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Agricultural Support Services And Food Security: A Case Of Smallholder Farmers In Kano State, Nigeria

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Abstract: ***The study examined the relationship between agricultural support and food security in Kano State, Nigeria. Data was collected from a sample of 378 respondents through questionnaires, interview and focus group discussions. Using correlation and multiple regression analysis, the study established that inputs and services were positive correlates of food security ($p < 0.05$). At preliminary level there was a relationship between inputs and food security ($r = 0.216$, $p< 0.05$) and between services and food security ($r = 0.441$, $p< 0.05$). However, services had a more positive significant relationship than inputs. At the confirmatory level, the two support services method explained 24.5% of the variation in food security (adjusted $R^2 = 0.245$) while the remaining 75.5% of the variation was accounted for by other factors not considered in this paper. The regression model was also significant ($F = 57.171$, $p< 0.05$), which also suggested that there is relationship between inputs and food security ($\beta = 0.244$, $p = 0.000$) and between services and food security ($\beta = 0.445$, $p = 0.000$). However, the magnitude of the respective betas suggested that services were the most significant predictor of food security followed by inputs respectively.***

Keyword: Agricultural Support, agricultural Inputs, Agricultural Services, Food Security, Smallholder Farmer.

I. INTRODUCTION

Kano State was estimated to have a total of 13,076,900 people according to 2016 forecast by National Population Commission of Nigeria and National Bureau of Statistics (2018). It is the most populated state in Nigeria. Agriculture is the major economic activity engaging over 65% of the population, majority of who were producing at subsistence levels (Abdulrahman, 2013). The study was premised on the assertion that in spite of executing several agricultural projects to boost agricultural production and spending huge sums of money annually on food production/ importation, yet, food insecurity remained a major challenge affecting many families in Nigeria (Ephraim and Arene, 2015). Various authors have discussed of the eminent food and nutrition insecurity in the country (Olayide, 1982; Famoriyo, 1998; Okuneye, 2000, 2002) in Adebayo, (2010). And this was argued to be the main reason behind the deregulation policy measures in the food sub-sector in 1986. Food insecurity is conceived to mean food supply and demand imbalance. Base on nutrition and food security survey, Adebayo (2010) observe this to have reached unprecedented level in Nigeria. Children under the age of five years were mostly stunted (42 %), malnourished (9%) and underweight (25%). In addition, about 9% of adults suffered from mineral deficiency, and 11.6% of child bearing age women were under-nourished. In Kano State, the focus of the study, it was reported that there was increasing food insecurity because families could not access or afford the required amount of food they need on a sustainable basis (Irohigbe and Agwu, 2014). Many projects were executed by the State and Federal Government such as: Fadama Irrigation Scheme which targeted over 760,000 smallholder farmers and Agricultural Intensification Program under the National Special Program on Food Security (NSPFS) targeting over 6,000 smallholder farmers. However, the issue of food insecurity remains quite alarming due to enormous increase in

human population coupled with gradual degradation of existing agricultural land which presents Kano with one of the greatest challenge of population/land ratio in the country (Maigari, 2014).

However, Boserup (1975) posits that, population pressure, if properly managed could induce some positive changes in the agricultural production process by encouraging intensification. And this would produce more food to cater for the growing number of mouths to be fed. Agricultural intensification is defined by the Food and Agricultural Organisation of the United Nations to mean an increase in agricultural productivity per unit of inputs: labour, land, time, fertilizer, seed, feeds, or cash (FAO, 2009). But more technically, Boserup (1975) defined agricultural intensification to mean "key response to population pressures that may include, increase cropping intensities (shorter fallow) and introduction of land saving techniques". The paper is therefore hinged on the theory of agricultural intensification by Boerup (1975) for sustainable household food security in Kano State, Nigeria. It examined the relationship between agricultural support and food security among smallholder farmers in the Kano State.

Agricultural Support is categorised into inputs and services. Input is a common term for a range of materials which may be used to enhance agricultural productivity (Baltzer and Hansen, 2012). This may include land, labour, capital, seeds, fertilizer and pesticides (Sirisha, Babu, and Gowthami, 2016). Services on the other hand refer to all non-tangible and non-storable functions used by the farmers to improve agricultural productivity. Service facilitates the farmer to access and use improved inputs, infrastructure, information and technology for improving productivity and greater income generation (Kannan, 2013). Examples of agricultural services are finance access, agricultural mechanisation and extension services among others. Sustainable food security is also defined by FAO as ''access by all people at all times to safe and nutritious food to meet their dietary needs and food preference for a healthy and active life'' (Sunderland, 2011). Smallholder farmer is defined as small-scale farmer, pastoralist, forest keeper or fisherman who manages area of farmland varying from less than one hectare to 7 hectares characterized by family motives using family labour for production and using most of the produce for family consumption (FAO, 2009).

