

**IMPACTS OF COMMERCIAL AGRICULTURAL DEVELOPMENT  
PROJECT (CADP) ON FARMERS' EMPOWERMENT IN  
KADUNA STATE (2010-2016)**

**CHRISTOPHER, Seth Ibrahim**

PUBLIC ADMINISTRATION DEPARTMENT, ABU ZARIA.

ibraseth4@gmail.com

+2347060778330

&

**OTOHINOYI, Samuel**

PUBLIC ADMINISTRATION DEPARTMENT, ABU ZARIA.

otohinoyisamuel@yahoo.com

+2348036045571

&

**SHANUM, Leo Dodo**

DEPARTMENT OF PUBLIC ADMINISTRATION, KADUNA POLYTECHNIC

leoshanum4real@gmail.com

08134916414

**Abstract**

The study evaluates the impacts of the Commercial Agricultural Development Project (CADP) on the empowerment of farmers in Kaduna State with specific reference to Lere, Giwa and Kubau Local Government Areas for the period of 2010-2016. Survey and documentary research design were employed and data sourced were analyzed quantitatively and qualitatively with more emphasis on the later. The study adopted the theory of modernization as theoretical underpinning and was also guided by three hypotheses. The study revealed that CADP has positively impacted on the lives of rural farmers by empowering them through the provision of matching grant, training, provision of farm inputs and developing market opportunities/linkages which are manifested in the improvement in standard of living and the income of farmers. However, it has not succeeded in providing storage facilities, modern farming machinery like tractor, and a fixed/good price for farm products. It therefore, recommends that Kaduna CADP should provide storage facilities and modern farm equipment to farmers.

**Keywords:** Matching grant, Value chain, Market opportunities, Training, Agricultural output.

## **Introduction**

In recent years, the concept of farmer empowerment has been put on the agenda and is now an integral part of many development organizations' and NGOs' policies for supporting agricultural and rural development (Danida, 2004). Empowerment has assumed a prominent role in rural and agricultural development with support to farmer groups and organizations entering the dialogue between donors and governments in Asia and Africa (Mohammad, 2012). A central argument used by donors for supporting farmer empowerment is that there is a strong relation between farmer empowerment and such development outcomes as poverty reduction, improved agricultural opportunities for growth and better governance.

Several agricultural empowerment programmes have been introduced to reduce abject poverty among rural dwellers, mostly farmers, in sub-Saharan Africa and also improve rural infrastructures. Some of these programmes include: United Nations Development Programme (UNDP), International Fund for Agricultural Development (IFAD), Agricultural Development Programmes (ADP), The Directorate of Food, Roads and Rural Infrastructure (DIFRRI), and National Fadama Development Projects I, II, III etc., but it seems that these efforts have yielded little or no impact on the rural population, as argued by Afolayan (1997). Supporting this view, Agwu and Abah (2009) argue that the various attempts by Nigerian government in initiating agricultural development programmes aimed at achieving food security have failed (e.g. as seen in the second National Fadama Development Project).

The Kaduna State Commercial Agriculture Development Project (CADP), a World Bank assisted project, has assumed a different approach with objectives to strengthen agricultural production systems and facilitate access to market for targeted value chains (i.e. maize, fruits and dairy products) among small and medium scale commercial farmers in the State with a view to positively enhancing farm output and income. However, despite the claim of provision of matching grant to farmers through the Commercial Agriculture Development Project over three million dollars (\$3,000,000) so far accessed by Kaduna State government (KDSCADO, 2014 Report), the extent of farmer's performance, empowerment and rural development is still below expectations as they are short of funds. Reiterating this position, Onyehialam (2002) observed that for more than two decades now, the agricultural sector of the Nigerian economy has continued to perform below expectation despite the huge sums of money being allocated to the sector in each year's budget. This situation thus raised question as to the effectiveness of the World Bank assisted Commercial Agriculture Development Project (CADP) which was established in the belief that such project will empower farmers to radically transform agriculture and increase the country's food production. The problem is much more confounding when one realizes that the farmers in most parts of Kaduna State in particular still engaged in primitive and traditional methods of agricultural production. For example, in communities like Saminaka, Zaria, Kachia, etc, where farming activities are practiced in large scale, it is observed that primitive forms of agriculture are still being used. This therefore, among

other factors, raises questions on the credibility of the processes involved in the disbursement of the matching grant to farmers in Kaduna State.

### **Objectives of the Study**

The central objective of this research is to evaluate the impacts of Commercial Agriculture Development Project (CADP) on the empowerment of farmers in Kaduna State. However, the specific objectives of this research include:

- i. To determine the extent of farmers' performance with respect to the matching grant provided by the Kaduna State Commercial Agriculture Development Project.
- ii. To examine the extent to which the Kaduna State CADP market opportunities for small and medium scale commercial farmers has enhanced the income of farmers.
- iii. To find out the level of training farmers have acquired to support the project in increasing output and generating employment.

