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ANALYSIS OF CORRELATION BETWEEN MARKET ACCESSIBILITY AND HOUSEHOLD FOOD SECURITY STATUS AMONG RURAL FARMERS IN KADUNA STATE, NIGERIA

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ABSTRACT

The study ascertained the relationship between market accessibility and rural farmers' household food security status in four sampled Local Government Areas in Kaduna state, Nigeria. Primary data were obtained by multistage sampling procedure from 244 household heads. Descriptive statistics, food security index and correlation analysis were used to analyze the data obtained. Only about 60% of the sampled farmers indicated participation in road side markets, village markets, rural bulking markets and urban retail markets at 11.64%, 45.21%, 19.86% and 23.29% respectively. It is indicative from this study that farmer's market accessibility is significantly and positively correlated with farmer's food security status, denoting that the less a farmer participates in market(s), the less likely that he will be food secured. Market distance was found to hamper market participation. Consequently, it is recommended that innovations that enhance farmers' participation in markets that can be instrumental in raising their ability to produce more for the market and invariably ensuring food security. Infrastructures that build and strengthen local food security and accessibility networks should also be encouraged like the construction of road networks to ease costly transportation and invariably increase farmers' income earning opportunities.

Keywords: Market Accessibility; Household Food Security; Rural Farmers; Kaduna State

INTRODUCTION

There is a general consensus among nations that the bane of global-food insecurity is morally unacceptable and that it has to be routed due to its myriad of deleterious downsides. Emphasizing the urgency to tackle hunger, the Millennium declaration of General Assembly of the United Nations identified the eradication of extreme poverty and hunger by the year 2015 as goal number one among the eight millennium development goals. Many developing countries, Nigeria inclusive, have not made significant progress to reducing the hunger scourge among its populace. Hunger and food insecurity should not be associated solely with shortfalls in food production and supply at national or international levels. Rather, they should be understood as products of deep-seated structural problems

associated with underdevelopment, accessibility to food and poverty, especially as these affect rural poor people (International Fund for Agricultural Development, IFAD, 2003).

The Food and Agriculture Organization (FAO, 1996) defines food security as "a condition in which all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". Accessibility is one of the pillars of food security that entails food access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements, as defined by FAO (2006), are the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources. Tembo and Simtowe (2009) have however, suggested that there are principally two major ways through which a household may gain access to food. Either the household may produce and consume food from own production, or the household may consume food purchased from the markets.

Markets are of fundamental importance in the way of life of most farmers, rich and poor alike. Markets are where, as producers, they buy their inputs and sell their products; and where, as consumers, they spend their income from the sale of crops to buy their food requirements and other consumption goods. Farmers' access to markets and agricultural support services should be a major concern of policy makers, as agricultural policies have fundamentally been conceived of as a response to perceived market failure and weak access to markets by smallholder farmers (Chapoto and Jayne, 2011).

In line with food security attainment as it relates to accessibility to markets by farmers however, the Healthy Food Access Portal (2017), noted that farmers markets contribute to the health of residents by improving the availability of fresh, nutritious, and affordable food within the community. Markets also build local economies by providing local producers with opportunities to sell their produce directly to consumers. Additionally, farmers markets can provide helpful nutrition information to communities regarding the preparation of often times unfamiliar fresh produce (Healthy Food Access Portal, 2017).

There are many causes or determinants of food security but a number of reports have researched on known determinants like demographic and socio-economic factors; however, operational agencies lack a method for differentiating households at varying degrees of food insecurity in order to target and evaluate their interventions (Webb *et al*., 2006). Simmonds (2006) reported that one of the major causes of food insecurity could be location isolation which relates to poor roads, non-functional markets, long distances to markets, hospital, education facilities and other basic social facilities. This study, therefore, quantified the effect of market accessibility on household food security in the study area. The paper used the Economic theory of consumption based on consumer problem which indicate that a standard household utility model is used to examine/assess the relationships of food security by specifying a demand function for calories.