Several studies have been carried out by different authors to illustrate the influence of input on increased agricultural production. For instance, (Abayomi and Adebayo, 2014; Abrha, 2015; Eze and Echezona, 2012; Chapoto, Sabasi, and Asante-Addo, 2015; Ibeawuchi, Obiefuna, and Iwuanyanwu 2015; Habib, Rani, Siddiqui, Zaman and Anwar, 2014; Kassa, 2014; Marzouk and Kassem, 2011; and Thapa, 2007) were all alluding to the relationship between input and increased food production or food security. However, gaps emerge at contextual and methodological levels. At contextual level, studies by Abayomi and Adebayo (2014), Ibeawuchi *et al.* (2015), and Obasi, Adisu, Desalegn, and Gebreegziabher (2013) were carried out in Southern Nigeria not Kano State, which is located in the northern part of the country with different physiographical setting. At methodological level, the study by Eze and Echezona (2012) was a critical review. These gaps made it reasonable for this empirical study in the context of Kano State to investigate the relationship between inputs and sustainable food security.

In the same token, different scholars have also carried out studies to establish the relationships between services and increased agricultural production. For instance, Akwaa-Sekyi, (2013); Al-Sharafat, Altarawneh, and Altahat (2012); Amare and Endalew, (2016); Anaeto, Asiabaka, Nnadi, Ajaero, Aja, Ugwoke, and Onweagba, (2012); Apiors, Kuwornu, and Kwadzo (2016); Ashaolu, Momoh, Phillip, and Tijani (2011); Baffoe, Matsuda, Nagao, and Akiyama (2014); Bello, Onyeanula, Saidu, and Bello (2015); Chisango and Obi, (2010); Ciaian, Fałkowski, and Kancs (2012); Elias, Nohmi, Yasunobu, and Ishida (2013); Hormozi, Asoodar, and Abdeshahi (2012); Lawal, Torimiro, and Makanjuola (2009); Nigussie, Adisu, Desalegn, and Gebreegziabher (2016).

The literature above shows the significant contribution made by different scholars in trying to relate agricultural services to increased production, working capital, output and income of farmers, etc. However, empirical gaps emerged. Where all other studies revealed that services relate to increased food production, the study by Al-Sharafat *et al.* (2012) indicated that provision of extension services made no difference in the achievement of farmers regarding their production. Contextually, there was no study under Kano State on the use of services to improved food security. Most studies focused on increased agricultural production, working capital, output and income of farmers. These gaps made it reasonable for this study to investigate the relationship between support services and food security in in the context of Kano State, Nigeria.

II. METHOD

A total of 378 respondents were selected using multi-stage random sampling techniques for the questionnaire. Interview and focus group discussions were equally conducted using participants purposively selected from 9 program sites.

SURVEY METHOD: Questionnaire was administered on 378 respondents from across the state. The questionnaire demanded respondents to answer questions covering: background information and support services. Section A has a total of 7 items, while section B, has 10 questions. Questionnaire survey was chosen because it allowed for gathering of a lot of information from large number of respondents within a short period of time (Oso and Onen, 2009).

INTERVIEW: The study used unstructured interview because it allows great freedom and flexibility of questions and responses which relied on social interaction between the researcher and the informant. Interview was conducted in all the 9 sites where 2 farmers and the site manager (extension officer) were purposively selected making a total of 3 participants. Interview was also conducted with Kano State coordinator on National Special Program on Food Security (NSPFS).

FOCUS GROUP DISCUSSION: Focus Group Discussions was conducted to obtain more detailed information not necessarily provided by the questionnaire or

the interview. This comprised two groups of 17 participants who were purposively selected. The first group covering 4 sites consisted of 4 extension managers from each of the program site, 4 farmers and 1 representative of the Local Government Authority making a total of 9 participants. The second group covering 5 sites, had 5site managers 5 farmers representing each program site, and 1 representative of the Local Government Authority, making a total of 11participants. The discussion was guided by the questions used in the interview, though, not restricted to that. Vital information was obtained particularly on the counterpart funding, sustainability of the program and general benefits of the program to the farmers and the state.