### **Hypotheses**

In order to achieve the objectives stated above, the following hypotheses have been formulated:

- H<sub>01</sub>:** There is no significant relationship between farmers' performance and matching grant provided for the project (i.e. CADP).
- H<sub>02</sub>:** There is no significant relationship between the types of training farmers acquire and increase in agricultural output and employment generation.
- H<sub>03</sub>:** There is no significant relationship between the Kaduna State CADP market opportunities for small and medium scale commercial farmers and enhanced income of farmers.

### **Literature Review and Theoretical Framework**

The word 'development' is a normative concept, almost a synonym for 'improvement' and sometimes used by scholars to mean 'modernization'. It has been used in many senses; including political, economic, social, cultural, administrative and technological. As used in several applications, it always implies a favourable change; a step from the simple to the complex, from the inferior to the superior; from worse to better. The word indicates that one (country) is doing well because it is advancing towards a desirable state (Esteva, 1998).

Dennis Goulet quoted by Thirlwal (2002) posited that, development means obtaining the good life, and has identified three (3) elements of good life, termed "core values" for clear understanding of development – life sustenance; self-esteem; and freedom. These represent common goals sought by all individuals and societies. Life sustenance is concerned with the ability to provide basic needs such as housing, clothing, and food, health care and minimum education. A major objective of development, therefore, must be to raise individuals and society as a whole out of

primary poverty and to provide the basic needs. Absence of the basic needs is equated to underdevelopment; and therefore, a society is developed if they (basic needs) are adequate in supply.

In his conception, Seer (1969) related development to eradication of poverty, unemployment and inequality in a society among other variables when he asserted that;

*The questions to ask about country's development are therefore; what has been happening to poverty? What has been happening to unemployment? What has been happening to inequality? If all the three of these have declined from high levels, then, beyond doubt, this has been a period of development for the country concerned. If one or two of these central problems have been growing worse, especially if the entire three have, it would be strange to call the result "Development" even if per capita income doubled (Seer, 1969:3).*

Seers (1973) added self-reliance, which in this context implies reducing dependence on importing the basic necessities such as food and capital equipment. Because of the complexity in Seers definition above, he summarized development as the "realization of the potentiality of human personality". This entails the ability to provide enough basic necessities such as food, shelter, cloth and employment. He further argues that equality and self-reliance are important to development. He concluded that for development to occur there must be reduction in poverty, inequality and unemployment.

Generally, empowerment can be understood in two different dimensions: (i) to develop the competences and capacities of individuals: to educate and to qualify individuals (farmers), special target groups such as children, women, elderly persons and or families to improve their skills and knowledge so that they are able to generate income and improve the quality of their everyday live and can contribute to the development of the society. (ii) The means to develop, to enable the preconditions for individuals: basic requirements such as peace, gender equality, human rights, or available food, access to land and micro credits or adequate education systems are necessary to enable individuals, special target groups such as women, elderly persons and or families to improve their wellbeing (UNDP document, 2002).

The definition of empowerment as stated above has to do with developing or building the capacities and competences of farmers through training them (i.e. education) in order to improve their skills and knowledge in the application of farm input leading to an enhanced outcome, income and ultimately improved standard of living. Supporting this, Mensah and Yankson (2013), opine that empowerment is a social accomplishment involving processes that support practical contribution of people, organizations and communities in uplifting standard of living.

Rifkin (2003) views the concept of empowerment as a mechanism or process through which individuals, organizations and groups can work on things and have more control over what they are involved in. So that individuals, organizations and groups

with a high power could control the resources, build confidence, make capacity and have an active participation in managing their life.

Farmer empowerment therefore means providing them with the ability and capacity to use local and international skills and knowledge to ensure a fair social and economic situation while preserving and conserving the environment. In this process, the farmer is becoming a supply chain actor, a crop specialist with clear market orientation. The farmers are informed and taught all the best practices to create sustainable production, and to increase the quality of their livelihood. This enables the production of a better crop of a higher and more consistent quality and quantity, which is better suited to satisfy the needs of the buyers while asking for a fair price without damaging the environment.

### **An Overview of Some Development Strategies in Nigeria**

Several developmental strategies and programmes have been developed by past and present governments to empower especially the rural farmer with a view to tackling issues of rural development and food security in Nigeria. These include:

#### **i) The Agricultural Development Project (ADP) Strategy**

As one of the numerous farmers' empowerment initiatives of government and the World Bank, the ADP strategy was popular in the 1970s. The objective of the ADP strategy was to improve the living conditions of the low income earners/farmers resident in the rural areas. This implies farmers' empowerment through the supply of farm inputs such as fertilizer, fungicide, pesticide, High Yielding Variety (HYV) seeds, credit facilities, land clearing services, the development of feeder roads and extension services. The Federal Government had also planned to make the programme nationwide. Thus by January 1982, the World Bank as one of the financiers of the ADP programme, had spent well over two hundred and seventy seven million naira (₦277,000,000) on eleven (11) ADP projects in Nigeria. The Federal Government had in the 3<sup>rd</sup> National Development Plan (1975-1980) for example, committed nearly ₦260 million to the three (3) Pilot Projects in Funtua, Gusau and Gombe. Out of this amount, the World Bank gave the Federal Government of Nigeria a sum of ₦43 million as loan for the projects. By 1980, the ADP strategy was extended to other parts of Nigeria and in 1981 nearly every part of Nigeria was covered by the ADP Strategy (Takura, 1985 cited in Otaki, 2005).

