EFFECTS OF NATIONAL AGRICULTURAL LAND DEVELOPMENT AUTHORITY (NALDA) PROJECTS ON MAIZE PRODUCTION IN NIGER STATE, NIGERIA

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ABSTRACT

The study was carried out to determine effects of National Agricultural Land Development Authority (NALDA) projects on maize production in Niger State, Nigeria. Multi-stage sampling technique was adopted to select 172 registered maize farmers for the study. The data collected were analysed using descriptive statistics (such as frequency, percentage and mean) and inferential statistics such as (Multiple Regression Model). The study revealed that access to land ($\bar{X}$ = 3.62), pesticide/insecticide and fertilizer ($\bar{X}$ = 3.1) were the major benefits of NALDA to maize farmers in the study area, while agrochemicals ($p<0.01$), education ($p<0.01$), extension services ($p<0.01$) and training received via NALDA ($p<0.01$) were the major factors influencing maize farmers output in Niger State. The study recommended that farmers should prioritize attending training sessions on agronomic practices provided by NALDA to improve their knowledge on soil testing, site selection and input usage. This will enhance their productivity and help them better utilize NALDA's support.

KEYWORDS; National; Agricultural; Maize; Production; Niger State; Authority

INTRODUCTION

Agriculture should be the industrial and economic springboard for the nation's quest for acceleration of growth and development as it is well-placed to have a high multiplier effects on social wellbeing and other sectors of the economy. The contemporary socio-economic literature is replete with evidences of the potency of agriculture as a driver of sustainable economic growth and development. The experiences of China, Brazil, Malaysia and Indonesia countries with development characteristics similar to Nigeria, are instructive. These countries have relied on their agricultural prowess to facilitate the process of industrialization from predominantly agrarian economies (Fawole and Oladele, 2020).

In Nigeria, Agriculture was the main stay of the economy long before the discovery of oil in commercial quantity in the 1950s. Covering an area of 924,000 square kilometers, Nigeria has varied ecology, ranging from the Sahel, Sudan and Guinea Savannahs in the North to the Southern rain forests, thus making it possible to produce many varieties of crops and livestock (Fawole and Oladele, 2020). About 75 percent of Nigeria's land is arable, more than half of which is yet to be put into cultivation (Food and Agriculture Organization Statistics (FAOSTAT), 2022). The country is also endowed with rich fishery resources and ample potentials for large-scale fish farming (Abiodun *et al.,* 2020). Agriculture is still largely at rain-fed, subsistence level, characterized by smallholdings, traditional and inefficient method of cultivation, storage and processing (Ambali and Murana, 2017).

Maize is one of the main staple crops in Nigeria and featured among the five food crops (cassava, maize, wheat, rice and sugarcane) whose production is to be promoted for

attainment of food self-sufficiency as revealed by the Minister of Agriculture and Water Resources. In Nigeria, maize production ranks third after sorghum and millet among the cereal crops (Food and Agriculture Organization Statistics (FAOSTAT), 2022). A survey conducted in Nigeria revealed that maize accounts for about 43 percent of calorie intake, with income elasticity of demand of 0.74, 0.65 and 0.71 for both low and high income households, respectively and contributes to 7.7 percent of total cash income of farm households (Aluko *et al.,* 2021).

Land area under maize increased from 5m ha in 2007 to 6.5 million (Ha) across diverse agro-ecological zones of Nigeria and production also increased from 7m to 12m tons during the same period (FAOSTAT, 2022). The average yield of 1.5-2.2 tonnes/ha being obtained in Nigeria is low compared to other places. For instance, FAOSTAT (2022) production statistics from 2007-2020 shows that world maize average yield was 4.3tonnes/ha, average yield for Kuwait was 18.4tonnes/ha, Jordan, 16.2tonnes/ha, New Zealand, 10.2tonnes /ha, Chile, 9.5tonnes/ha, Egypt, 7.1tonnes/ha, Mauritius 5.8tonnes/ha, South Africa, 2.5tonnes/ha, Algeria 2.4tonnes/ha, Cameroon, 1.9tonnes/ha, Ethiopia, 1.8tonnes/ha and Kenya, 1.7tonnes/ha (IITA, 2019). The National Agricultural Land Development Authority (NALDA) in Nigeria is a pivotal government agency saddled with the mandate of transforming the agricultural landscape by empowering smallholder farmers, enhancing food security, and driving rural development. Established in 1992 and later reactivated in 2020, NALDA has emerged as a critical player in the nation's quest for agricultural self-sufficiency and economic diversification. Initially conceived to spearhead the development of idle agricultural lands, NALDA has evolved to address broader challenges facing the agricultural sector. Its reactivation in 2020, under the leadership of the Nigerian government, marked a renewed commitment to harnessing the vast agricultural potential of the country (Dare, 2021). Despite the implementation of various support initiatives by NALDA, there is lack of clarity regarding its effectiveness on maize farming in Niger State. This includes understanding the extent to which these initiatives had contributed to increasing maize productivity, improved farmers' income levels and enhanced overall livelihoods. Based on the foregoing, the study aimed to

i. determine the nature of NALDA projects in maize production in Niger State;
ii. examine the effects of NALDA projects in maize production

