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MARKET STRUCTURE AND PRICING MECHANISMS OF AGROCHEMICALS IN NASARAWA STATE, NIGERIA

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Abstract: The study analysed the market structure of agrochemicals in Nasarawa State, Nigeria, focusing on socio-economic characteristics of agrochemical marketers and the degree of market concentration of these marketers. Using stratified sampling technique, data were collected from 165 marketers across six Local Government Areas via structured questionnaire. The collected data were analysed by employing descriptive statistics and the Gini coefficient. The findings on the socio-economic characteristics of agrochemical marketers revealed that the agrochemical market in the study area is dominated by married males within the productive age group, possessing a substantial educational background but with minimal cooperative involvement. The finding on the concentration of agrochemical market in the area revealed a high market concentration with a Gini coefficient of 0.58, indicating significant inequality in sales distribution. This suggests a monopolistic market structure where a few marketers dominate sales. The study recommended establishing market information centers to improve communication and flow of information between agrochemical marketers throughout the marketing system in addition to encouraging cooperative formation among marketers to enhance market efficiency and equitable profit distribution.

Keywords: Market; Structure; Agrochemicals; Nasarawa State; Nigeria

Introduction

The agricultural sector in Nigeria is pivotal to the nation's economy, contributing significantly to employment, food security, and income generation (Tiku *et al*., 2017, Toluwase *et al*., 2019, Agyo and Ornan, 2021, Dayyabu *et al*., 2021, Okpukpare *et al*., 2021, Gbigbi and Ndubuokwu, 2022). Agrochemicals, encompassing pesticides, herbicides, and fertilizers, play a crucial role in enhancing agricultural productivity by protecting crops from pests and diseases and improving soil fertility (Carvalho, 2006, Devi *et al*., 2022). According to Ekeleme (2022) and Obulamah *et al*. (2022), the demand for agrochemicals has increased in Nasarawa State, Nigeria due to the rising need for higher agricultural yields and pest control measures. However, the structure of the agrochemical market in Nasarawa State remains poorly understood, with limited research addressing its dynamics, competitiveness, and regulatory challenges.

Existing literature suggests that market structure significantly influences the efficiency and effectiveness of products' distribution. For instance, Lynham (2018) and Garcia (2023) showed that monopolistic and

oligopolistic market structures can lead to price distortions, reduced product availability, and compromised product quality. Similarly, Flamm and Varas (2022) pointed out that inadequate market information and the presence of low quality products are prevalent issues in poorly structured markets.

Despite the importance of understanding market structures, there is a paucity of comprehensive studies that focused on the agrochemical market in Nasarawa State. Available related studies (Ogaji *et al*., 2013; and Issa *et al*., 2020) focused on marketing of agrochemicals in Benue State and Kano State respectively. This gap in knowledge hinders policymakers, stakeholders, and marketers from making informed decisions to enhance market efficiency and safeguard farmers' interests. Consequently, there is an urgent need to analyze the market structure of agrochemicals in Nasarawa State to identify prevailing issues and propose strategic interventions. Thus, this study broadly analyzed the market structure for agrochemicals in Nasarawa State, Nigeria. Specifically, the study described the socio-economic characteristics of agrochemical marketers, and analyzed the concentration of agrochemical marketers in the study area.

Methodology

The Study Area

The study was conducted in Nasarawa State, Nigeria. The State is located in the central region of Nigeria. Nasarawa State was created out of Plateau state on October 1st 1996 with its headquarters in Lafia. The State lies between the latitude of 7.45º and 9.23º North of the equator and between longitude 7º and 9.37º East of the Greenwich Meridian (Bimbol and Marcus, 2020). It covers a land mass of 26,2526km^2 with a population of 2,886,000 people according to 2022 provisional census spread in the thirteen (13) Local Government Areas of the State namely Akwanga, Awe, Doma, Karu, Keffi, Kokona, Lafia, Nassarawa Eggon, Nassarawa, Obi, Toto and Wamba.

The State shares boundary with Kaduna State in the North, Plateau State in the East, Taraba and Benue States in the south and Federal Capital Territory and Kogi State in the west. Major crops produced in commercial quantities in the State are rice, yam, cassava, sesame, yam, sweet potato, melon, groundnut, cowpea etc. As agriculture-based State, agrochemicals market is promising as farmers see to their production with available land technologies. The choice of Nasarawa State for this study was deemed to be appropriate given its antecedent in agriculture and agro-chemical marketing. Agrochemicals are important to Nasarawa State as agriculture is the major occupation of the people.