This is reflected in the 4<sup>th</sup> National Development Plan (1980-1985), where the government had nearly committed ₦2.3 billion to the ADP Strategy. For the successful implementation of the programme, the ADP Strategy also categorized the rural producers into three (3) based on their receptivity to this programme of development for the purpose of distributing farm inputs: the large-scale farmers; progressive farmers; and traditional farmers.

## **ii) Fadama Development Project (FadamaI, II& III)**

Fadama-I (1993-1999) focused mainly on crop production and largely ignored support of postproduction activities such as commodity processing, storage and marketing (down stream agricultural sector). The emphasis was on providing boreholes and pumps to crop farmers through simple credit arrangements aimed at boosting cumulative crop output (Nkonya et al. 2008). Fadama I worked with Fadama User Associations, which the states used mainly to recover loans and to decide on water infrastructure locations. The design of FadamaI did not support rural infrastructure development and did not consider other resource users such as livestock producers, fisher-folk, pastoralists, and hunters, among others.

The Second National Fadama Development Project (Fadama II) aim was to increase the incomes of farmers, fishers, and other poor people in Fadama areas. It sought to empower local communities and improve the government's capacity to reach out specifically to the poor and vulnerable groups, such as women, unemployed youth, widows, and people living with HIV/AIDS (IDA, 2009; IFPRI, 2007; Nwanchuku and Ezeh, 2007). Importantly, the strategy represented a shift from public sector domination to a community-driven development (CDD) approach, which is built around community-defined priorities. The participatory component of the project was based on Fadama user groups with common economic interests, such as farmers, fishers, pastoralists (people who raise livestock), women, the disabled, and students (NFDP II, 2005).

Fadama III project which commenced in January, 2004 and lasted for six (6) years was a follow-up to the Fadama II project which was assessed to have impacted the lives of rural farmers, raising their incomes by 63 percent. The project like Fadama II takes the CDD approach, which places beneficiaries in driver's seat. Local community members under the umbrella of Fadama Community Associations (FCAs and Fadama Users Groups (FUGs), oversee the design and implementation of the project and are empowered through skills and capacity building to improve their livelihoods by increasing income generating activities. Fadama III project established standardized procedures and steps to guide the local people on how to take part in the decision-making process. It established platforms for participation, such as local consultation meetings to identify and select the needed infrastructure to be funded by the project.

## **Theoretical Framework**

This study is based on Modernization which refers to a theory of a progressive transition from a 'pre-modern' or 'traditional' to a 'modern' society. The theory looks at the internal factors of a country while assuming that, with assistance, "traditional" countries can be brought to development in the same manner more developed countries have. The exponents of modernization theory like Walter Rodney, Walt Rostow, W.A. Lewis, Talcott Parsons, Daniel Lerner and so on, connect the incredible change experienced in the modern era with modernization. They felt that the rest of the world needed to look to the Western model of modernity and pattern their society like the West in order to progress (Linda, 2001). Appelbaum and Williams (1997) describe

modernization as a complex set of changes that take place in almost every part of a society as it attempts to industrialize. Russ (2009) thus identified four general characteristics of modernization to include: a shift from the simple to the complex; agriculture progresses from being oriented towards subsistence farming that occurs on small plots to commercial farming of large scale; a trend towards industrialization in which human and animal powers are de-emphasized, replaced by machinery drive production; and society changes from one centered on rural to one centered on cities. It is thus based on the postulations that as societies modernize, they leave behind their historical agrarian lifestyles in favour of modern industrial or technological lifestyles; at worst, modernize their cultural agrarian lifestyle, towards economic prosperity and effective fight against poverty (McGuigan, 2009).

Modernization connotes that developing societies would evolve from subsistence farming towards commercial production. As identified in the characteristics of modernization postulated by Russ (2009), the Commercial Agriculture Development Project (CADP) is in a process of modernization especially in the agricultural sector of the country's economy. This is based on the fact that the Kaduna state CADP objectives implies a shift from subsistence farming that occurs on small plots to commercial farming of large scale.

In the same vein, Ellis and Biggs (2001) opined that modernization policies intended to raise the standard of living of the poor often consist of disseminating knowledge and information about more efficient techniques of production. For instance, the agriculture modernization process involves encouraging farmers to try new crops, new production methods and new marketing skills. In general, modernization led to the introduction of hybrids, the green house technology, genetically modified food, use of artificial fertilizers, insecticides, tractors and the application of other scientific knowledge to replace traditional agricultural practices.

### **Research Methodology**

For the purpose of this research, the researchers adopted the survey and documentary methods, with data sourced from questionnaires, interviews, CADP Annual Reports, internet, journals, and other published and unpublished materials. The population size for this study covered 1,637 farmers that were beneficiaries of the CADP grant in Lere, Giwa and Kubau local government areas of Kaduna State and some staff of the Kaduna State Commercial Agriculture Development Office who are key to the project and area of this study. Sample size for the study was drawn using the Krejcie and Morgan (1960) Table for Determining Sample Size from a given population leading to a sample of 312.