RESEARCH METHODOLOGY

This study was conducted in Niger State, Nigeria. It lies between longitude 3^0 30^1 and 7^0 20^1 East of the Greenwich Meridian and latitude 8^0 20^1 and 11^0 30^1 North of the equator (Niger State Bureau of Statistics (NSBS), 2011). The total inhabitants in the State was 3,950,249 people during the 2006 population census. However, going by the annual population growth rate of 3.4% in Nigeria, the population of Niger State was projected to be 6,783,300 people in the year 2022 (NPCN, 2022). The land area is about 76,481.1 square kilometers at a density of 72.76/square kilometer, there are two distinct seasons in Niger State: the dry and wet seasons, which allow the production of numerous agricultural products. The State experiences average annual rain-fall of up to 1,100mm in the North, lasting up to about 120 days and 1,600mm in the South which last up to 150 days. (NSBS, 2022).

Multi-stage sampling technique was adopted for this study. The first stage involved purposive selection of three (3) local Government areas (LGAs) based on available project sites and NALDA activities in the State. In the second stage, three (3) villages were randomly selected from each of the selected LGA. The third stage involved the selection of registered maize farmers from each of the selected village as obtained from Niger State Agricultural and

Mechanization Development Authority (NAMDA) in Table 1. Thus, a total of 172 registered maize farmers were randomly selected from the sample frame of 1,106 as respondents for this study using Yamanne equation for sample size determination as used by Abdullahi *et al.* (2018).

Primary data were used for this study. The data was collected through a semi-structured questionnaire complemented with an interview schedule and assisted by trained enumerators. Data collected were analysed using both descriptive (such as frequency, percentage and mean) and inferential statistics (such as Multiple Regression Model).

Multiple Regression Model

The explicit form of the model could be expressed in four functional forms as given in equation below;

Linear: $Y = a + b_1x_1 + b_2x_2 + \cdots \ldots b_{14}x_{14} + e$ (1)

Semi - $Log{:}Y = a + b_1 logx_1 + b_2 logx_2 + \cdots \ldots b_{14} logx_{14} + loge$ (2)

Cobb-Douglas: $LogY = a + b_1 logx_1 + b_2 logx_2 + \cdots \ldots b_{14} logx_{14} + loge$ (3)

Exponential: $\text{Log } Y = a + b_1x_1 + b_2x_2 + \cdots \ldots b_{14}x_{14} + e$ (4)

Where:

Y = Total output of maize produced (yield in kg);

$\beta_1 - \beta_{14}$ = Parameters to be estimated

$X_1 - X_{14}$=independent variables. Where;

X_1 = Quantity of seed received from NALDA (kg); X_2 = Quantity of fertilizer received from NALDA (kg); X_3 = Quantity of agrochemical received from NALDA (ltr)

X_4 = Size of land received from NALDA for maize production (ha); X_5 = Level of Educational (number of years spent in school); X_6 = Production for commercial purpose (Yes=1, otherwise=0)

X_7 = Access to machine labour from NALDA (yes=1, otherwise=0); X_8 = Access to credit (amount received); X_9 = Access to maize market networks (yes=1, no=0)

X_{10}= Access to Extension services (number of visits); X_{11}= Farm income (naira)

X_{12}= Cost of farm practices (naira); X_{13} = Number of training on agronomic practices by NALDA (No of training); X_{14}= Level of participation in NALDA support initiatives (high=1, low=0)

e = Error term.