MATERIALS AND METHODS

Study Area

Kaduna State is a state in Northwest Nigeria with its capital in Kaduna and populated by about 63 different ethnic groups (Hayab, 2015). The State occupies part of the central portion of the northern part of Nigeria and shares common borders with Zamfara,

Kastina, Niger, Kano, Bauchi, Nasarawa and Plateau state as well as the Federal Capital Territory (FCT). The state lies between Longitudes 6^0 and 09^0 E and latitudes 9^0 and 11^0 30'N. The State occupies an area of approximately 48,473.2 square kilometers with annual rainfall ranging between 800 to 1500 mm from North to South, respectively. About 80 percent of the State's population is engaged in peasant farming producing both food and cash crops such as cotton, groundnut, tobacco, maize, beans, guinea corn, millet, rice, ginger, cassava, yam and potatoes. Rearing of livestock such as cattle, sheep, goats, pigs and poultry is also prevalent. Kaduna State occupies a very strategic position in terms of its historical role, contemporary political development and economic activities. The state has 23 local government councils.

Sampling and Data Collection

For this study, primary data were utilized. A multi-stage sampling technique was also used. The Kaduna state Agriculture Development Project being a statewide project operates in 4 zonal offices namely Maigana, Samaru Kataf, Birnin Gwari and Lere Zones. Two of these four zones were selected at random, after which two Local Government Areas were randomly selected of the two zones, namely Giwa, Ikara, Zango Kataf and Kachia. In each of the chosen LGAs, two communities were also randomly selected. The study was conducted in 8 randomly selected villages, and a total of 244 farming households were sampled at random from a 10% sampling frame of registered farmers/household heads.

Data Analysis

The analytical tools that were used to achieve the research objectives include Descriptive Statistics, Food Security Index (FSI), and Correlation Analysis.

The approach taken in this study for the determination of food security index is to follow the identification and aggregation procedures. Identification is the process of defining a minimum level of nutrition necessary to maintain healthy living. This is referred to as the 'Food Security Line", below which people are classified as food insecure and subsisting on inadequate nutrition. The food security line was used in this study based on the daily-recommended level of calories and protein, which are 2260 Kcal and 65g per capita respectively (Olayemi, 1998). This is given by:

$$\textit{Food Security Index (Zi)} = \frac{\textit{Household Daily per Capita Calorie/Protein Consumed}}{\textit{Household Daily per Capita Calorie/Protein Required}}$$

For a household to be food secured, Zi must be greater than or equal to 1 ($Zi > 1$). If Zi is less than 1 ($Zi < 1$), the household is food insecure. The quantity of crops produced, purchased and received as gifts were converted to kilogram and further to calorie consumed per day per household and then compared with the standard (2260kcal).

The measure of market accessibility noted the household head's participation in market(s), distances covered to get to market(s) and types of market(s) accessed by farmers.

RESULTS AND DISCUSSION

Socio-economic Characteristics

The farmers under study were mostly between the age group 21 to 60 years (95.5%), with an average mean age observed to be 39.1 years. The farming population is essentially a young one as only 2.87% of the sample farmers are aged above 60 years. The age of the farmer affects the farmer's knowledge and is expected to also affect the awareness of the activities in the surrounding environment and participation in those activities among other farmers. It was also found that about 88% of the respondents were male. The household income level (a sum of farm income and non-farm income) was averaged at ₦271,238.88, with majority (74.42%) earning less than ₦400,000 annually. Income level is crucial in household food security status because, the higher the income of the farmer, the more likely he/she can afford to feed the family adequately, especially with the much more expensive animal protein type. Opara (2010) suggested further, that, with improved income, the farmer will be better disposed to spend more say, on recommended farm practices that would further increase his farm earnings. However, the results presented in Table 1 showed that most of the small-scale farmers in the study area were low income farmers.

Table 1: Socio-economic characteristics of sampled farmers

Variables	Frequency	Percentage	Range/Mean
Gender of Household Head			
Male	214	87.70	
Female	30	12.30	
Age of Household Head			
≤ 20	4	1.6	
21-40	151	61.89	Mean 39.1
41-60	82	33.61	Range 18-68
> 60	7	2.87	
Household size			
≤ 5	77	31.56	
6-10	115	47.13	Mean 7.5
11-15	44	18.03	Range 1-27
> 16	7	2.87	
Level of Income			
≤ ₦200,000	99	40.57	Mean ₦271,238.88
₦200,001- ₦400,000	107	43.85	Range
₦400,001- ₦600,000	27	11.07	₦ 320,000-1,283,000
> ₦600,000	11	4.51	
Education Level of Household Head			
No Formal Education	25	10.25	
Arabic Education	58	23.77	
Adult Education	18	7.38	
Primary Education	59	24.18	
Secondary Education	68	27.87	
Post-Secondary Education	16	6.56	

Field Survey, 2016

Sampled Farmers' Market Accessibility Indices

Table 2 presents the indices of market accessibility as indicated. Only about 60% of the sampled farmers indicated participation in market either as sellers of their farm produce and/or as buyers of foodstuffs, inputs and other consumables. The types of markets accessed by the sampled farmers include; road side markets, village markets, rural bulking markets and urban retail markets at 11.64%, 45.21%, 19.86% and 23.29% respectively.