A total of 104 copies of questionnaire were distributed to farmers in each of the three (3) LGAs under study. However, those filled and returned were: Giwa 90, Lere 83 and Kubau 95. Also, some key staff were interviewed including: Facilitators- Maize, Facilitator- Road, and Facilitator- Marketing as these were vital to the study. The researchers also interviewed some staff of CADP and farmers in order to gather information relevant to the topic under consideration and to validate results from the

questionnaires. In order to analyze data collected, the use of quantitative and qualitative methods were explored using chi-square ( $x^2$ ) statistical tool to test the hypotheses highlighted.

The presentation and analysis of data for this study were essentially done with the use of tables, simple percentages and chi-square ( $x^2$ ) statistical tool. Therefore, the hypotheses were tested at a critical point of 5% (0.05) to serve as a basis for the acceptance or rejection of the hypotheses formulated.

### Test of Hypothesis One (1)

The null hypothesis to be tested is “that, there is no significant relationship between farmers’ performance and matching grant provided for farmers in the selected LGAs.” This, in effect, is to see the relationship between CADP matching grant and farmers’ performance with the notion that the latter depends on the former. Based on this, the independent variable is “CADP matching grant” while the dependent variable is “farmers’ performance.”

**Table 1: Provision of CADP Matching Grant to Farmers**

Response grading	Giwa lga	Percentage (%)	Lere lga	Percentage (%)	Kubau lga	Percentage (%)	Total	Percentage (%)
Yes	87	100	74	100	82	100	243	100
No	0	0	0	0	0	0	0	0
<b>Total</b>	87	100	74	100	82	100	243	100

Source: Researcher’s field survey, 2016

Respondents were asked whether they received the CADP matching grant to support their farm business. Based on Table 1 above, the entire 243 respondents from Giwa, Lere and Kubau representing 100% agreed that they have benefited from the CADP matching grant. An interaction with some staff of CADP revealed that project is guided by the *matching grant* principle. By implication, the higher the contribution made by a farmer, the lesser the commitment made by CADP.

**Table 2: Extent of Farmers’ Performance and Grant**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
High	56	64	45	61	48	59	149	61
Low	31	36	29	39	34	41	94	39
<b>Total</b>	87	100	74	100	82	100	243	100

Source: Researcher’s field survey, 2016

Table 2 above indicates that 149 respondents representing 61% of the total number of respondents from Giwa, Lere and Kubau LGAs were of the opinion that the CADP matching grant offered to rural farmers has highly increased their performance while 94 representing 39% held a contrary opinion.

**Table 3: Farmers' Performance and the Use of Modern Farming Machinery**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Yes	13	15	20	27	39	48	72	30
No	74	85	54	73	43	52	171	70
<b>Total</b>	87	100	74	100	82	100	243	100

Source: Researcher's field survey, 2016

Respondents were asked whether their performance was connected to the use of modern farming equipment and machinery provided by CADP. Based on this, 72 respondents representing 30% agreed that their performance was as a result of the modern machinery and equipment provided by the CADP while an overwhelming majority of the respondents from Giwa, Lere and Kubau of 171 representing 70% asserted that their performance and productivity were not tied to the provision of modern farming machinery and equipment provided by CADP.

Interactions with some of the respondents revealed that farmers in the study area were not provided with modern farming machines. Instead, they hired machines like tractors to work on their farms at high cost and those who could not afford it employed manual labour.

The chi-square ( $\chi^2$ ) was used to measure the discrepancies between the observed and the expected frequencies of the value obtained from the respondents. The following formula was adopted for the calculation:

$$X^2 = \sum \frac{(O-E)^2}{E}$$
 Where O = Observed frequency of any value; E = Expected frequency of any value.

The  $X^2$  value obtained from the above formula is compared with the value of  $X^2$  table for a given significance level ( $\alpha$ ) and number of degree of freedom (v).  $V = (\text{rows} - 1) (\text{column} - 1)$

Where the rows and columns are from the original table of actual or observed frequencies.

### Decision Rule

Accept the null hypothesis ( $H_0$ ), if chi-square ( $X^2$ ) calculated value is less than  $X^2$  critical value and reject the alternate hypothesis ( $H_1$ ). However, if  $X^2$  calculated is greater than  $X^2$  critical value, reject null hypothesis ( $H_0$ ) and accept alternative hypothesis ( $H_1$ ).