RESULTS AND DISCUSSION

Nature of NALDA projects in maize production in Niger State

Table 1 present the results of nature of NALDA projects in maize production in Niger State. This was categorised into: training, farm inputs and farm project operation. Table 4.3 revealed that training on site selection and soil test ($\bar{X}$ =3.53), training on types of farm inputs ($\bar{X}$ =3.34) and training on soil preparation and management were ranked topmost NALDA training initiatives among maize farmers in the study area. These interventions play a vital role in addressing the challenges faced by small-scale farmers and improving their productivity. Land is a critical factor in farming and improper site selection can lead to suboptimal yields. NALDA's focus on training farmers in site selection aims to prevent these challenges by ensuring farmers cultivate land best suited for maize production. Additionally, soil testing provides farmers with detailed information about the nutrient content and fertility status of their soil. By assessing soil suitability and fertility, these tests enable farmers to apply appropriate fertilizers and other inputs, thereby improving resource efficiency, increasing yields and promoting sustainable farming practices. This aspect of NALDA's

initiative equips farmers with the knowledge to address soil deficiencies effectively and make informed decisions about fertilizer use, avoiding wasteful application or overuse.

Training on the types of farm inputs to use is another significant support initiative. This training is designed based on soil testing results, ensuring that farmers apply the appropriate quantity and type of inputs such as fertilizers, seeds and herbicides. This training does not only enhance productivity but also promotes cost efficiency by preventing the unnecessary application of inputs, which could otherwise result in wastage or harm to the environment Training on soil preparation and management complements these efforts. Proper soil preparation ensures better aeration, moisture retention and nutrient availability, creating optimal conditions for crop growth. These initiatives aim to provide farmers with the knowledge and resources necessary to make the best use of their available land, ultimately enhancing their productivity and improving their livelihoods. This is similar to the study of Omotayo (2021) enhancing land productivity for crops is production is one of the aim of NALDA programme in Nigeria.

Regarding inputs, access to land ($\bar{X}$ = 3.62), access to pesticide/insecticide ($\bar{X}$ = 3.1) and access to fertilizer ($\bar{X}$ = 3.01) were ranked as the top NALDA input initiatives among maize farmers in the study area. By making land accessible, NALDA enables farmers to expand their production capabilities, aligning with the programme's goal of consolidating fragmented peasant farms into larger, more economically viable units. This initiative promotes agricultural development by ensuring that farmers can access land to increase their farm size and productivity. Additionally, providing access to essential inputs such as pesticides, insecticides and fertilizers further supports maize farmers by enhancing crop protection and optimizing soil fertility. These interventions are crucial in improving yield potential and ensuring sustainable farming practices, contributing to increased agricultural productivity in the region. This substantiate the study of Shodimu and Oluwadare (2020) who reported that NALDA had several support initiates which aimed at improving the productivity of farmers in Nigeria.

More so, soil preparation ($\bar{X}$ = 3.24), weed and pest management ($\bar{X}$ = 3.23) and storage and processing ($\bar{X}$ = 3.21) were ranked as the top NALDA farm project initiatives among maize farmers in the study area. These initiatives are crucial for enhancing maize production. Proper soil preparation ensures optimal conditions for crop growth, while effective weed and pest management techniques safeguard crops from potential damage, reducing losses. Additionally, training on storage and processing helps to preserve maize quality, minimize post-harvest losses, and add value to the produce, thus improving farmers' profitability and sustainability.

Effects of NALDA projects on maize farmers' output

Table 2 present the results of multiple regression on the effects of NALDA projects on maize farmers' output. The double-log functional form was selected as the lead equation due to the number of significant variables aligning with *a priori* expectations and its highest R-squared value. The computed R-squared was 0.7119, indicating that approximately 71.2% of the variation in maize farmers' output was explained by the included variables, while the remaining 28.8% could be attributed to other factors not captured in the model or random error. The F-statistic was statistically significant at 0.01 probability level, confirming that the model is fit for explaining the relationships studied.

The coefficient for the quantity of agrochemicals received from NALDA (0.1376259) was positive and statistically significant at 0.01 probability level. This implies that a unit increase

