE 6. PROBLEMS FACED BY POULTRY FEED MARKETERS

Problems	Frequency	Percentage
Seasonality of the demand	55	55.0
Irregular supply	07	07.0
Lack of preservation	07	07.0
High cost of transport	12	12.0

Source: Data analysis, 2018

CONCLUSION AND RECOMMENDATIONS

The study concludes that animal feed market is of monopolistic completion type. Marketers sell different types of animal feeds. Majority operated on one shop location and traded on locally made feeds and the most popular channel of distribution was retailing. There is low operational efficiency among marketers and the factors affecting operational efficiency include: gender, marital status, number of shops run, layer mash price, turkey mash price, chicks feed price and local feed. It is therefore recommended that women should be encouraged to venture into livestock feed marketing, local feed marketing should further be encouraged, and marketers be advised to operate only one shop location. Also, local feed marketers are advised to trade more on chicks and growers mash to improve efficiency.

REFERENCES

Abdullah, R. B., Wan Embong W. K. and Soh, H. H. (2011). Biotechnology in animal production in developing countries. Proceedings of the 2nd International Conference on Agricultural and Animal Science, November 25-27, Singapore. Pp. 88-91.

Oguntade, A. E. and Mafimisebi, T. E. (2010). Pricing and Operational Efficiencies in the Livestock feed market in Ondo State, Nigeria. *Revista De Economia E Agronegocio*, 8(2): 279-293.

Chavez, T. (2014). Analysis of Market Structures, ECO 204 Microeconomics, Ashford University, California, USA.

Dejene, M., Bediye, M., Alemu, D., Kitaw, G., Kehaliw, A., Assefa, G. and Tadesse, G, (2014) Livestock Feed Marketing in Ethiopia: Challenges and Opportunities for Livestock Development. *Journal of Agricultural Science and Technology*, A4: 155-168. Available online at: https://www.researchgate.net/publication/268937594_Livestock_Feed_Marketing_in_Ethiopia_Challenges_and_Opportunities_for_Livestock_Development [accessed Jun 21, 2019].

Gura, S. (2008). Industrial livestock production and its impact on smallholders in developing countries. Consultancy Report to the League for Pastoral Peoples and Endogenous Livestock Development, Germany, 65 pp.http://www.pastoralpeoples.org/docs/gura_ind_livestock_prod.pdf.

Harriss, B. (1993). There is Method in My Madness or is it vice versa? Measuring Agricultural Performance in Agricultural and Food Marketing in Developing Countries". In: John Abbot (Ed.): Agricultural and Food Marketing in Developing Countries. Trowbridge Wittshire: Redwood Book Limited. Pp. 34-40.

Hendy, C.R.C., Kleih, U., Crawshaw, R. and Phillips, M. (1995). Livestock and the Environment, finding a balance: Interactions between livestock production systems and the environment impact domain: Concentrate feed demand. Natural Resources Institute, UK, 141 pp.

Imoudu, P. B. and Afolabi, J. A. (2002). An Assessment of the Performance of Plantain Marketing in Ondo State, Nigeria. *Journal of Applied Science*, 5(2): 2690- 2697.

Kassali, R. (2009). Economics of Egg Wholesale Market in Osun State, Nigeria. *Nigerian Poultry Science Journal*, 6:2-10.

Kassali, R., Girei, AA. and ID. Sanu (2018). Analysis of Yam Marketing in Akoko North-East Local Government of Ondo State, Nigeria. *International Journal of Agricultural Marketing*. 4(2):170-177

Loosli J. K. and Holden P. J. (2012). Feed Agriculture. Available at: https://www.britannica.com/topic/feed-agriculture#accordion-article-history.

Mafimisebi, T. E. (2002). Yield of investment in large-scale production and distribution of eggs in Ibadan metropolis. *Tropical Animal Production Investigations*, 5(2):91-101.

Mafimisebi, T. E., Okumadewa, F.Y. and Wright, A.D. (2002). Marketing margin Differentials at three levels of the egg distributive chains in Ibadan metropolis. *Tropical Journal of Animal Science*, 5(1):53-63.

Makkar, H.P.S. (2006). Improving animal productivity through meeting nutrient deficiencies with multi-nutrient blocks, enhancing utilization efficiency of alternate feed resources, and controlling internal parasites: A summary. In: IAEA(ed). Improving Animal Productivity by Supplementary Feeding of Multi-nutrient Blocks, Controlling Internal Parasites and Enhancing Utilization of Alternate Feed Resources. Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture. Pp. 1-12. Available online at: www-pub.iaea.org/MTCD/publications/PDF/te_1495_web.pdf

Makkar, H. P. S., Tran G., Heuzé V. and Ankers, P. (2014). State-of-the-art on use of insects as animal feed. *Animal Feed Science and Technology*, 197:1–3.

Munyori, J. W., Ofunya, F. A. and Ithinji, G. K. (2014). Factors affecting the size of animal feed manufacturing firms in Nyeri and Kiambu Counties. *European Journal of Business and Social Sciences*, 3(3):249-264.

Scherer, F. and Ross, D. (1990). Industrial Market Structure and Economic Performance. Third Edition, Houghton Mifflin, Boston, MA. 713 pages.

Steinfeld, H. (2003). Economic constraints on production and consumption of animal source foods for nutrition in developing countries. *J. Nutr*. (133): 4054S-4061S.

Unang, I. (2003). Profitability and efficiency of the broiler industry in Tasikmalaya. Faculty of Agriculture University of Siliwangi Tasikmalaya Indonesia. http://www.stanford.edu/group /FRI/indonesia/research/broilers.pdf

Wilson, C. and Tisdell, C. (2002). OLS and Tobit Estimates: When is substitution defensible operationally? Economic Theory, Applications and Issues, Working paper No. 15. School of Economics, University of Queensland, 4072, Australia. Pp. 1-14.