**Table 4: Test of Hypothesis 1**

Observed frequencies				Expected frequencies			
Farmers' Performance and CADP Matching Grant	Yes	No	Total	Farmers' Performance and CADP Matching Grant	Yes	No	Total
Provision of CADP matching grant to rural farmers	243	0	243	Provision of CADP matching grant to rural farmers	154.67	88.33	243
CADP matching grant and extent of farmers' performance	149	94	243	CADP matching grant and extent of farmers' performance	154.67	88.33	243
Extent of farmers' performance and the use of modern farming machinery	72	171	243	Extent of farmers' performance and the use of modern farming machinery	154.67	88.33	243
<b>Total</b>	<b>464</b>	<b>265</b>	<b>729</b>	<b>Total</b>	<b>464</b>	<b>265</b>	<b>729</b>

Source: Researcher's field survey, 2016

The expected frequencies are obtained using the formula below:

$E = \frac{\sum R \times \sum C}{\sum G}$  Where E = Expected frequencies,  $\sum R$  = Row total, and  $\sum C$  = Column total

**Table 5 Computation of X<sup>2</sup> Calculated**

O	E	O - E	(O - E) <sup>2</sup>	(O - E) <sup>2</sup> /E
243	154.67	88.33	7,802.2	50.4
149	154.67	-5.67	32.15	0.21
72	154.67	-82.67	6,834.33	44.19
0	88.33	-88.33	7,802.19	88.33
94	88.33	5.67	32.15	0.36
171	88.33	82.67	6,834.33	77.37
			<b>Total</b>	<b>260.86</b>

Source: Researcher's field survey, 2016

In computing the degree of freedom, we now have:  $V = (3 - 1) (2 - 1) = 2 \times 1 = 2$

The value of the cut off points of chi-square (X<sup>2</sup>) for 2 degree of freedom from chi-square (X<sup>2</sup>) table at 0.05 or 5% level of significance is 5.99.

### Decision

From the computations in table above, chi-square ( $x^2$ ) calculated value of 260.86 is greater than chi-square ( $X^2$ ) critical value of 5.99. To this end, the null hypothesis ( $H_0$ ) would be rejected and the alternative hypothesis ( $H_1$ ) would be accepted. This has proven that there is a significant relationship between farmers' performance and matching grant provided for the project.

### Test of Hypothesis Two

The null hypothesis to be tested is "that, there is no significant relationship between the types of training farmers acquire and increase in agricultural output and employment generation." This in effect is to see the relationship between the types of training workers acquire and agricultural output and employment generation with the notion that the latter depends on the former. Based on this, the independent variable is "farmers' training" while the dependent variable is "increase in agricultural output and employment generation."

**Table 6: Farmers and Training organized by CADP**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Yes	87	100	74	100	82	100	243	100
No	0	0	0	0	0	0	0	0
<b>Total</b>	87	100	74	100	82	100	243	100

Source: Researcher's field survey, 2016

Respondents were asked if they benefited from any form of training organized by CADP. Table 6 above depicts that all the respondents from the three (3) local government areas of Giwa, Lere, and Kubau have agreed that they have benefited from one form of the training or the other organized by CADP. This confirms that CADP has made significant effort towards building the capacity of commercial farmers in the state.

**Table 7: Types of Training Farmers Receive**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Oversees training	-	-	-	-	-	-	-	-
Local training, Workshop and Seminars	30	34.48	21	28.38	25	30.49	76	31.28
On-the-farm training	44	50.57	38	51.35	40	48.78	122	50.21
Oversees training, Local training, Workshops and Seminars.	13	14.95	15	20.27	17	20.73	45	18.51
<b>Total</b>	87	100	74	100	82	100	243	100

Source: Researcher's field survey, 2016

Respondents were asked what type of training they have received. Table 7 above shows that 76 of the respondents representing 31.28% submitted that they have received local training, workshop and seminars, 122 of the respondents representing 50.21% held that they had on-the-farm training, while 45 of the respondents representing 18.51% opined that they participated in overseas training, local training, workshops and seminars. However, none of the respondents agreed that overseas training was offered to them. Hence, it is clear that the major type of training offered to farmers was on-the-farm training.

Interactions with some staff of CADP revealed that the project has improved the skills and capacities of farmers in Kaduna State through trainings including in-house training on: project facilitation, the use of Aflatoxin technology, keeping of farm records, market facilitation, business plan development, post harvest handling of farm produce, etc.

**Table 8: Training and Increased Agricultural Output**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Yes	87	100	74	100	82	100	243	100
No	0	0	0	0	0	0	0	0
<b>Total</b>	87	100	74	100	82	100	243	100

**Source: Researcher’s field survey, 2016**

Respondents were asked whether training offered them by CADP has improved or increased their agricultural output. Table 8 above indicates that all the respondents from the three (3) local government areas of Giwa, Lere and Kubau agreed that training offered by CADP has led to increase in their agricultural output.

**Table 9: Farmers Training and the Extent of Agricultural Output**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
High	51	58.6	46	62.2	49	59.8	146	60.1
Low	36	41.4	28	37.8	33	40.2	97	39.9
<b>Total</b>	87	100	74	100	82	100	243	100

**Source: Researcher’s field survey, 2016**

As a follow up to the last question, respondents were asked the extent to which their agricultural output has increased as a result of the training received. The table above indicates that 146 respondents representing 60.1% of the total number of respondents from Giwa, Lere and Kubau LGAs were of the opinion that the CADP training offered to rural farmers has highly increased their agricultural output while 97 representing 39.9% held a contrary opinion.