Table 1: Nature of NALDA projects in maize production in Niger State

Variable	SD Freq. (%)	D Freq. (%)	A Freq. (%)	SA Freq. (%)	WM	Rank	RMK
Training							
Training on site selection and soil testing	4 (2.3)	9 (5.2)	51 (29.7)	108(62.8)	3.53	1st	A
Training on types of farm inputs	14 (8.1)	0(0.0)	85 (49.4)	73 (42.4)	3.34	2nd	A
Training on soil preparation and management	10 (5.8)	34 (19.8)	58 (33.7)	70 (40.7)	3.09	3rd	A
Training on weather and climate change	26 (15.1)	30 (17.4)	29 (16.9)	87 (50.6)	3.07	4th	A
Training on marketing	47 (27.3)	13 (7.6)	40 (23.3)	72 (41.9)	3.03	5th	A
Training on storage and crop processing	39 (22.7)	63 (36.6)	31 (18.0)	39 (22.7)	3.01	6th	A
Training on weed and pest management	43 (25.0)	79 (45.9)	33 (19.2)	17 (9.9)	3.00	7th	A
Training on crop harvesting	63 (36.6)	55 (32.0)	24 (14.0)	30 (17.4)	2.10	8th	D
Farm inputs							
Access to land	3 (1.7)	5 (2.9)	47 (27.3)	117(68.0)	3.62	1st	A
Access to pesticide/insecticide	13 (7.6)	20 (11.6)	66 (38.4)	73 (42.4)	3.16	2nd	A
Access to fertilizer	4 (2.3)	36 (20.9)	75 (43.6)	57 (33.1)	3.08	3rd	A
Access to mechanical labour/machineries	30 (17.4)	29 (16.9)	30 (17.4)	83 (48.3)	3.06	4th	A
Access to herbicide	24 (14.0)	23 (13.4)	72 (41.9)	53(20.8)	3.01	5th	A
Access to credit/capital	27 (15.7)	30 (21.5)	39 (22.7)	76 (44.2)	3.00	6th	A
Access to seed	42 (24.4)	31 (18.0)	31 (18.0)	68 (39.5)	2.73	7th	D
Farm project operation							
Participation in soil preparation	38 (22.1)	3 (1.7)	10 (5.8)	121(70.3)	3.24	1st	A
Participation in weed and pest management	30 (17.4)	16 (9.3)	10 (5.8)	116(67.4)	3.23	2nd	A
Participation in storage and processing	5 (2.9)	22 (12.8)	77 (44.8)	68 (39.5)	3.21	3rd	A
Participation in planting and agrochemical application	10 (5.8)	12 (7.0)	132 (76.7)	18 (10.5)	3.03	4th	A
Participation in marketing	43 (25.0)	22 (12.8)	54 (31.4)	53 (30.8)	3.02	5th	A
Participation in crop harvesting	67 (39.0)	38 (22.1)	37 (21.5)	30 (17.4)	2.17	6th	D
Participation in soil & project site selection	83 (48.3)	21 (12.2)	27 (15.7)	41 (23.8)	2.15	7th	D

Source: Field survey, 2024: **SD =** strongly disagree, D= Disagree, U= Undecided, A= Agreed and SA = strongly agreed. WM =weighted mean, RMK=Remark. Cut off mean ≥3

in the quantity of agrochemicals provided by NALDA leads to 13.8% increase in maize farmers' output. Agrochemicals, essential for enhancing crop productivity, have become increasingly expensive due to the removal of fuel subsidies, which has driven up the cost of agricultural inputs. This makes agrochemicals inaccessible to many small-scale farmers. However, access to these inputs through NALDA initiatives helps farmers improve productivity and efficiency, thereby increasing their income. By reducing the financial burden of procuring these inputs, NALDA supports smallholder farmers in achieving better yields and income stability, enabling them to sustain their agricultural operations. This substantiate with the study of Ahmed and Yusuf (2022) who reported that participation in the anchor borrower's programme (ABP) on crop yield in Nigeria let to 15 percent increase in maize output.

The coefficient for the level of education (0.1541427) was positive and statistically significant at 0.01 probability level, indicating that a unit increase in education leads to 15.4% increase in maize farmers' output. Educated farmers are better equipped to adopt improved farming techniques, manage resources efficiently and access relevant agricultural information. They are more likely to embrace innovative practices, such as using recommended inputs or modern tools, which enhance productivity. Furthermore, educated farmers can navigate agricultural programmes like NALDA more effectively, leveraging opportunities to improve farm output and profitability. Thus, education empowers farmers to make informed decisions, optimise production processes, and increase income levels. This is similar to the study of Adebayo *et al.* (2021) education is a significant predictor of farmer's outputs.

The coefficient for access to extension services (0.2570594) was positive and statistically significant at 0.01 probability level, indicating that a unit increase in access to extension services provided by NALDA results in a 25.7% increase in maize farmers' output. This implies that access to extension services plays a critical role in enhancing farmers' productivity and profitability. Extension services provide farmers with essential knowledge on best farming practices, pest and disease management, proper use of agrochemicals and improved technologies. Through regular interaction with extension agents, farmers can make informed decisions, optimize input use and adopt modern techniques that improve yields.