To establish whether there was a relationship between agricultural support and food security, each of the two constructs on agricultural support (inputs and services) were considered. The results were presented at bivariate which include linear correlation of the independent variable on the dependent variable and at multivariate levels, where the pertinent hypotheses derived from agricultural support were tested using multiple regression modelling. In the interpretation of results basing on the five-point Likert scale that was used, a mean close to one is considered to imply strongly disagreed, a mean close to two is considered to indicate disagreed, a mean close to three is considered not sure (average or moderate), a mean close to four suggested agreed while a mean close to five was considered to indicate strongly agreed. To establish the kinds of services that were being accessed by smallholder farmers under the program, the respondents were required to respond to some questions on the same. The items required the respondents to indicate whether they were able to obtained fertilizers to enhance their production, AIP had provided them with seeds and insecticides at subsidised rates, AIP had provided them with herbicides to control weed, bought most of the fertiliser they used from the market and whether they used a combination of animal dropping and fertilisers on their farms. The results of farmers' access to agricultural inputs were presented in Table 1.

Descriptive			Statistic	Std. Error
Agricultural inputs	Mean		3.73	0.02
	95% Confidence Interval for Mean	Lower Bound	3.69	
		Upper Bound	3.78	
	5% Trimmed Mean		3.76	
	Median		3.80	
	Variance		0.16	
	Std. Deviation		0.41	
	Minimum		2.20	
	Maximum		4.60	
	Range		2.40	
	Interquartile Range		0.40	
	Skewness		-0.77	0.13
	Kurtosis		0.442	0.256

Source: Primary Data (2016)

Table 1: Summary statistics on Farmers Access to Agricultural Inputs

The results in Table 1, shows that the mean = 3.73 was almost equal to the median = 3.80. Therefore, despite the negative skew (skew = -0.77), the results were normally distributed. The mean and median close to four suggested that farmers' access to agricultural inputs was good basing on the scale used; four represented agreed (good). The low standard deviation = 0.41 suggested low dispersion in the responses.

To establish if there were agricultural services being accessed by the farmers under AIP, the respondents were required to respond to some items on the same. The items required the respondents to point out whether under AIP, they were able to accessed back loans, had easy access to tractors to work on their farms, there were extension workers to assist in their farming activities, received ox ploughs at subsidised rate and if the loans obtained were adequate. The results of farmers' access to agricultural services were presented in Table 2.

Descriptive			Statistic	Std. Error
Agricultural services	Mean		3.49	0.02
	95% Confidence Interval for Mean	Lower Bound	3.44	
		Upper Bound	3.53	
	5% Trimmed Mean		3.50	
	Median		3.60	
	Variance		0.19	
	Std. Deviation		0.44	
	Minimum		2.00	
	Maximum		5.00	
	Range		3.00	
	Interquartile Range		0.60	
	Skewness		-0.42	0.13
	Kurtosis		0.82	0.26

Source: Primary Data (2016)

Table 2: Summary statistics on Farmers Access to Agricultural Services

The results in Table 2 shows that the mean = 3.49 was almost equal to the median = 3.60. Therefore, despite the negative skew (skew = -0.42), the results were normally distributed. The mean close to three suggested that farmers access to agricultural services was moderate basing on the scale used, three represented not sure (moderate). The low standard deviation = 0.44 suggested low dispersion in the responses.

To establish whether there was a relationship between agricultural Services and food security, linear correlation analysis was carried out. The two agricultural Supports considered were inputs and services and the results were given in Table 3.

Constructs	Food security	Agricultural inputs	Agricultural services
Food security	1		
Agricultural inputs	0.216** 0.000	1	
Agricultural services	0.441** 0.000	-0.017 0.745	1

***. Correlation is significant at the 0.01 level (2-tailed).*
Source: Researcher's Computation (2016)

Table 3: Correlation between agricultural Support and Food Security

The results in Table 3 suggested that Agricultural Support namely inputs and services were positive significant correlates of food security ($p < 0.05$). Thus, at the preliminary level, hypotheses H1 to the effect that there is a relationship between inputs and food security ($r = 0.216$, $p < 0.05$) and H2 to the

effect that there was a relationship between services and food security ($r = 0.441$, $p < 0.05$) were supported and the null hypothesis was rejected. This means that there is a significant positive relationship between agricultural Support and food security. However, services had a more positive significant relationship than inputs.