An interview held with some of the commercial farmers validates the opinion that farmers' training in Giwa, Lere and Kubau LGAs has significantly increased their output between 2010 and 2014. For instance, in Giwa local government area, one of the maize farmers belonging to TalafiCommodity Interest Group (CIG) informed the researcher that before the grant, he made 110 bags of maize from 7 hectares of farmland annually, but after the intervention he now makes up to 300 bags. Another farmer from Lere LGA belonging to Saminaka Logic CIG testified that prior to the intervention; he made 120 bags of maize annually using 10 hectares of land, but afterwards produced 370 bags. Also, a farmer from Anchau Commercial Maize Farmers' Cooperative Society in Kubau LGA affirmed that he rose from production of 109 bags to 320 bags on 10 hectares of farmland.

The chi-square ( $\chi^2$ ) was used to measure the discrepancies between the observed and the expected frequencies of the value obtained from the respondents. The following formula was adopted for the calculation:

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Where O = Observed frequency of any value; E = Expected frequency of any value.

The  $\chi^2$  value obtained from the above formula is compared with the value of  $\chi^2$  table for a given significance level ( $\alpha$ ) and number of degree of freedom ( $\nu$ ).

$\nu = (\text{rows} - 1) (\text{column} - 1)$

Where the rows and columns are from the original table of actual or observed frequencies.

### **Decision Rule**

Accept the null hypothesis ( $H_0$ ), if chi-square ( $\chi^2$ ) calculated value is less than  $\chi^2$  critical value and reject the alternate hypothesis ( $H_1$ ). However, if  $\chi^2$  calculated is greater than  $\chi^2$  critical value, reject null hypothesis ( $H_0$ ) and accept alternative hypothesis ( $H_1$ ).

**Table 11: Test of Hypothesis 2**

Observed frequencies				Expected frequencies			
Types of Farmers Training, Agricultural Output and Employment Generation	Yes	No	Total	Types of Farmers Training, Agricultural Output and Employment Generation	Yes	No	Total
Rural Farmers and CADP Training	243	0	243	Rural Farmers and CADP Training	210.67	32.33	243
Farmers' Training and Increased Agricultural Output	243	0	243	Farmers' Training and Increased Agricultural Output	210.67	32.33	243
Farmers' Training and the Extent of Agricultural Output	146	97	243	Farmers' Training and the Extent of Agricultural Output	210.67	32.33	243
<b>Total</b>	<b>632</b>	<b>97</b>	<b>729</b>	<b>Total</b>	<b>632</b>	<b>97</b>	<b>729</b>

Source: Researcher's field survey, 2016

The expected frequencies are obtained using the formula below:

$$E = \frac{\sum R \times \sum C}{\sum G}$$

Where E = Expected frequencies,  $\sum R$  = Row total, and  $\sum C$  = Column total

**Table 12 Computation of X<sup>2</sup> Calculated**

O	E	O - E	(O - E) <sup>2</sup>	(O - E) <sup>2</sup> /E
243	210.67	32.33	1,045.23	4.96
243	210.67	32.33	1,045.23	4.96
146	210.67	64.67	4,182.21	19.85
0	32.33	-32	1,024	31.67
0	32.33	-32	1,024	31.67
97	32.33	64.67	4,182.21	19.85
			<b>Total</b>	<b>112.96</b>

Source: Researcher's field survey, 2016

In computing the degree of freedom, we now have:  $V = (3 - 1) (2 - 1) = 2 \times 1 = 2$   
 The value of the cut off points of chi-square ( $X^2$ ) for 5 degree of freedom from chi-square ( $X^2$ ) table at 0.05 or 5% level of significance is 5.99.

**Decision**

From the computations in table above, chi-square ( $x^2$ ) calculated value of 112.96 is greater than chi-square ( $X^2$ ) critical value of 5.99. To this end, the null hypothesis ( $H_0$ )

would be rejected and the alternative hypothesis ( $H_1$ ) would be accepted. This has proven that there is a significant relationship between the types of training farmers acquire and increase in agricultural output and employment generation in Kaduna State.

### Test of Hypothesis Three

The null hypothesis to be tested is “that, there is no significant relationship between Kaduna State CADP market opportunities for small and medium scale commercial farmers and enhanced income of farmers.” This in effect is to see the relationship between the CADP market opportunities for small and medium scale commercial farmer and the income of farmers with the notion that the latter depends on the former. Based on this, the independent variable is “market opportunities” while the dependent variable is “income of farmers.”

**Table 12: Construction of Feeder Roads to link Farmers to the Market**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Yes	50	57.5	45	60.8	48	58.5	143	58.8
No	37	42.5	29	39.2	34	41.5	100	41.2
<b>Total</b>	87	100	74	100	82	100	243	100

Source: Researcher's field survey, 2016

Under this variable, respondents were asked whether feeder roads were provided in the areas to link farmers to the market. Table above revealed that 143 of the respondents representing 58.8% were of the opinion that CADP has constructed feeder/paved roads in their communities to link them to the market while 100 representing 41.2% of the respondents opined that CADP has not constructed feeder/paved roads to link them to the market.

