IMPACT ASSESSMENT OF COMMERCIAL AGRICULTURE DEVELOPMENT PROJECT ON DAIRY PRODUCTION AND RURAL LIVELIHOOD IN SELECTED LOCAL GOVERNMENT AREAS OF KADUNASTATE, NIGERIA

BY

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DECLARATION

I hereby declare that this dissertation titled "**Impact Assessment of Commercial Agriculture Development Project on Dairy Production and Rural Livelihood in Selected Local Government Areas of Kaduna State, Nigeria**" has been written by me and it is a record of my research work. No part of this dissertation has been presented in any previous application for another degree or diploma in this or any other institution. All borrowed information has been duly acknowledged in the text and a list of references provided.

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CERTIFICATION

This dissertation titled "**Impact Assessment of Commercial Agriculture Development Project on Dairy Production and Rural Livelihood in Selected Local Government Areas of Kaduna State, Nigeria**", by Ahmed Zuntu BAKO meets the regulations governing the award of the Degree of Master of Science of the Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This dissertation is dedicated to my endearing parents AlhajiBakoZuntu, HajiyaZainabBakoZuntu, also my step mother HajiyakhadijaBakoZuntu and the entire BakoZuntu family. This thesis is also dedicated to all the Muslim Ummah in Nigeria and the world at large.

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ABSTRACT

This study assessed the Impact of Commercial Agriculture Development Project (CADP) on Dairy Production and Rural Livelihood in Selected Local Government Areas of Kaduna State, Nigeria. The broad objective of the study is to assess the impact of CADP on dairy production and rural livelihood in the study area. A multi-stage sampling technique was used to select a sample size of 120 respondents out of a sample frame of 1200 dairy farmers whom are beneficiaries of the project. Primary data was collected with the aid of a well structured questionnaire administered to the 120 respondents from Giwa, Kachia and Birningwari LGAs respectively. The data collected were presented using descriptive statistics like frequency tables, averages and percentages to describe the socio-economic characteristics of the respondents while the Wilcoxon-signed-rank test statistic was used to assess the impact of CADP on assets, productivity and income of the respondents. The result showed that the average age of the respondents was 42 years with an average of 28 years experience in dairy production. It was also found that the average household size of the respondents is 9 members. The impact result revealed a positive and significant impact of CADP on the assets, productivity and income of the respondents. Specifically, the findings suggested that the beneficiaries experienced a positive increase in their assets, productivity and income by NGN 48,636.83,0.12litre/cow/day and NGN 18,202 per annum respectively. Also, the Wilcoxon-signed-rank test value of 6.47,5.89 and 7.64 revealed that CADP has significant positive impact on assets, productivity and income at 1% level of probability respectively. It was therefore recommended that CADP should be extended to other states and also other value chains in order to improve dairy production and rural livelihood.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Livestock play a very important role in Nigerian agriculture contributing about 12.7% of agricultural GDP (Central Bank of Nigeria (CBN), 1999). The livestock population comprises about 14 million cattle including dairy cattle, 34 million goats, 22 million sheep and about 100 million poultry (Walker,1981).

The dairy industry provides a means of livelihood for a significant proportion of rural pastoral families in the sub-humid and semi-arid ecological zones of Nigeria. According to FAO (1988), an estimated 183 thousand rural households derived some income from dairy industry in 1986.

The livestock resource survey carried out by the Federal Department of Livestock and Pest Control Services (FDLPCS)in 1990 puts the cattle population at 13.9 million, out of these 13.5 million (96%) are in the hands of pastoral Fulani. This pastoral herd is the most important source of domestic milk in Nigeria. Only a few imported cattle breed such as Friesians and Brown Swiss and their crosses are being kept in experimental milk production farms owned by companies and individuals are known to exist. These farms which constitute the organized dairy farmsproduce an insignificant proportion of the domestic milk supply (National Livestock Project Division(NLPD),1992).

The Nigerian rural sector with abundance of human and natural resources accommodate 49.7% of the nation's population (World Bank, 2011). Yet, Nigerian rural communities are lacking in infrastructural facilities such as roads, potable water supply and sanitation,

energy communication, health and education facilities. It is estimated that 85% of the extremely poor in Nigeria currently live in rural areas. Nevertheless, the rural sector is predominantly agriculture based (including livestock, forestry and fisheries), employs about 75% of the labor force and contributes about 40% of the GDP (Federal Government of Nigeria (FGN), 2006).

According to Federal Government of Nigeria (2006), different agricultural and rural development programmes and projects as well as Overseas Development Aids (ODA) have increased during the last two decades. Rural development programmes and projects in Nigeria are more often associated with agricultural development with a difference in the last two decades which witnessed the birth of the community based and people centered approach to rural and agricultural development programmes. The National Integrated Rural Development Policy and Strategy under the auspices of Rural Development Strategy for Nigeria (RDSN) is one of Nigeria Government's policies that are aimed at addressing the problem of the rural people. It is a collaborative project with the World Bank that started in 2001, The policy took into cognizance other rural activities and not only agriculture with emphasis on women, children, People Living with HIV/AIDS (PLWHA) and also the right of people to food.

Nigeria is part of the 189 countries that signed the Millennium Development Goals in 2000 and responded to it by developing the National Economic Empowerment and Development Strategies (NEEDS) in 2002 which is a replica of the MDGs. The NEEDS piloted in several agencies like Agricultural Credit Guarantee Scheme which provides loan for the farmers. Nigerian Agricultural Insurance Corporation (NAIC) which provides risk cover incase of crop failure, natural disaster, loss of livestock, Small and Medium Scale

Enterprises Development Agency of Nigeria (SMEDAN) which provide micro credit (FGN,2006).

In 2003, Community Based Agriculture and Rural Development Programme (CBARDP) which was a collaboration between the Federal Government of Nigeria and International Fund for Agricultural Development (IFAD) took off. The programme aimed at improving the livelihood of the rural communities with emphasis on women and other vulnerable group within the programme area. This is being pursued through two main components namely awareness and capacity building and community development (FGN,2006).

The last two decades ushered in new approaches to tackling rural problems with the development of different approaches that guide the way development programmes are being carried out. The popular one is the livelihood of people in the rural areas. A livelihood comprises capabilities, assets and activities. Livelihood is said to be sustainable when it can cope with stresses and shocks and maintain or enhance its capabilities and assets both now and in future, while not undermining the natural resource base (Chambers and Conway, 1992).

The Commercial Agriculture Development Project (CADP) is a World Bank supported project aimed at improving agricultural production in Nigeria by supporting commercial agriculture production, processing and marketing outputs amongst small and medium scale commercial farmers and agro-processors. In Nigeria, there are five (5) participating states namely Cross River, Enugu, Lagos, Kaduna and Kano state (CADP,2009).

1.2 Statementof the Problem

The supply of milk has been declining over the past two decades while demand has been increasing; this is as a result of increase in population and urbanization. Consequently, Nigeria has remained a net importer of livestock and livestock products (inclusive of dairy products) (Central Bank of Nigera (CBN),1999).

Restriction placed on import of animal products and foodstuffs in the 1980s couple with the introduction of structural adjustment program (SAP) saw a massive devaluation of the Nigerian currency initially reduced the importation of meat and dairy products. However, during the period 1995 to 1999, expenditure on the importation of food and live animals has tended to increase (CBN, 1999).