Population of the Study

The population of this study consisted of 280 agrochemical marketers obtained in 2022 from the Agrochemical Marketers Association, Nasarawa State chapter. The marketers comprised both the wholesalers and retailers of the product. Their membership units cut across the six Local Government Areas (LGAs) of Nasarawa State namely: Lafia, Awe, Wamba, Akwanga, Kokona, and Toto.

Sampling Technique and Data Collection

The study adopted stratified sampling technique to select a sample of 165 agrochemical marketers from six randomly selected Local Government Areas of Nasarawa State. Structured questionnaire was used for the data collection.

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Analytical Techniques

The study employed descriptive statistics, and Gini coefficient to analyze the collected data. Descriptive statistics were used to describe the socio-economic characteristics of agrochemical marketers while Gini coefficient was used to analyze the structure of agrochemical market in the study area.

The Gini coefficient is given as:

$GC=I-\sum XY$

Where;

GC = Gini coefficient

$\sum$ = summation sign

X = proportion of agrochemical marketers.

Y = cumulative proportion of marketers' sales

Gini coefficient varies from zero to one, where zero indicates perfect equality while one indicates perfect inequality. Higher GC means higher level of market concentration leading to high inefficiency in the market structure (Abah, 2015).

Results and Discussion

Socioeconomic characteristics of agrochemical marketers

The analysis of the socioeconomic characteristics of agrochemical marketers in the study area is presented in Table 1. The result shows that majority (73.94%) of the marketers were male. The dominance of men in agrochemical marketing could be attributed to the stress and energy requirements of the business especially in the area of travelling and movement from one market to another to sell these products which the women owing to their responsibilities in the home cannot afford. This finding is in agreement with Ogaji *et al*. (2013) and Issa *et al*. (2020) that reported the dominance of males in agrochemical marketing in Benue and Kano States respectively.

The distribution of the marketers according to marital status shows that majority (77.58%) were married. The dominance of the married in agrochemical marketing could be attributed to the increased level of household responsibilities of married men and women, thereby making them to look for various avenues to feed their families. This finding is in tandem with Ogaji *et al*. (2013) that reported the dominance of the married in the marketing of agrochemicals in Benue State.

The age distribution of the marketers reveals that most (41.82%) were between the ages of 30 and 39 with a mean age of 38 years. This average age of 38 years implies the dominance of youth in the marketing of agrochemical chemicals in the study area and could be attributed to the youth having the energy requirement to travel and move from one market to another to market these agrochemicals. This finding agrees with Ogaji *et al*. (2013) that reported agrochemical marketing was mostly done by youth between the ages of 31 and 40 years.

The distribution of the marketers by their marketing experience shows that majority (87.8%) of them had five years or less of experience in marketing agrochemicals with mean marketing experience of five years. These marketers are more likely to have a good understanding of the agrochemical market, including product knowledge, customer preferences, and effective marketing strategies. These experience can thus, influence their ability to effectively promote and sell agrochemicals. This finding agrees with Issa *et al*. (2020) that reported majority of marketers of agrochemicals in Kano State had between one and five years of marketing experience.

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The result in Table 1 reveals that the marketers have had one form of formal education or the other. Those with secondary education were 27.27% while those with tertiary education were 67.88%. Only a few (3.03 %) had primary education. This implies that marketers in the study area are literate and should be able to educate the farmers who are the end users on how to use the agrochemicals effectively in order to yield good results and also could guide the marketers in the adoption of improved marketing strategies that could effectively influence the profit accruing from their marketing activities. This is in agreement with Zalkuwi (2019) who posited that educated marketers would find it relatively easy in dealing with customers with respect to communication. Similarly, Emodi and Agwu (2018) opined that the more educated a marketer is, the more he/she is likely to acquire new ideas in marketing.

The result obtained also reveals that 87.88 % of the agrochemical marketers were not in any cooperative society, indicating that the agrochemical marketers in the study area did not know the benefit of cooperative society. According to Adefila and Madaki (2014), Nlerum and Ogu (2014), and Arigbogu *et al.*(2016), benefits members derive from cooperative include improved sales of products, access to credit facilities, enlightenment and education, strong bargaining power for marketing products, transportation services to evacuate and distribute products, provision of market survey and research, and collective market access for members products. This finding is in consonance with Issa et al. (2018) that reported non-involvement in cooperative society among marketers of agrochemicals in Kano State, Nigeria.