Markets have different efficiencies essentially determined by value addition, marketing channels, presence and activities of middlemen and distances covered to the markets. For market distances, farmers may not find it convenient to transport some farm produce to markets in the absence of personal transport. Therefore, the results as indicated in Table 2 shows that, only about 60% of the respondents that patronize markets did so for markets having a distance of 5km or less. 39.75% of the respondents had markets with distances observed to be more than 5km, which was one of the reasons certain farmers did not participate, considering the cost of transportation to such markets. If the market distance is too far, it may even discourage cultivation or production of certain crops. Several studies (Alimi, 1999; Balogun, 2000; Adesoji and Farinde, 2006) have noted that with peasant farmers cultivating arable crops, especially on scattered farm holdings, market integration becomes a challenge. The food security level of the farmers sampled is also indicated in Table 2. Only 66.39% of the farming households were food secured, while 33.61% were not.

Table 2: Indices of market accessibility by sampled farmers

Market participation	Frequency	Percentage
Market participating farmers	146	59.84
Non-market participating farmers	98	40.16
Type of markets Accessed by Farmers		
Non-market participation	98	40.16
Road side market	17	11.64
Village market	66	45.21
Rural bulking market	29	19.86
Urban retail market	34	23.29
Market Distance		
Market(s) distance less than 5km	147	60.25
Market(s) distance more than 5km	97	39.75
Level of Farm Household Food Security		
Food insecure farm households	82	33.61
Food secured farm households	162	66.39

Field Survey, 2016

Correlation of Market Accessibility and Farmers' Food Security Status

Food security status of a farmer's household is fairly positively correlated with market participation on a 41.5% relationship and found significant at 1% level as shown in Table 3. Food security status was also found to be positively correlated with market types, at P < 1% with a correlation coefficient of 0.288, in favour of more organized markets like the rural bulking markets and urban retail markets. Markets distances and food security were also found to be positively but weakly correlated, at a correlation coefficient of 0.087. This means that on an average, farmer's participation in markets either as a seller and or as a buyer predisposes his household to food security. The less a farmer participates in market(s), the less likely that he will be food secured. Furthermore, market participation can be assumed to lead towards production system that is more specialized, which are based on comparative advantages in resource use. Specialization leads to higher productivity through scale economies, greater learning by doing, regular interaction and exposure to new ideas through trade, and better incentives in the form of higher income, which can achieve welfare gains for smallholder farmers (Jaleta *et al.*, 2009; Mathenge *et al.*, 2010). Hence, market participation is expected to affect various aspects of households that in turn influence their welfare, such as production and productivity, incomes, food and nutrition security.

Market types' relationship with respondents' participation was observed to have a very strong positive relationship at almost 80% level (significant at 1%), and as expected, market distance and farmers' participation was found to be strongly, positively correlated with a coefficient of 0.763.

Table 3: Food security status correlation with market accessibility indices

Food security status	Food security status	Market participation	Market types	Market distance
Food security status	1	0.415** [.000]	0.288** [.000]	0.087 [.177]
Market participation	0.415** [.000]	1	0.795** [.000]	0.763** [.000]
Market types	0.288** [.000]	0.795** [.000]	1	0.638** [.000]
Market distance	0.087 [.177]	0.763** [.000]	0.638** [.000]	1

Field Survey, 2016, Figures in parenthesis are p-values, **Significant at P<0.01 (2-tailed).

CONCLUSION

This study is indicative that farmer's market accessibility was significantly and positively correlated with farmer's food security status, denoting that farmers' participation in markets either as sellers and or as buyers predisposes their households to household food security. The less a farmer participates in market(s), the less likely that he will be food secured. Market distance however was found to hamper participation, as it becomes increasingly inconvenient for farmers to travel long distances, with attendant higher cost of

transportation, to be integrated into markets for effective gains. Consequently, it is recommended that innovations that enhance farmers' participation in markets which can be instrumental in raising their ability to produce more for the market and invariable ensuring food security should be pursued. Infrastructures that build and strengthen local food security and accessibility networks such as the construction of road networks, health, educational and other essential facilities should be pursued by the relevant authorities, to ease costly transportation and invariably increase farmers' income earning opportunities.

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