Table 2: Effects of NALDA projects on maize farmers' output

Variable	Linear Coef. (t-value)	Semi-log Coef. (t-value)	Double log Coef. (t-value)	Exponential Coef. (t-value)
Quantity of seed received from NALDA	-0.00669	-0.00241	0.06151	0.29511
	(-0.43)	(-0.61)	(1.06)	(1.21)
Quantity of fertilizer received from NALDA	0.15177	0.06078	0.07381	0.19017
	(0.81)	(1.28)	(1.77)	(1.09)
Quantity of agrochemical received from NALDA	0.11998	0.02490	0.13762	0.63912
	(3.17)***	(2.59)***	(3.20)***	(3.55)***
Size of land received from NALDA for maize production	-0.04227	-0.01209	0.01431	0.04465
	(-0.23)	(-0.26)	(0.33)	(0.25)
Level of educational	0.41005	0.09939	0.15414	0.49804

	(2.19)**	(2.08)**	(2.55)***	(1.97)*
Production for commercial purpose	0.25147	0.07462	0.01922	0.08746
	(1.15)	(1.34)	(0.39)	(0.42)
Access to machine labour from NALDA	0.01385	0.00436	0.07941	0.22441
	(0.57)	(0.71)	(0.81)	(0.55)
Access to credit	0.09261	0.02067	0.08640	0.40214
	(2.11)**	(1.85)*	(1.42)	(1.58)
Access to maize market networks	0.11659	0.05396	0.08869	0.20778
	(0.52)	(0.94)	(1.72)	(0.96)
Access to extension services	0.49638	0.14692	0.25705	0.76218
	(2.72)***	(3.16)***	(2.93)***	(2.07)**
Farm income	0.45602	0.15336	0.11810	0.34508
	(1.86)*	(2.46)**	(2.10)**	(1.47)
Cost of farm practices	-0.09258	-0.02142	-0.93544	-3.73564
	(-4.31)***	(-3.92)***	(-1.66)	(-5.40)***
Number of training on agronomic practices by NALDA	4.20546	1.32581	0.76225	2.22434
	(5.74)***	(7.11)***	(7.32)***	(5.10)***
Level of participation in NALDA support initiatives	0.04468	0.01582	0.00910	0.01946
	(0.63)	(0.88)	(0.57)	(0.29)
Constant	1.59526	0.41200	3.78277	13.58444
	(1.67)	(1.69)	(7.78)***	(6.67)***
R-squared	**0.5643**	**0.5797**	**0.7119**	**0.6319**
Adj R-squared	**0.5076**	**0.5244**	**0.6684**	**0.5813**
Prob > F	0.0000	0.0000	0.0000	0.00000
F-statistic	6.43***	6.86***	11.76***	8.53***

Source: Field survey, 2024

Consequently, increased access to extension services empowers farmers to maximise their potential, leading to higher income levels and improved livelihoods. Isah *et al.* (2020) reported that farmers in Kebbi State who received agricultural extension services achieved a notable increase in maize yield, with an average rise of 13 percent. The coefficient for the number of training sessions on agronomic practices by NALDA (0.7622516) was highly significant at the 0.01 probability level. This implies that a unit increase in the number of training sessions results in 76.2% increase in the output of maize farmers. This is because training equips farmers with knowledge and skills to adopt best agronomic practices such as optimal planting techniques, proper use of fertilizers, pest and weed management and efficient water use. These practices enhance crop yield and quality, leading to higher market value and income. Additionally, such training encourages farmers to adopt sustainable practices, reducing production costs and increasing profitability. The substantial effects showed the effectiveness of capacity-building initiatives under NALDA in improving farmers'

productivity, income and overall economic wellbeing. This implies that regular training sessions are a crucial component of agricultural transformation. Asfwa *et al*. (2018) reported that agricultural training had positive impact on farmers output and income.

The coefficient of farm income (0.1181004) was positive and statistically significant at the 0.05 probability level. This implies that a unit increase in farm income results in 11.8% increase in maize output. This is because higher farm income provides farmers with the financial capacity to invest in improved agricultural inputs such as quality seeds, fertilizers, and other agrochemicals, which enhance productivity. Additionally, farmers with higher income can adopt modern farming technologies, hire labour and access training or extension services that contribute to efficient farming practices. Increased income also enables farmers to expand their operations by cultivating larger areas or diversifying into complementary farming activities. This corroborates put this in reference list or remove (2020) who reported that increase in farmers' income led to positive influence on farmer's productivity.

CONCLUSION AND RECOMMENDATIONS

From the findings, it can be concluded that training on soil preparation and management as well as, access to land, pesticide/insecticide and fertilizer were the major benefits of NALDA to maize farmers in the study area, while agrochemicals, education, extension services and training received via NALDA were the major factors influencing maize farmers output in Niger State. The study recommended that farmers should prioritize attending training sessions on agronomic practices provided by NALDA to improve their knowledge on soil testing, site selection and input usage. This will enhance their productivity and help them better utilize NALDA's support.

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