The various activities of the Nigerian diary industry (Viz. Milk production, importation, processing, marketing and consumption) have been going on in the country for over 60 years. These activities are however unorganized except for the relatively few processing firms that produce and market reconstituted milk products from imported powdered milk. Despite the unorganized nature of the industry, the dairy industry represents an important component of the agricultural sector of the economy with great economic, nutritional and social implications (Olaloku, 1976). The industry through commercial dairy processing plants and marketing segments provide employment and value. Currently, however, very few of the 63 known processing plants are operating. Those that are still functioning operate at less than 20% of capacity. At present, the market has been taken over by cottage outfits that process and markets yoghurt in urban areas. Most of them use milk powder to produce yoghurt (World Bank,1992).

Since mid seventies, successive governments in Nigeria have come up with lots of laudable initiatives or programmes geared towards poverty alleviation. Some of the poverty alleviation programmes include: The National Agricultural Land Development Authority (NALDA) which was established in 1971, the National Accelerated Food Production Programme (NAFPP) established in 1972 and the Agricultural Development Projects (ADPs) launched in 1973. Others include the Operation Feed the Nation (OFN) and the River Basin Development Authorities (RBDAs) established in 1976, also the Agricultural Credit Guarantee Scheme Fund of 1977, the Green Revolution (GR) in 1979 and Better Life Programme (BLP) in 1987 (Agbamu, 2006 and Omokore, 2009).

Increased exposure to western education and pattern of life, level of urbanization and the perceived health benefits to adults, pregnant mothers and babies have led to increased demand in dairy products over several decades in Nigeria. The local diary production, however, has always lagged behind despite a number of initiated programmes by the federal government through the establishment of dairy farms in selected areas in the country for the cross-breeding of local and exotic breeds of cattle. Despite the efforts of the Federal Government of Nigeria to boast production, diary's farmers' livelihood have not visibly improved.

Based on the aforementioned gaps observed in the literature of dairy production in Nigeria and Kaduna State in particular, such as inadequate diary production and lack of evidences of the performance of existingprogrammes aimed at improving diary production and rural livelihood, this study sought to evaluate the impact of World Bank Assisted Commercial Agriculture Development Project (CADP) on Dairy Production and Rural Livelihood in

Selected Local Government Areas of Kaduna State. Consequently, the above situation raises the following research questions:

i. What are the socio-economic characteristics of dairy farmers in the study area?

ii. What is the impact of the CADP on the level of asset acquired by dairy farmers in the study area?

iii. What is the impact of the CADP on the productivity of dairy farmers in the study area?

iv What is the impact of the CADP on the income of dairy farmers in the study area?

1.3 Objective of the Study

The broad objective of the study is to Assess the Impact of World Bank Assisted Commercial Agriculture Development Project (CADP) on dairy production and rural livelihood in Kaduna State. The specific objectives are to:

i describe the socio-economic characteristics of dairy farmers,

ii. assess the impact of the CADP on the level of asset acquired by dairy farmers,

iii. assess the impact of the CADP on the productivity of dairy farmers and

iv. assess the impact of the CADP on the income of dairy farmers.

1.4 Justification of the Study

The current emphasis being placed on agriculture and rural development by the initiation of several development programmes since independence among which is CADP justifies the need for an empirical study on the impact of the CADP on rural livelihoods in the study area. The production and consumption of milk are not adequately documented in Nigeria. Therefore, this study will serve as a source of information in the documentation of dairy production especially in Kaduna state.

This research findings would serve as a guide to extension workers, policy makers and the government in planning for effective initiation of rural development programmes so as to better the lives of the rural dwellers not just in Kaduna State but the nation at large. Also, findings of this research will contribute to existing literature on impact of rural development programme.

1.5 Research Hypotheses

i. CADP has no significant impact on the assets of dairy farmers in the study area.

ii. CADP has no significant impact on productivity of dairy farmers inthe study area.

iii CADP has no significant impact on the income of dairy farmers in the study area.

CHAPTER TWO

LITERATURE REVIEW

2.1 Socioeconomic Characteristics of Dairy Farmers in Nigeria

Milk, in Nigeria, is mainly produced from the Fulani-herd cattle (Ugwu, 2010). However, production figures are not available on Fulani herds and cattle farms in Nigeria. The annual production of milk per cow in sub-sahara Africa (SSA) is estimated to be less than 10% of that produced by the European Union (EU) (Bayei and Nache, 2014). This is due to low quality dairy breeds, limitation imposed by harsh environmental conditions such as high ambient temperatures, high incidence of diseases and parasites, poor nutrition and low level application of modern technology in the management of dairy cattle (Bayei*et al.* 2014).

2.1.1 Sex

Gender relations are the ways in which a society defines rights, responsibilities, and the identities of men and women in relation to one another. In most low-income countries, women play a major role in attaining household food security (Quisumbing, Meinzen-Dick and Smith, 2004). Although women are found to participate in dairy farming, their labour's contribution is often less than that of their counterparts (Paudel*et al.* 2012; Njarui*et al.* 2010). Previous studies on dairy farming show that the majority of dairy farmers are male.

Bayei*et al.* (2014) observed that 100% of cattle farmers in Kaduna State were male and therefore implying that male were more interested in cattle farming than their counterparts. Musa, Aminu, Taibat and Musa (2014) observed that 71.2% of Fulani Cattle Rearers in Zuru Local Government Area of Kebbi State were male. According to these authors the implication is that cattle's rearing is very strenuous that is why it is undertaken by males,

while the female counterpart involves themselves in domestic activities and processing of dairy products from the cattle. Similar findings were found by Ayanwuyi, Adedeji, and Olatilewa (2012) and Adesehinwa, Okunola and Adewumi (2004). In their study they found that more than 70% of the dairy farmers in South Western Nigeria were male. From the review so far it can be inferred that the majority of dairy farmers in Nigeria are male(Ayanwuyi*et al.,* 2012; Musa *et al.,* 2014; Uddin, Uddin, Mamun, Hassan and Khan, 2012).

2.1.2 Age

Age is an important factor for both crop and livestock farming. Many empirical research findings attest that age is positively and significantly related to efficiency (Audu, Otitolaiye and Ibitoye, 2013; Girei, Dire, Iliya and Salihu, 2013). The older a farmer becomes, the more the ability to combine resources in an optimal manner given the available technology. Cattle farming, being regarded as a demanding work in terms of physical strength appears to be dominated by young people. Musa *et al.* (2014) found that the majority of Fulani cattle rearers in Kebbi LGA were within the age bracket of 31-35 years with only 15% of them being above 40 years. Ayanwuyi*et al.* (2012) discovered that the majority of dairy farmers in Kwara State were between 41-50 years, thus, cattle farming are dominated by youths.

2.1.3 Marital status

One of the most important factors affecting the level of production and productivity on peasant farms is the composition and size of farming family (Opara, 2010). Musa *et al.* (2014) found that about 65% Fulani cattle farmers were married. Fulani men marry at early

age. Married farmers are likely to be under pressure to produce more, not only for family consumption but also for sale (Opara, 2010). According to Onubuogu,Chidebelu, and Eboh(2013), they tend to have easy access to production variables such as land and large family size which are traditionally owned and provided by household heads (husbands) to compliment family labour, enhance production, resource use efficiency of the household farmers and to reduce the cost of hired labour.

2.1.4 Household size

Large family size is often regarded as a source of family labour. Omoregbee, Ighoro and Ejembi (2013) observed that large household size may provide the needed labour requirement for farming but their impact can be limited by the small farm cultivated. However, it may reduce the economic welfare of the household especially when the dependency ratio is high.