Furthermore, Table 1 indicates that majority (60.61%) of the marketers had household size of less than or equal to six persons with a mean household size of seven persons. The mean household size of seven persons implies they have large household size. The household size can influence the distribution and marketing of agrochemicals in the sense that a larger household have the probability of having higher number of persons that can be involved in the marketing process. However, this depends on the composition of the family. This finding conforms to Ogaji *et al*. (2013) that reported 76.8% of agrochemical marketers in Benue State, Nigeria had household size of between one and five persons.

Table 1: Socioeconomic characteristics of agrochemical marketers (n=165)

Variables	Frequency	Percentage (%)	Mean
Sex			
Male	122	73.94	
Female	43	26.06	
Marital status			
Single	37	22.42	
Married	128	77.58	
Age			38 years
≤ 29	30	18.18	
30 – 39	69	41.82	
40 – 49	47	28.48	
≥ 50	19	11.52	

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Marketing experience					5 years
≤ 5	145	87.88			
6-10					
≥ 11					
	13		7.88		
Educational level					
No formal education			3	1.82	
Primary			5	3.03	
Secondary			45	27.27	
Post-secondary			112	67.88	
Membership of cooperative					
Member			20	12.12	
Non-Member			145	87.88	
Household size					7 persons
≤ 6					
7-9					
≥ 10					

Source: Field survey data, 2022.

Structure of Agrochemical Market

The structure of agro-chemical markets was examined based on the degree concentration of the marketers. The analysis of the structure of agrochemical market in the study area is presented in Table 2.

The analysis reveals a Gini coefficient value of 0.58, an indication that there is inequitable distribution of sales. This result reveals a high market concentration, meaning few marketers tend to dominate the agrochemical market in the area. This is therefore an indication of imperfect market competition with monopolistic features, as few marketers handle the largest shares of agrochemical sales in the market. This finding agrees with the report of Isah *et al*. (2023) that revealed agricultural input markets in Nigeria is underdeveloped, causing farmers not to have necessary inputs on time, and in excellent quality, in addition to making them pay exorbitant rates for these inputs.

Table 2: Structure of Agrochemical Market

Class of Income (₦)	No of Marketers	Proportion of Marketers (x)	Total Sales (₦)	Proportion of Total Sales	Cumulative Proportion of Sales (y)	□xy
200,000-250, 000	2	0.012	450,000	0.016	0.016	0.000192
251,000-300, 000	4	0.024	1,102,000	0.038	0.054	0.001296
301,000-350, 000	3	0.018	976,500	0.034	0.088	0.001584
351,000-400, 000	16	0.097	1,877,500	0.065	0.153	0.014841
401,000-450, 000	38	0.230	2,553,000	0.088	0.241	0.05543

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451,000-500, 000	50	0.303	5,608,000	0.194	0.435	0.131805
501,000-550, 000	39	0.236	5,432,000	0.188	0.623	0.147028
551,000-600, 000	3	0.018	1,726, 500	0.060	0.683	0.012294
601,000-650, 000	4	0.024	3,704,000	0.128	0.811	0.019464
651,000-700, 000	2	0.012	1,351,000	0.047	0.858	0.010296
701,000-750, 000	1	0.006	725,500	0.025	0.883	0.005298
751,000-800, 000	3	0.018	3,453,000	0.119	1.002	0.018036
Total	165	1	28,959,000	1		0.417564

Source: Field survey data, 2022.

Mean value sales ₦ 603, 312.50

Gini Coefficient = 1- 0.417564

GC = 0.582436

GC = 0.58

Conclusion and Policy Implications

Evidence from the study shows that the agrochemical market in the study area is dominated by mainly married males and new entrants who are within the productive age with large household size, literate and not involved in cooperative society. The findings also show that the market for agrochemical in the area is characterized by a significant concentration of market share among a few dominant players, which suggests that a small number of marketers control a large portion of the market.

Based on the findings of the study, the following were recommended:

i. Market information centres on agrochemicals should be established by the Nasarawa State government to facilitate adequate communication and flow of information between agrochemical marketers throughout the marketing system.

ii. Agrochemical marketers in the area should be encouraged to form cooperative as some of them might not be getting the right price for their products in view of the high concentration of the market. This would ensure efficiency and increased profit while guaranteeing sustainable supply of agrochemicals in the State.

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