III. REGRESSION OF AGRICULTURAL SUPPORT AND FOOD SECURITY

To confirm whether Agricultural Support predict food security, the independent variable namely, agricultural Support was regressed on the dependent variable that is food security. The agricultural support were inputs and services. The results were presented in Table 4.

Constructs	Standardised Coefficients Beta (β)	Significance P
Agricultural inputs	0.244	0.000
Agricultural services	0.445	0.000
Adjusted $R^2 = 0.245$ F = 57.171, p = 0.000		

Source: Primary Data (2016)

Table 4: Regression of Agricultural Support and Food Security

The results in Table 4 shows that the two agricultural support methods explained 24.5% of the variation in food security (adjusted $R^2 = 0.245$). This means that 75.5% of the variation was accounted for by other factors not considered in this study. The regression model was significant ($F = 57.171$, $p < 0.05$). This is to suggest that there was relationship between agricultural input and food security ($\beta = 0.244$, $p = 0.000$) and agricultural services and food security ($\beta = 0.445$, $p = 0.000$), were supported and the null hypothesis was rejected. The magnitudes of the respective betas suggested that agricultural services were the most significant predictor of food security and followed by agricultural inputs respectively.

IV. SUMMARY

Agricultural support was found to be useful methods for achieving food security in Kano State. It was also indicated that farmers can now access fertilizers, herbicides and ox-cart at subsidized rates. However, accessing loan and tractors for increased mechanization have been relatively difficult to farmers. Therefore, the two agricultural support methods namely input and services were positive correlates of food security. This means that there is a significant positive relationship between agricultural support and food security.

V. DISCUSSION OF FINDINGS

The study found that the two agricultural Support methods namely inputs and services have positive significant relationship with food security. This statement was in agreement with the findings of previous scholars. For example, Abayomi and Adebayo (2014) revealed a positive significant relationship between fertilizer use and annual crops production. Chapoto *et al.* (2015) found how increased use of manure led to yield increase per hectare. Abrha (2015) established that landholding size, possession of oxen, amount of fertilizer used, improved seeds availability, soil quality, average distance of plots from the homestead and crop rotation were among determinant variables of increased agricultural production.

Eze and Echezona (2012) reported the implementation of aspects of farm management such as sources of seeds and seedlings, pests and weed elimination, pesticide application, dates and amounts of fertilization and harvesting or post-harvest treatment can guaranteed food security. Habib *et al.* (2014) revealed how costs of land preparation, fertilisers, seed and labour for harvesting were the significant factors which affected the proceeds of sugarcane growers. Ibeawuchi *et al.* (2015) found that farm size, labour inputs, capital inputs, planting materials and organic manure had a positive significant effect on crop production. Kassa (2014) showed how age, family size, land size, plot distance, fertilizer use, row spacing, credit access and membership to an association had a positive significant influence on production. Marzouk and Kassem (2011) established how application of organic manure alone or in combination with mineral fertilizer such as NPK increased palm yield as compared to mineral fertilization alone (NPK or N). In general, fruit weight, flesh weight, length, diameter and dry weight were increased. Higher fruit TSS and total sugars content were obtained by the application of organic manures alone or in combination with mineral NPK. Obasi*et al.* (2013) indicated that age, level of education, years of farming experience, farm size, fertilizer use, planting materials and labour was the main determinants of agricultural productivity. Thapa (2007) reported that farm size, labour input and manure had a positive and significant influence on farm production. The finding of the study therefore, proves that there is also positive significant relationship between agricultural inputs and food security.

In the same token, to the effect that agricultural services have significant relationship with food security resonates with previous scholars. For instance, Adio *et al.* (2016) found that farmers that used extension services information for crop and animal production, pests, diseases and weed control, fishing, disaster control and mitigation, fertilizer procurement and application, post-harvest technology, sourcing for labour and agricultural credit among others increased their productivity. Akwaa-Sekyi (2013) established how micro credit intervention had a positive significant effect on labour employed, working capital, output and income of farmers. Amare and Endalew (2016) showed that mechanisation had a positive significant effect on the agricultural production system. Using mechanization technologies increased the technical efficiency of smallholders through increased labour and land productivity which also improved food security. Anaeto *et al.* (2012) revealed that agricultural extension was an educational process that brought about desired behavioural change in farmers and other stakeholders. The ability of extension worker to communicate well with farmers, get on well with their initiatives helped to increase their productivity. Apiors *et al.* (2016) reported that mechanisation influenced

land size cultivated, agrochemical expenditure, tillage intensity and threshing intensity hence productivity.