2.1.5 Educational level

Education has been found to be important in agriculture in several ways. Majority of cattle farmers in Nigeria have informal education (Adesehinwa, Okunola and Adewumi, 2004; Ayanwuyi*et al.,* 2012; Musa *et al.,* 2014). Education is important because it enlightens farmers about risks and uncertainty involved in the dairy business, and it also sharpens their problem solving abilities. Inadequate access and use of agricultural information can be detrimental to the livelihood of farmers as uninformed farmers will be likely to be more exposed to risk and uncertainty. An illiterate farmer is generally apathetic, and lacks choice. According to Flyvberg (1990) and Mabogunje (1999), lack of choice is due largely to lack

of knowledge which can be epistemological, technical or prudential. It excludes the small scale farmers from being active participants in development.

2.1.6 Farming experience

Years of experience in agricultural production helps in determining the accuracy in decision making (Musa et *al.* 2014). Oluwatayo,Sekumade and Adesoji(2008) reported that farmers with more years of experience would be more efficient, accept innovations easily, and have better understanding of the environment and market situations. Cattle farmers in Nigeria are quiet experienced. Musa *et al*. (2014) found that the majority of cattle farmers in Kebbi State had more than 11 years of experience. Similar findings were obtained by Bayei and Nache (2014) that majority of cattle farmers in Kaduna State had more than 15 years of cattle farming experience.

2.1.7 Main occupation

The main occupation of farmers is often known to be important in terms of efficiency in production depending whether or not farming is the main occupation. Bayei and Nache (2014) observed that the majority of dairy farmers in Kaduna State were specifically pastoralists. According to the authors, the finding is supported by the fact that the Fulanis are still the major cattle owners in the study area and majority of them still have not adopted sedentary life-styles.

2.2 CADP – Project Background

The Commercial Agriculture Development Project (CADP) is a five year large-scale intervention project to boost commercial agriculture through rural infrastructure investment, financial and technical support. It is currently being implemented in five States of the Federal Republic of Nigeria being financed by World Bank. The participating states are Cross River, Enugu, Kaduna, Kano and Lagos. The project supports three value chains per State. The value chains are distributed thus: Cross river (Oil palm, Cocoa and Rice), Enugu (Fruit trees, Poultry and Maize), Kaduna (Fruit trees, Diary and Maize), Kano (Rice, Diary and Maize) and Lagos (Poultry, Aquaculture and Rice). The value chains chosen by each of the participating states were based on the respective comparative advantage and their contribution to the agricultural growth (CADP, 2009).

The project has two major components: agricultural production and commercialization which is aimed at complimenting the country's food security initiative, development of domestic and export markets for targeted crops and rural infrastructure which is aimed at providing resources for the construction of new roads rehabilitation and maintenance of selected access roads to farming communities in the state. It also connects commercial farms to the electricity grid.

To increase productivity in agriculture in Kaduna State, CADP supports three food chains namely fruit trees (Citrus, mango, guava, pineapple, passion and cashew), dairy and maize. In Nigeria, dairy products are sourced both locally and internationally. The tradition and culture of the northerners that favour cattle rearing are strong factors explaining the prevalence of traditional dairy products such as sour milk and sour yogurt as part of their local diet while on the contrary, the consumption of imported dairy products, such as

sweetened and unsweetened milk and cream, cheese and butter are more prevalent in southern Nigeria (Abdullahi, M.K., Kyiogwom, U.B., Tanko, L. and Jibir, M., 2014; Akinyosoye, 2006). Available statistics points the need to promote increased consumption of high nutrient food substances among Nigerians and especially among the children of whom 36% of those under the age of 15 years are reported to be underweight, 57% stunted, and 16% wasted (Philip *et al.,* 2013). The consumption of dairy products is recommended to prevent high blood pressure, bone deterioration and lactose intolerance and to reduce cancer risk.

Nigeria's Commercial Agriculture Development Project (CADP) aims at strengthening agricultural production system and supporting the dissemination and adoption of new technologies for targeted value chains among small and medium scale farmers in the five participating States in the country (CADP, 2009).

2.2.1 Project components

The project has two (2) components namely:

i. Agricultural production and commercialization.

ii. Rural infrastructure

The CADP attempts to make Nigeria`s agricultural growth sustainable, increase employment, reduce poverty in rural areas and to boost investment in new technologies. The project involves significant investments aimed at increasing domestic food production and improving access to markets through the construction and rehabilitation of rural infrastructure CADP,2009).

Some of the interventions of the project include Capacity building, Market facilitation, Technology Demonstration and Adoption for Agricultural Commercialization, Support to staple crops production systems, Matching grants, Development of a Network of Farm Access Roads and Provision of rural energy

2.2.2 Objectives of CADP

The objectives of the project is to strengthen agricultural production systems and facilitate access to market for targeted value chains among small and medium scale commercial farmers in the five participating states. These value chains are: oil palm, cocoa, fruit trees, poultry, aquaculture and diary, with maize and rice as staples.

2.3Theoretical Framework

2.3.1 Modernization theory

Modernization theory is a theory used to explain the process of modernization within the societies. Modernization refers to a model of a progressive transition from `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. Modernization theory attempts to identify the social variables that contribute to social progress and development of societies, and seeks to explain the process of social evolution (Ekong,2003).

Modernization theory maintains that traditional societies will develop as they adopt more modern practices. Proponents of modernization theory claim that modern states are wealthier, more powerful and that their citizens enjoy a higher standard of living. The modernization theory is the theoretical assumption underlying the planning and execution

of change programmes in most developing countries. This approach focuses on the premises that change will occur when there are changes in technology, level of capital investment and market demand (Webster,1987).

2.3.2 Social change

Social change is the alteration in the social structure or it`s component parts over a period of time. Social change is also the process by which alterations occur in the structure and function of a social system (Ekong,2003). Government and non-government agencies have played a central role in influencing the pattern of rural social change. Development agencies such as World Bank, International Monetary Fund (IMF), the USAID etc have influenced rural change and production of agricultural policies in rural tropics of Nigeria, Ghana, Kenya etc have influenced rural change. Their role in the formulation and implementation of policies include policy decision on rural programmes, consultancy services to the national governments and provision of quality services to the national and local government in terms of provision of agricultural equipments like tractor, harvester, mechanical driers, agrochemicals and non-project programmes such as loan, structural adjustment programme (SAP) and others austerity measures. All these measures, political and economic as they are, have indeed influenced change in the rural hinterland (Alanana, 2005).

2.4 Conceptual Framework

2.4.1 Concept of Impact

Assessing the impact of a program on a series of outcomes is equivalent to assessing the causal effect of the program on those outcomes. Impact is the difference between the relevant outcome indicator with the program and that without it (Ravallion, 2007). Differently put, it is the difference between in outcomes from being in a project relative to control area for a person or individual or unit randomly drawn from a population of potential participants. This difference is often referred in the literature as Average Treatment Effect. Alternate treatment effects are observed in the form of Average Treated Effect on the treated, that is, the difference in outcomes from receiving the program as compared with being in a control area for a person or subject randomly drawn from the treated sample reflects the average gains for participants, conditional on these participants receiving the program. Other treatment effect of interest is the ATE on the Untreated which is the average gains for non-participants, conditional on these non-participants receiving the program. The impact of a program or intervention can also be determined as the difference between the actual and counterfactual outcomes. However, we can never simultaneously observe someone in two different states of nature. This is because while a post-intervention indicator is observed, its value in absence of the program is not, that is, it is a counterfactual. Thus, the problem of impact is that of missing data and therefore calls for counterfactual analysis.