**Table 13: Feeder/Paved Roads and Movement of Farm Produce**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Yes	34	39.1	26	35.1	21	25.6	81	33.3
No	53	60.9	48	64.9	61	74.4	162	66.7
<b>Total</b>	87	100	74	100	82	100	243	100

Source: Researcher's field survey, 2016

Respondents were asked whether the roads provided by CADP are good enough to ease the movement of farm produce. From The table above, it can be deduced that 81 respondents representing 33.3% agreed that the roads provided in their communities were good enough to ease movement of farm produce while 162 respondents representing 66.7 disagreed that roads provided have eased movement of farm produce.

**Table 14: Price Mechanism and Profitability of Farm Business**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Yes	25	28.7	17	23.0	28	34.1	70	28.8
No	62	71.3	57	77.0	54	65.9	173	71.2
<b>Total</b>	87	100	74	100	82	100	243	100

**Source: Researcher’s field survey, 2016**

Respondents were asked whether CADP has put in place a price mechanism to regulate prices of farm produce and ensure profitability of their farm business. The table above shows that 70 respondents representing 28.8% agreed that there is a regulatory price mechanism put in place by CADP to enhance profitability of their farm business while 173 respondents representing 71.2% held a contrary opinion, that there was no price mechanism put in place to regulate prices of farm products and ensure farm profitability.

However, interview held with the CADP Facilitator for Marketing revealed that although CADP (as part of its proposal) made provision for the Market Information Kiosk (MIK) which were to be developed for the dissemination of market information, the project was yet to implement this as at the time of this research. Also, an interview with some of the farmers that the absence of a mechanism for regulating prices of farm product has immensely affected the profitability of their farm business and constituted their greatest challenge in commercial farm business.

**Table 15: CADP Storage Facilities and Agricultural Products**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Yes	29	33.3	13	17.6	17	20.7	59	24.3
No	58	66.7	61	82.4	65	79.3	184	75.7
<b>Total</b>	87	100	74	100	82	100	243	100

**Source: Researcher’s field survey, 2016**

Respondents were asked whether CADP has provided storage facilities for the preservation of their agricultural products. Table above reveals that, 59 respondents representing 24.3% opined that CADP has provided storage facilities for their agricultural products while 184 respondents representing 75.7% held a contrary view that storage facilities were not provided to them by CADP. However, the researcher gathered from the discussions held with farmers in Lere, Giwa and Kubau local government areas that storage facilities were not provided by CADP although farmers were taught storage/preservation technology and the use of treated bags which can be applied in their local stores. In consonance with this opinion, an interview with the Facilitator- Marketing and Facilitator- Maize revealed that CADP has not provided storage facilities to commercial farmers in the Kaduna State, although it was part of the project’s plan/proposal.

**Table 16: CADP Market Opportunities and Enhanced Income of Farmers**

Response Grading	Giwa LGA	Percentage (%)	Lere LGA	Percentage (%)	Kubau LGA	Percentage (%)	Total	Percentage (%)
Yes	49	56.3	42	56.8	57	69.5	148	60.9
No	38	43.7	32	43.2	25	30.5	95	39.1
<b>Total</b>	87	100	74	100	82	100	243	100

Source: Researcher's field survey, 2016

Respondents were asked whether market opportunities provided by CADP has led to increase in their income. The table above reveals that, 148 respondents in Giwa, Lere and Kubau LGAs representing 60.9% agreed that the market opportunities provided by CADP has led to improvement in their income while 95 respondents representing 39.1% opined that market opportunities provided by CADP has not enhanced their income. Information gathered from the farmers revealed that while CADP has done well in the areas of linkage of farmers to off-takers, there were shortfalls in the areas of providing a price control mechanism to ensure that they sell farm products at profitable prices.

The chi-square ( $\chi^2$ ) was used to measure the discrepancies between the observed and the expected frequencies of the value obtained from the respondents. The following formula was adopted for the calculation:

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Where O = Observed frequency of any value

E = Expected frequency of any value.

The  $X^2$  value obtained from the above formula is compared with the value of  $X^2$  table for a given significance level ( $\alpha$ ) and number of degree of freedom (v).

$$V = (\text{rows} - 1) (\text{column} - 1)$$

Where the rows and columns are from the original table of actual or observed frequencies.

### Decision Rule

Accept the null hypothesis ( $H_0$ ), if chi-square ( $X^2$ ) calculated value is less than  $X^2$  critical value and reject the alternate hypothesis ( $H_1$ ). However, if  $X^2$  calculated is greater than  $X^2$  critical value, reject null hypothesis ( $H_0$ ) and accept alternative hypothesis ( $H_1$ ).