Ashaolu *et al.* (2011) established how total cost per hectare of credit user farmers was higher than that of non-credit user farmers indicating misallocation of resources by credit-user farmers. Again, profit per hectare of credit user farmer was greater than that of non-credit users suggesting that, access to credit led to improved farmers' productivity and higher income in form of revenue and profit. Credit access had a positive significant effect on fertilizer use which led to higher productivity and profit in agricultural production. Baffoe *et al.* (2014) revealed that yield productivity of (cassava, maize and yam) and of borrowing households was larger than that of non-borrowing households. Chisango and Obi (2010) reported how mechanisation was found to be an important factor in the performance of farmers who participated in the programme. Ciaian *et al.* (2012) found that the use of variable inputs and capital investment increased output with additional credit. Farm access to credit increased the total factor productivity up with additional credit.

Elias *et al.* (2013) revealed that low level of mechanical power input, underutilisation of available mechanical power and reliability on human power in most of these areas contributed to low production efficiency. Hormozi *et al.* (2012) established that mechanisation had positive significant effects on the efficiency of rice producers. Lawal *et al.* (2009) showed how farmers adoption of external practices and how this led to considerable improvement in the living standard of the poultry farmers. There was a significant association between adoption of improved practices and standard of living of farmers. Nigussie *et al.* (2016) revealed that on the average annual income of extension users was significantly greater than non-extension users. However, on the contrary, Al-Sharafat *et al.* (2012) revealed that the net profit of farmers who received extension services was almost the same as those who did not receive any extension services. The provided extension services made no difference in the achievement of farmers regarding their production and consequently their net profits. However, the finding of the study to the effect that there is positive significant relationship between agricultural services and food security, agreeing with most of the previous scholars and confirm the hypothesis which stated that food security is depended on agricultural support.

VI. CONCLUSION

The two agricultural support methods namely input and services were found to have positive correlation with food security ($p < 0.05$). At the preliminary level, hypotheses H1 to the effect that there is a relationship between agricultural inputs and food security ($r = 0.216$, $p< 0.05$) and H2 to the effect that there is relationship between agricultural services and food security ($r = 0.441$, $p< 0.05$) were supported and the null hypothesis was rejected. This means that there is significant positive relationship between Agricultural Support and Food Security. However, agricultural services had a more positive significant relationship than agricultural inputs. At the confirmatory level, the two Agricultural Support methods explained 24.5% of the variation in Food Security (adjusted R^2 = 0.245). This means that 75.5% of the variation was accounted for by other factors not considered in this study. The regression model was significant ($F = 57.171$, $p< 0.05$). Therefore, the hypotheses to the effect that; H1 stating that there was a relationship between agricultural input and food security ($\beta = 0.244$, $p = 0.000$) and H2 stating that there was a relationship between agricultural support and food security ($\beta = 0.445$, $p = 0.000$), were supported and the null hypothesis was rejected. The magnitudes of the respective betas suggested that agricultural services were the most significant predictor of food security and followed by agricultural inputs respectively.

VII. RECOMMENDATION

It is recommended that government should introduce some elements of mechanization in the intensification program if meaningful food production and security is to be achieved. The sustainability of the program and indeed the diversification of agricultural enterprise in Kano State depend on government initiatives to adopt some form of mechanization in the production process. The fact that majority of the beneficiaries are smallholder farmers, made them incapable to engage the services of private tractor operators. Government, therefore, needs to introduce tractor hire service at subsidized rates in order to encourage massive food production for the sustainability of the program. It is also recommended that government should initiate policies that would make funds available to farmers (ex-ante and ex-post access to capital). Information from the background characteristics indicated that, more than 60% of the beneficiaries owned less than 1-2 hectares. This makes it difficult for them to use such land as collateral to obtain loans from banks. It is therefore recommended that Kano State Government should liaise with some commercial/agricultural banks acting as surety to enable farmer obtain loan at a reasonable interest rates that can be attractive to smallholder farmers. This will encourage the adoption of some of the innovations introduced under the program which is believed to be input intensive.

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