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2.4.2 Impact Evaluation

Governments, donors and other practitioners in the development community are keen to determine the effectiveness of programs with far-reaching goals such as lowering poverty or increasing employment. These policy quests are often possible only through impact evaluation based on hard evidence from survey data or through related quantitative approaches. evaluation/ assessment is judging, appraising or determining the worth, value or quality of project, in terms of its relevance, effectiveness and efficiency (Akinola, 2004). According to Khandker*et al.* (2010) the obvious need for impact evaluation is to help policy makers to decide whether programs are generating intended effects, to promote accountability in the allocation of resources across public programs, to fill gaps in understanding what works and what does not and how measured changes in well-being are attributable to a particular project or policy intervention. Impact evaluation spans qualitative and quantitative methods, as well as ex ante and ex posts methods(Khandker*et al.*, 2010).

2.4.2.1 Qualitative methods of impact evaluation

Qualitative methods of impact evaluation generate information that may be critical for understanding the mechanisms through which the program helps beneficiaries. They seek to gauge potential impacts that the program may generate the mechanisms of such impacts, and the extent of benefits to recipients from in-depth and group-based interviews. However, these methods are not generalisable and cannot determine true impact because they are unable to assess the outcomes against relevant alternatives or counterfactual outcomes. That is, they cannot indicate what might have happen in absence of the program.

2.4.2.2 Quantitative methods of impact evaluation

Quantitative methods span ex ante and ex post approaches. The ex ante design determines the possible benefits or pitfalls of an intervention through simulation or economic models. It attempts to predict the outcomes of intended policy changes, given assumptions on individual behavior and markets. Ex ante approaches often build structural models to determine how different policies and markets interlink with behavior at the beneficiary level to better understand the mechanisms by which programs have an impact. Ex ante analysis can help in refining programs before they are implemented, as well as in forecasting the potential effects of programs in different economic environments. Ex post impact evaluation, in contrast, is based on actual data gathered either after program intervention or before and after program implementation. It measures actual impacts accrued by the beneficiaries because of the program. These methods, however, sometimes miss the mechanisms underlying the program's impact on the population, which structural models aim to capture. These mechanisms can be very important in understanding program effectiveness (particularly in future settings).

Ex post impact evaluation, which is of interest in this study, spans seven methods often used in impact evaluation theory to address the problem of counterfactual. These are: randomized evaluations, matching methods, double difference, instrumental variable, regression discontinuity, distributional impacts and structural models.

2.5 Conceptualizing rural livelihood

Livelihood is defined as the capabilities, assets and activities that rural people require for means of living (FAO, 2003). The activities they adopt and the way they reinvest in asset-building are driven in part by their own preferences and priorities (John, Diana, Caroline

and Cathryn, 1999). The assumption is that people pursue a range of livelihood outcomes (health, income, reduced vulnerability, etc.) by drawing on a range of assets to pursue a variety of activities (John *et al.* 1999; Caroline and Karim, 2000).

A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, without undermining the natural resource base. The Department for International Development (DFID) has developed a sustainable framework in order to understand the various factors that affect a person's livelihood. It views livelihood as a system and provide a way to understand: (1) the assets people draw upon, (2) the strategies they develop to make a living, (3) the context within which a livelihood is develop, (4) and those factors that make livelihood more or less vulnerable to shock and stresses.

2.5.1 Livelihood assets

Livelihood assets or capital may be tangible (food stores, cash savings, trees, land, livestock, tools and other resources), intangible (claims, one can make for food, work, assistance, access to materials, information, health services, and employment opportunities), human (skill, knowledge, health and ability to work), social capital (social resources including informal network, membership of formalized groups and relationships of trust that facilitate co-operation and economic opportunities), natural capital (natural resources such as land, soil, water, forests and fisheries), physical capital (basic infrastructure such as road, water and sanitation, school, ICT, producer goods, tools, livestock and equipment), financial capital (savings, credit, income from employment, trade and remittances).

2.5.2 Livelihood context

Livelihoods are formed within social, economic, political and natural environmental context. This is because people's assets are affected by changes in institutions processes and policies, such as market and social norms and land ownership policies. The change can be positive or negative depending whether the context created an opportunity or obstacle. Based on changes in natural environment, livelihoods can also be affected. The quality of soil, air and water; the climatic and geographic conditions; the availability of fauna and flora; and the frequency and intensity of natural hazards all influence livelihood decisions.

2.5.3 Livelihood vulnerability

The strength of a given livelihood is not only measured by its productive outcomes, but equally by its resilience to shocks, seasonal changes and trends. Shocks might include natural disasters, wars, and economic downturns. Availability of resources, income-generating opportunities, and demand for certain products and services may fluctuate seasonally. More gradual and often predictable, trends in politics and governance, technology use, economics, and availability of natural resources, can pose serious obstacles to the future of many livelihoods. These changes impact the availability of assets and the opportunities to transform those assets into a "living". Under such conditions, people must adapt existing strategies or develop new strategies in order to survive.

2.5.4 Livelihood interdependence

One final important characteristic of livelihoods is their interdependence. Very few livelihoods exist in isolation. A given livelihood may rely on other livelihoods to access

and exchange assets. Traders rely on farmers to produce goods, processors to prepare them, and consumers to buy them. Livelihoods also compete with each other for access to assets and markets. Thus positive and negative impacts on any given livelihood will, in turn, impact others. This is a particularly important consideration when planning livelihood assistance.

2.5.5 Measuring rural livelihood

People invest their assets in various activities in order to achieve livelihood outcomes. Thus, livelihood, being a system –coherent and interrelated set of activities that are implemented within a broader environment- is not measurable based on livelihood outcomes alone but equally in terms of assets owned and activities or strategies used to produce the livelihood outcomes.

2.5.5.1 Measuring livelihood assets

Among agricultural producers, agricultural production is often regarded as the most important source of livelihood outcome. However, this is not always the case because farmers do have additional ways of making a living: labourers, artisans, processors, traders, moneylenders, and so forth. In addition, remittances of money from relatives in town or abroad, or from the rent of land or houses may be important sources of income.

Akangbe*et al.* (2012) assessed the effects of Fadama II project on livelihood of farmers in Orire LGA of Oyo State, Nigeria. They considered some livelihood outcomes, strategies and assets. Concerning the livelihood assets, land and animal for grazing were considered. The findings showed a significant and positive impact of Fadama II project on land.

2.5.5.2 Measuring livelihood strategies

This approach is often based on evaluating the contribution of a given strategy to a household's welfare proxy by per capita income or consumption expenditure so that policy would be determined to improve them and bring about positive changes in their livelihood outcomes.

In order to assess livelihood strategies in rural South Africa, Alemu (2012) combined stochastic dominance test and multinomial regression analysis. The stochastic dominance test permitted them to determine the most important livelihood strategies in terms of contribution to welfare while the multinomial was used to identify the policy implications that could facilitate the entry of high-return livelihood strategies by poor households thereby contributing to poverty alleviation. Given that poor farm households are generally engaged in more than one livelihood activities, the respondents in the study were requested to indicate only their major source of income. The main livelihood strategies were determined based on four major sources of income namely, non-labour income, only-farm, farm and non-farm, and only non-farm. Households that take on the 'farm and non-farm' and the 'only non-farm' activities were further broken down into seven smaller sub groups.

The result of the analysis revealed that the non-farm is a superior activity in rural areas. They ranked the seven livelihood strategies in order of their superiority as 'only non-farm' wage earners, 'farm and non-farm' wage earners, 'farm and non-farm' non-wage earners, pensioners, only non-farm non-wage earners, remittances, and social grants. Poor households face some barriers to entering into high-return non-farm activities. They included demographic factors (age, and gender of household heads), human capital (labour endowments and education), and social infrastructure (access to water, electricity,

telephone lines). In general, the results suggested that the fight against poverty in rural areas can't be won with a mere focus on agricultural development. Employment creation through non-farm activities should also be considered important routes out of poverty.