**Table 17: Test of Hypothesis 3**

Observed frequencies				Expected frequencies			
Market Opportunities for Small and Medium Scale Farmers and Enhanced Income	Yes	No	Total	Market Opportunities for Small and Medium Scale Farmers and Enhanced Income	Yes	No	Total
Construction of Feeder Roads to link Farmers to the Market	143	100	243	Construction of Feeder Roads to link Farmers to the Market	100.2	142.8	243
Feeder/Paved Roads and Movement of Farm Produce	81	162	243	Feeder/Paved Roads and Movement of Farm Produce	100.2	142.8	243
CADP Storage Facilities and Agricultural Products	59	184	243	CADP Storage Facilities and Agricultural Products	100.2	142.8	243
Price Mechanism and Profitability of Farm Business	70	173	243	Price Mechanism and Profitability of Farm Business	100.2	142.8	243
CADP Market Opportunities and Enhanced Income of Farmers	148	95	243	CADP Market Opportunities and Enhanced Income of Farmers	100.2	142.8	243
<b>Total</b>	<b>501</b>	<b>714</b>	<b>1,215</b>	<b>Total</b>	<b>501</b>	<b>714</b>	<b>1,215</b>

**Source: Researcher’s field survey, 2016**

The expected frequencies are obtained using the formula below:

$$E = \frac{\sum R \times \sum C}{\sum G}$$

Where E = Expected frequencies,  $\sum R$  = Row total, and  $\sum C$  = Column total

**Table 18: Computation of X<sup>2</sup> Calculated**

O	E	O - E	(O - E) <sup>2</sup>	(O - E) <sup>2</sup> /E
143	100.2	42.8	1,831.8	18.3
81	100.2	-19.2	368.6	3.7
59	100.2	-41.2	1,697.4	16.9
70	100.2	-30.2	912.04	9.1
148	100.2	48.0	2,304.0	22.9
100	142.8	42.8	1,831.8	18.3
162	142.8	19.2	368.6	3.7
184	142.8	41.2	1,697.4	16.9
173	142.8	30.2	912.04	9.1
95	142.8	-47.8	2,284.8	16.0
			<b>Total</b>	<b>134.9</b>

Source: Researcher's field survey, 2016

In computing the degree of freedom, we now have:

$$V = (5 - 1) (2 - 1) = 4 \times 1 = 4$$

The value of the cut off points of chi-square (X<sup>2</sup>) for 4 degree of freedom from chi-square (X<sup>2</sup>) table at 0.05 or 5% level of significance is 9.48.

### Decision

From the computations in the table above, chi-square (x<sup>2</sup>) calculated value of 134.9 is greater than chi-square (X<sup>2</sup>) critical value of 9.48. To this end, the null hypothesis (H<sub>0</sub>) would be rejected and the alternative hypothesis (H<sub>1</sub>) would be accepted. This has proven that Kaduna State CADP market opportunities for small and medium scale commercial farmers have led to the enhancement in the income of farmers.

### Findings

The test of the formulated hypotheses of this study with data generated from the field led to the following findings:

- i. The study discovered that there is a significant and positive relationship between farmers' performance and matching grant provided for the project. This implies that the matching grant offered to commercial farmers in Kaduna State has helped to improve their performance and strengthen their farming business. The grant has led to the empowerment of farmers by building their capacities for higher production of farm products in Kaduna State. However, some farmers were not able to access the grant due to inability to pay their part of the contribution.
- ii. It was also found that, commercial farmers were empowered through training (i.e. on-the-farm and local trainings) and this has led to increase in agricultural output which proves a positive relationship between the types of training and increase in

farm output. Though, most of the training received by farmers were on-the-farm and local trainings, it has contributed to their increase in crop production.

- iii. This study also found out that, CADP has provided marketing opportunities (i.e. linkage to off-takers, storage techniques, etc) to farmers which have enhanced their income. However, it has not succeeded in providing storage facilities as earlier planned/proposed by the project and has affected food supply in Kaduna State.
- iv. Other factors that have undermined the performance of farmers in the State include: lack of modern farming machineries (e.g. Tractors, Harvesters, Graders, etc.); and lack of fixed and good pricing system put in place to regulate prices.

### **Conclusion**

Based on our findings from the analysis of data, we conclude that the activities of CADP has impacted especially on the empowerment of commercial farmers in Kaduna State based on its policy objectives to strengthen agricultural production systems and facilitate access to market for targeted value chains among small and medium scale commercial farmers in the State. The project was assessed to have impacted the lives of commercial farmers by raising their income level, increasing production and sales of farm products, creating linkage to market, etc. Success has been made in the empowerment of farmers through the provision of matching grant, training, market linkages to potential off-takers, and so on. However, CADP has not succeeded in the aspects of ensuring a good/fixed pricing system for agricultural products, storage facilities, timely supply of farm inputs, modern machineries, good road linkages, and so on. All these therefore pose a great challenge that has undermined the effective performance of farmers from 2010 – 2016 in Kaduna State.

### **Recommendations**

In the light of the research findings, the following recommendations are hereby made:

- i. It is recommended that farmers who could not benefit from the grant should be linked to commercial banks for assistance. More so, sensitization and awareness creation is necessary to increase participation of farmers.
- ii. Apart from local and on-farm training, there is the need for the CADP to do more in the areas of extension services and inter-state trainings to abreast farmers with best practices nationally and globally.
- iii. There is a need for CADP to do more in the areas of marketing opportunities: provide storage facilities (storage cans, silos, etc) in each LGA/community. More so, a fixed market price of farm commodities should be fixed by government to make farming lucrative and profitable.
- iv. We also recommend that modern farm machinery should be made available to commercial farmers as this will go a long way towards enhancing agricultural productivity in Kaduna State. Alternatively, CADP can enter into a memorandum of understanding (MOU) with relevant companies who can lease these farm machines to commercial farmers.

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