2.5.5.3 Measuring livelihood outcomes

Akangbe*et al.* (2012) in assessing the effects of Fadama II project on livelihood of Farmers in Orire Local Government Area of Oyo State, income and employment were the two livelihood outcomes of interest. The result of the analysis showed that 53.5% of Fadama farmers were assisted by the project to have an increase in income. According to the authors, the outcome was probably due to the fact that Fadama II project provided avenue for non-Fadama farmers to accessing technological information, inputs and marketing opportunities. The results also showed that the project also provided employment opportunities as indicated by 30% and 20% of Fadama and non-Fadama farmers respectively.

2.6 Conceptual Model

Burt (1993) defined a conceptual model as simply an attempt to classify the major elements of an entity or phenomenon with regards to their functions and inter-relationships in order to observe more closely causal relationships. Furthermore, a conceptual model is a construction that shows the relationship existing among variables and most often these relationships are depicted schematically and mathematically. Here in figure 2.1, the model shows how the interventions embarked upon by C.A.D.P caused a change in dairy production and rural livelihood with the corresponding outcome as shown below.

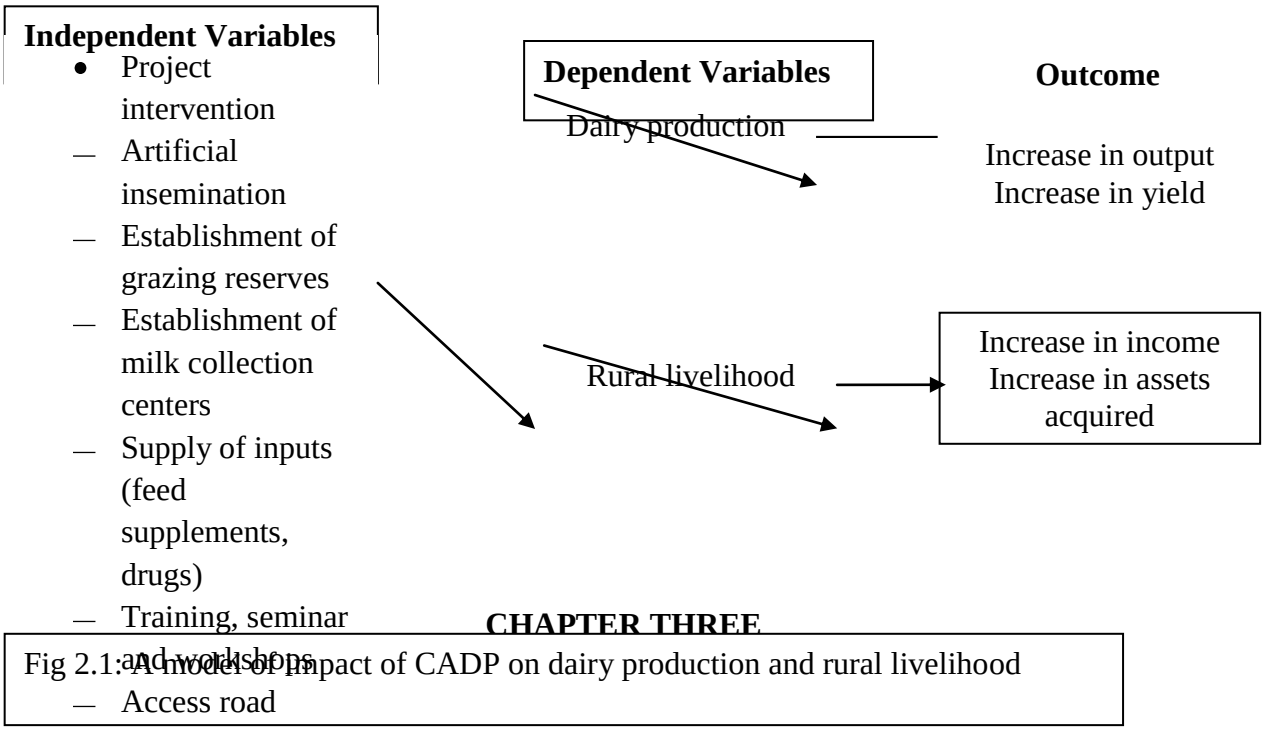


Fig 2.1: A model of impact of CADP on dairy production and rural livelihood

CHAPTER THREE

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was conducted in Kaduna State. Kaduna state is located between latitude 1^0 and 12^0 N and extends from longitude 6^0 and 9^0 E of Greenwich Meridian. The state has a population of 6,066,512 people according to NPC (2006) population census and a projected population of about 6,667,357 in 2010 (FOS, 2006). It has an estimated cultivable land area of about 45,786km^2 with only about 30,000km^2 under cultivation by traditional low income group (Wikipedia, 2013). Kaduna state share common border with Abuja in the North-east and six other states which comprises of Katsina, Kano, Zamfara in the North-North, Nasarawa and Plateau in the North-east and Niger in the North-west.

The area is marked with two distinct seasons of wet and dry season, the wet season which commence in the month of April in the Southern part of the state and late June in the Northern part. The dry season extends from October to March and is marked by the hot dry north easterly harmattan winds. The mean annual rainfall shows a marked decrease from South to North (1524-633mm). The vegetation in the Southern part of the State is southern guinea savannah vegetation. Farming is the main occupation of the people of Kaduna and it is characterized predominantly by mixed cropping, of such crops as maize, sorghum, millet, cowpea, rice, cassava, coco yam, sugar cane, tomatoes, pepper, acha and potato. The State is currently made up of twenty-three Local Government Areas (LGAs).

3.2 Sampling Procedure and Sample Size

A multi-stage sampling technique was used for this study. In the first stage,three LGAs namely, Giwa, Kachia and BirninGwari were purposively selected on the basis of higher

number of beneficiaries namely Giwa, Kachia and BirninGwariLGAs respectively. At the second stage, six villages namely, Dan Mallam, HayinMadara, Mayo Amana, Mayo Borno, Kwaga, and KamfaninDokawere purposively selected by selecting two villages from each local government on the basis of villages with higher number of dairy farmers that are beneficiaries of the project. Finally, a simple random sampling procedure was adopted to select a sample size of 120 household heads out of a sample frame of 1200 that benefited from the programme as shown in Table3.1

Table 3.1: Sample frame and sample size of dairy farmers participants in CADP

LGA	Villages	Sample Frame	Sample Size(10%)
Giwa	Dan Mallam	100	10
	HayinMadara	100	10
Kachia	Mayo Amana	200	20
	Mayo Borno	200	20
B. Gwari	Kwaga	300	30
	KamfaninDoka	300	30
Total		**1, 200**	**120**

Source: Kaduna Agricultural Development Project (KADP, 2014)

3.3 Methods of Data Collection

The study made use of primary data sources. The primary data were obtained using a well structured questionnaire which was administered to the beneficiaries of the project. The information collected include socio-economic characteristics of beneficiaries, income of beneficiaries before and after the project intervention, number and monetary value of assets acquired by the beneficiaries of the project and also the dairy yield and output of the beneficiaries before and after the project respectively.

3.4 Analytical Technique

3.4.1 Descriptive statistics

Descriptive statistics such as mean,percentages, standard deviation and frequency distribution were used to achieve objective (i), (ii), (iii) and (iv) respectively.

3.4.2 Hypotheses testing

The parametric and non-parametric two-sided Paired sample t-test and Wilcoxon signed-rank test were used to test first, second and third hypotheses of the study.

3.4.2.1 Two-sided paired sample t-test

The formula for the paired sample t-statistic can be written as:

$$t_{paired} = = \frac{\bar{X}_{diff} - \bar{X}_{hyp}}{SE_{diff}}$$

Where

$\bar{X}_{diff}$ =Sample mean difference of the outcome of interest before and after participation in CADP

$\bar{X}_{hyp}$ =Hypothesized mean difference of the outcome of interest before and after participation in CADP

SE_{diff} =Standard error of the sample means difference of the outcome of interest before and after participation in CADP

$$SE_{diff} = \frac{Sd_{diff}}{\sqrt{n}}$$

Sd_{diff} =Standard deviation of the difference in outcome of interest before and after participation in CADP

n =Sample size of the participants in CADP

The degree of freedom upon which the empirical probability for which the calculated t-statistic would be greater than the tabulated is given by

$df = n - 1$

Note: Paired sample t-test is unbiased and therefore valid under the assumption that the difference in the outcome of interest before and after participation is normally distributed

3.4.2.2 Wilcoxon signed-rank test

Under the assumption of non-normally distributed difference in outcome of interest before and after participation in CADP, the non-parametric Wilcoxon Signed-rank test is more robust. The formulae can be written as:

$$T_{obs} = \sum_{j=1}^{n} r_j = (sumofranksfor + signs) - (sumofranksfor - signs)$$

$r_j =$ Observed sign rank for the difference in the outcome of interest before and after participation in CADP

The ranks with positive (T_+) sign have mean and variance given by

$E(T_+) = \frac{n(n+1)}{4}andVar_{adj}(T_+) = \frac{1}{4}\sum_{j=1}^{n} {r_j}^2$ respectively.

A normal approximation for T_{obs} can be expressed as

$$Z = \frac{T_+ - E(T_+)}{Var_{adj}(T_+)}$$

3.5 Operational Definition and Measurement of Variables

3.5.1 Independent variables

3.5.1.1 Age

This is the number of years of a respondent from the time of birth to the time of study. It is measured by scoring the number of years given by the respondent.

3.5.1.2 Extension contact

This is the meeting of respondents with extension agents. It is measured by the number of visits or contacts between extension agents and the respondents.

3.5.1.3 Level of education

This is the level of education the respondents have attained. It is measured y asking the respondents the number of years spent in formal education which will constitute the score.

3.5.1.4 Household size

This is the total number of individuals in the respondent's household including both family and dependents who rely on the respondent for their survival. It is measured by the total number of persons in the respondent's household which is the score.

3.5.2 Dependent variables

3.5.2.1 Farm income

This is the total amount of money gained from the sales of dairy products or milk less total cost of production. It is measured in naira (₦).

3.5.2.2 Level of assets acquired

This is the ownership of valuable and tangible items. It is measured in terms of the monetary value of tangible items owned in naira (₦).

3.5.2.3 Dairy yield / Productivity

This is the quantity of milk produced by each cow daily. It is measured in litres (L) per cow.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Socio-economic Characteristics of Dairy Farmers

4.1.1 Sex of respondents

Table 4.1 showed that 71.67% and 28.33% of cattle farmers were male and female respectively. This is to say that dairy farming, in the study area, was dominated by males. The result is similar to many previous studies (Ayanwuyi*et al.,* 2012; Musa *et al.,* 2014; Uddin, Uddin, Mamun, Hassan and Khan, 2012). According to Musa *et al.* (2014) the dominance of male in dairy farming could be due to the fact that cattle rearing is very strenuous.

4.1.2 Age of respondents

The distribution of the respondentsbased on age group showed that the modal age class was 30-40 years while the average age was about 41 years with a standard deviation of 12.48. The finding implies that most dairy farmers in the study area were relatively young and falling within the economically active age. The implication is that the majority of dairy farmers would be able to withstand the strenuous activities that are involved in dairy farming. The result is consistent with the study of Musa *et al.* (2014) who found that the majority of the Fulani cattle rearers (42.05%) in Zuru Local Government Area of Kebbi State were between 31 – 35 years.

4.1.3 Educational level of respondents

The modal educational level was quranic education with about 48% of the dairy farmers falling in that category. It is noteworthy that 50% of the dairy farmershad less than primary level of education while 50% were with secondary or more level of education. The

implication is that the respondents were moderately educated in the study area. This is contrary to the findings of *Musa et al.* (2014) who observed that more than 50% of cattle rearers were without any formal level of education, while none of them had tertiary level of education. It could be explained by the fact that the dairy farmers were not Fulanis for the majority. This assertion is consistent with the study of Ayanwuyi*et al.* (2012) who found that about 83% of dairy farmers in Kwara State were educated. Education can enlighten the dairy farmers about risks and uncertainty involved in the dairy business, and it also sharpens their problem solving abilities.

4.1.4 Marital status of respondents

The distribution of the dairy farmers based on marital status revealed that about 95% of the respondents were married. This implies that dairy farming was dominated by responsible men and women. According to Onubuogu*et al.* (2013), married farmers usually have easy access to production factors such as land. The likelihood to have children could be important in terms of production as it could be expected that their children might provide some assistance in terms of labour. Moreover, married farmers tend to strive more than their unmarried counterparts in terms obtaining the best out of their low level of resources. The finding is consistent with works of Musa *et al.* (2014) and Uddin *et al.* (2012).

4.1.5 Household size of respondents

The distribution of the respondents based on household sizes revealed that the modal class was 6-10 household members while the mean household size was 9 with a standard deviation of 6.51. This is to say that the household size of dairy farmers in the study area was large (Onubuogu*et al.*, 2014). The implication is that large household size may provide

the needed labour requirement for farming depending on its structure (Omoregbee, Ighoro and Ejembi, 2013).

4.1.6 Farming experience of respondents

The distribution of the dairy farmers based on farming experience revealed that the modal class was 11-20 years while the mean experience was 28 years with a standard deviation of about 17. This shows that dairy farmers in the study area were averagely experienced. The implication of the finding is that the dairy farmers in the study area would be able to increase their accuracy in allocation of their limited resources. In the words of Oluwatayo*et al.* (2008), increase in years of experience in agricultural production helps in determining the accuracy in decision making. The finding is in line with the study of Musa *et al.* (2014) who observed that about 70% of Fulani cattle rearers had years of experience ranging between 11-20 years.

Table 4.1: Distribution of the respondents based on Socio-economic Characteristics

Characteristics	Frequency (n=120)	Percentage
Gender		
Female	34	28.33
Male	86	71.67
Age		
<30	18	15.38
30-40	44	37.61
41-50	26	22.22
51-60	23	19.66
>60	6	5.13
Mean	41.6	
Standard dev.	12.48	
EducationalLevel		
Quranic	57	47.9
Primary	15	12.61
Secondary	21	17.65
Tertiary	26	21.85
Marital Status		
Married	113	94.96
Unmarried	6	5.04
Household size		
1-5	35	30.17
6-10	46	39.66
11-15	24	20.69
>15	11	9.48
Mean	9	
Standard dev.	6.51	
FarmingExperience		
1-10	16	20
11-20	23	28.75
21-30	6	7.5
31-40	17	21.25
>40	18	22.5
Mean	28	
Standard dev.	16.90	

4.2 Impact of CADP on the Level of Asset Acquired by Dairy Farmers

The results in Table 4.2 present the impact of the World Bank assisted CADP on the level of assets acquired by dairy farmers. The results showed that after participation in CADP, dairy farmers experienced an increase in valued assets of about NGN 40,732.45. This implies that CADP had a positive impact of NGN 40,732.45 on the assets owned by dairy farmers in the study area. However, the estimated skewness and kurtosis revealed apparent deviation from normality as the statistics were found to be descriptively different from the theoretical values. In effect, for a normally distributed data Skewness is equal to zero while Kurtosis would be equal to 3.

Table 4.2: Table showing valued assets of the respondents before and after participation in CADP

Variables	Mean (NGN)	Standard deviation	Skewness	Kurtosis
After	97,733.48	136,325.00	4.04	23.26
Before	57,001.03	91,930.95	4.37	26.78
Difference	40,732.45	79,547.44	3.19	20.56

4.2.1 Hypothesis 1: CADP has no significant impact on the assets of dairy farmers

Table 4.3 showed the impact of CADP on assets of the respondentswith the corresponding test of hypothesis. The test of the difference in assets was then undertaken using the Wilcoxon-signed rank test and presented by Table 4.4. The result showed that before and after the programme was implemented, the dairy farmers had assets valued at NGN 57,001.03 and NGN 97,733.48 respectively and therefore indicating an impact of NGN 40,732.45. Provided that the assumption of normality underlying the paired-sample t-test was violated as shown so far, the Wilcoxon signed-rank test was undertaken. The

hypothesis that there is no significant impact of CADP on the level of assets of dairy farmers in the study area was rejected. In order words, CADP had a positive and significant impact on the level of assets owned by dairy farmers in the study area.

Table 4.3: Test of hypothesis that CADP had no significant impact on assets of dairy farmers

Hypothesis	Test-statistic	Test-statistic value	P-value	Decision
H_{01}	Wilcoxon W-statistic	6.47***	0.00	Rejected

****P<0.01*

4.3 Impact of CADP on Productivity of Dairy Farmers

The results in Table 4.4 present the impact of World Bank assisted CADP on the productivity of dairy farmers. The results show that after participation in CADP, dairy farmers experienced increase in the number of litres extracted from a cow per day with a net difference of 0.12 litres on average. This implies that CADP had a positive impact of 0.12litre/cow daily on dairy farmers' productivity.

Table 4.4: Table showing the productivity of the respondents before and after participation in CADP

Variables	Mean	Standard deviation	Skewness	Kurtosis
After	0.57	0.26	2.84	18.17
Before	0.45	0.16	0.71	5.03
Difference	0.12	0.24	2.47	19.00

4.3.1 Hypothesis 2: CADP has no significant impact on the productivity of dairy farmers

The non-parametric Wilcoxon signed-rank test was carried to test the null hypothesis that there is no significant impact of CADP on dairy's farmers' productivity. The Wilcoxon-signed rank test value of 5.89 shows that CADP has a significant and positive impact on productivity at 1% level of probability therefore the null hypothesis was rejected as in Table 4.5 even though the impact appeared low.

Table 4.5: Test of the hypothesis that CADP had no significant impact on productivity of dairy farmers

Hypothesis	Test-statistic	Test-statistic value	P-value	Decision
H_{02}	Wilcoxon W-statistic	5.89***	0.00	Rejected

****P<0.01*

4.4 Impact of CADP on Dairy Farmers' income

The results in Table 4.6 present the impact of the World Bank assisted CADP on the income of dairy farmers. The results showed that after participation in CADP, dairy farmers experienced an increase in income with a net difference of NGN 18,202.14. This implies that CADP had a positive impact NGN 18,202.14 on diary farmers' income. However, the evaluation of the skewness and kurtosis of the difference in income revealed apparent deviation from normality as the statistics were found to be descriptively different from the theoretical values therefore suggesting the use of a non-parametric method of testing the significance of the result.

Table 4.6: Table showing the dairy income of the respondents before and after participation in CADP

Variables	Mean (NGN)	Standard deviation	Skewness	Kurtosis

After	52,195.78	58,418.34	2.4	10.03
Before	33,993.64	42,747.94	2.77	11.54
Difference	18,202.14	45,450.03	2.89	27.44

4.4.1 Hypothesis 3: CADP has no significant impact on the income of dairy farmers

The test of significance of the impact of CADP based on Wilcoxon signed-rank method was undertaken and presented in Table 4.7. The estimated value of the Wilcoxon test-statistic was 7.64 and was found to be significant at 1% level of probability therefore the null hypothesis was rejected. This implies that CADP had a significant and positive impact on diary farmers' income.

Table 4.7: Test of hypothesis that CADP has no significant impact on income of dairy farmers

Hypothesis	Test-statistic	Test-statistic value	P-value	Decision
H_{03}	Wilcoxon W-statistic	7.64***	0.00	Rejected

***P<0.01

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The overall objective of this study was to assess the impact of Commercial Agricultural Development Programme (CADP) on dairy production and rural livelihood in Kaduna State. In order to achieve that, specific objectives were derived: (1) to describe the socio-economic characteristics of the farmers, (2) to assess the impact of CADP on assets, (3) to assess the impact of CADP on productivity and (4) to assess the impact of CADP on income of dairy farmers. A multi-stage sampling technique was adopted to select 120 respondents from which primary data were collected via well-structured questionnaire. Descriptive statistics, reflexive methods of impact evaluation, parametric and non-parametric test-statistics were used to analyze the collected data.

The result of the descriptive analysis of the socio-economic characteristics of the respondents showed that 86% of the respondents were male, average age was 41 with a standard deviation of 12.48; quranic education was the modal educational group with a relative frequency distribution of 47.9%, 94.96% were married, the household class interval 6-10 was the modal household class interval with relative frequency of 39.66% and the average farming experience was 28 years with standard deviation of 16.9.

The result of the impact of CADP on the level of asset acquired by the respondents was NGN40, 732.45 with NGN97, 733.48 and NGN57, 001.03 representing the assets' worth after and before the intervention. The impact of CADP on the respondents' level of productivity was 0.12 with 0.57 and 0.45 representing the respondents' level of productivity after and before the intervention. The impact of CADP on the respondents'

income was NGN18, 202.14 with NGN52, 195.78 and NGN33, 993.14 being their income after and before the intervention.Also,the values of the Wilcoxon-signed rank test statistic of 6.47,5.89 and 7.64 has shown that CADP had a significant and positive impact on lenel of asset,productivity and income of the respondents respectively.

5.2 Conclusion

Based on the findings of the study it can be concluded that that dairy farming was dominated by young and moderately educated male farmers that were experienced in dairy production. They were also found to have some responsibilities since majority of them were married and had large family size.Also, CADP was found to have a significant and positive impact on level of assets,productivity and income of dairy farmers in the study area.

5.3 Recommendations

1. The dairy farmers were found to averagely young and educated and highly experienced in dairy production. Therefore, it is recommended that modern technologies for milk extraction and handling should be made available for them.

2. The dairy farmers were found to be positively and significantly impacted by CADP. Therefore, it is recommended that the project should be extended to other states and other value chains on the basis of comparative advantage.

3. It is also recommended that dairy farmers should be strengthened in terms of capital by ensuring more access to credit facilities.

4. Dairy farmers should be encouraged to form cooperative societies as this will enable them benefit from government programmes and easy access to credit.

5.4 Contribution to knowledge

The following contributions to knowledge can be put forward:

1. Dairy farmers who participated in CADP experienced an increase in assets valued at NGN 40,732.45 on average.

2. Dairy farmers who participated in CADP experienced an increase in milk yield by about 0.12 litres/cow every day on average.

3. Dairy farmers who participated in CADP experienced an increase in income estimated at NGN 18,202.14 on average.

REFERENCES

Abdullahi, M.K., Kyiogwom, U.B., Tanko, L. and Jibir, M. (2014). Dairy Products Consumption Prevalence in Northern Nigeria: A Study of Sokoto Metropolis. International Journal of Innovative Research and Development, 3(13): 460-468.

Adesehinwa, A. O. K, Okunola, J. O and Adewumi, M. K. (2004).Socio-economic characteristics of ruminant livestock farmers and their production constraints in some parts of South-western Nigeria.*Journal of Livestock Research for Rural Development*, 16(8): 342-361.

Agbamu, J.U. (2006). *Essentials of Agricultural Communication in Nigeria.*Malthouse Press Limited. Lagos. PP.180-186.

Akangbe, J.A., Ogunyinka, W., Ayanda, I.F., Achem, B. and Adisa, R.S. (2012). An Assessment of Effects of Fadama II Project on Livelihood of Farmers in Orire Local Government Area of Oyo State, Nigeria.*Nigerian Journal of Agriculture, Food and Environment.* 8(1):27-32

Akinyosoye, V. O.(2006). Demand for dairy products in Nigeria: Evidence from the Nigerian Living Standards Survey.Journal of Economics and Rural Development, 16 (1):13-26.

Alanana,O.O. (2005). Rural sociology: An introduction. Joyce graphic printers and publishers, Kaduna, Nigeria.

Alemu, Z.G. (2012). Livelihood Strategies in Rural South Africa: Implications for Poverty Reduction. Selected paper prepared for presentation at the International Association of Agricultural Economists (IAAE) Triennial Conference, Foz do Iguacu, Brazil. P. 17

Audu, S. I., Otitolaiye, J.O. and Ibitoye, S.J. (2013).A Stochastic Frontier Approach to Measurement of Cost Efficiency in Small Scale Cassava Production in Kogi State, Nigeria.*European Scientific Journal, 9*(9): 189-202

Ayanwuyi, E., Adedeji, T. A. and Olatilewa, M. (2012).Contribution of Dairy Farming to Household Welfare in Edu Local Government Area of Kwara State, Nigeria.*International Journal of Physical and Social Sciences*, 2(6):512-530

Bayei, J.D. and Nache, A.I. (2014).The Effect of Socio-Economic Characteristics of Cattle Farmers on the Adoption of Artificial Insemination Technology in Kaduna State of Nigeria. *Journal of Agriculture and Veterinary Science*, 7(9): 11-17

Burt, S (1993). In: Joseph I.O. (2005). *An assessment of Impacts of Poverty Reduction Programme in Nigeria as a development Strategy.* PhD Dissertation of St. Clement University of Turks and Caicoos, Island. P. 67

Caroline, A. and Karim, H. (2000). Developing Methodologies for Livelihood Impact Assessment: Experience of the African Wildlife Foundation in East Africa, Portland House, Stag Place, London. Overseas Development Institute (ODI) Working Paper 129. P. 43

CBN (Central Bank of Nigeria). 1999. Annual report 1999.CBN, Lagos, Nigeria. P. 18-19

Chambers, R . Conway, G. (1992). 'Sustainable rural livelihoods: practical concepts for the 21st century', *IDS Discussion Paper* 296.*Brighton: IDS* Food and Agriculture Organization (FAO). 2011. Food Security Statistics. Available at: http://www.fao.org/economic/ess/ess-fs/en/. Accessed on: 25th February. 2014

Daniels, R.C, Partridge, A., Kekana, D. and Musundwa, S. (2013). Rural Livelihoods in South Africa. Cape Town: SALDRU, University of Cape Town. SALDRU Working Paper Number 122/ NIDS Discussion Paper 2013/4.

Ekong.E.E. (2003). Introduction to rural sociology, Dove Educational Publishers, Uyo, Nigeria.

FAO (Food and Agriculture Organization of the United Nations).1988. Agricultural development in Nigeria 1965-80. FAO, Rome, Italy.

FAO (2003). Enhancing support for sustainable livelihoods. A paper presentation at the seventeenth session of committee on Agriculture, Rome.www.fao.org/docrep/…/ y8349e.HTM.

Federal Government of Nigeria. (2006). Nigeria- National Report. Paper presented at International Conference on Agrarian Reform and Rural Development organized by FAO (2006) in Porto Alegre. Available at: www.icarrd.org/en/icard_doc_down/national_Nigeria.doc. Accessed on: 25th November, 2011.

Flyvberg, B. (1990). Aristotle, Foucault, and Progressive Phronesis: An applied ethics for substainable development. In Earl R. Winkler and Jerrold R. Combs (Eds.) *Applied ethics: A reader*. Oxford: Blackwell Publishers. 18-23

Girei, A.A., Dire, B. and Iliya, M.M. and Salihu, M. (2013).Stochastic Frontier Production Function on the Resource Use Efficiency of Fadama II Crop Farmers in Adamawa State, Nigeria.*European Journal of Agricultural and Forestry Research,* 1(2): 1-15.

John, F., Diana, C., Caroline, A. and Cathryn, T. (1999). Sustainable Livelihoods in Practice: Early Applications of Concepts in Rural Areas. *Overseas Development Institute,* P.23

Mabogunje, A.L. (1999). Nothing profits more: social knowledge and national development. Paper delivered at the 11th General Assembly of the Social Sciences Council of Nigeria held at Abuja on July 4th. P. 23-25

Musa, D. B., Aminu, M.S., Taibat, A.M. and Musa, S.R. (2014).Perception of Artificial Insemination among Fulani Cattle Rearers in Zuru Local Government Area of Kebbi State, Nigeria. *New York Science Journal*, 7(9): 451-472

NLPD (National Livestock Project Division). (1992). National dairy survey. NLPD Kaduna, Nigeria.

Olakoku E. (1976). Milk production in West Africa: objectives and research approaches. Journal of the association for the advancement of agriculture in Africa. 4 (7): 79-86

Oluwatayo, I. B., Sekumade A. B. and Adesoji S. A. (2008). Resource Use Efficiency of Maize Farmers in Rural Nigeria, Evidence From Ekiti State. *World Journal of Agricultural Science*, 2008; 4(1):9 –99.

Omokore.D.F. (2009).*The Crises Facing the Nigerian Peasantry Sincelndependence.* In: Agbamu J.C.(ed), Perspective in Agricultural Extension and Rural Development Springfield Publishers Lagos Ltd.PP.323-341.

Omoregbee, F.E., Ighoro, A. and Ejembi, S.A. (2013) Analysis of the Effects of Farmers Characteristics on Poverty Status in Delta State.*International Journal of Humanities and Social Science Invention ISSN (Online):* 2319 – 7722, ISSN (Print): 3(5): 2319 – 7714

Onubuogu. G. C., Chidebelu, S, A. N. D. and Eboh, E. C. (2013). Enterprise Type, Size and Allocative Efficiency of Broiler Production in Imo State, Nigeria. Int. J. Appl. Res. Technology. 2(6): 10 – 19

Opara, U.N. (2010). Personal and Socio-Economic Determinants of Agricultural Information Use by Farmers in the Agricultural Development Programme (ADP) Zones of Imo State, Nigeria: Library Philosophy and Practice. P. 32

Paudel, L.N., Meulen, U., Wollny, C., Dahal, H. and Gauly, M. (2012). Gender aspects in livestock farming: pertinent issues for sustainable livestock development in Nepal

Quisumbing, A.R., Meinzen-Dick, R.S. and Smith, L.C. (2004).Increasing the effective participation of women in food and nutrition security in Africa.Africa Conference Brief 4. International Food Policy Research Institute. Washington. 45-63

Ravallion, M. (2007). Evaluating Anti-Poverty Programs Part 1: Concepts and Methods. *Development Research Group, World Bank*

RIM (Resource Inventory and Management). (1990). Livestock resource survey. 1990.

Stifel, D. (2010). The rural non-farm economy, livelihood strategies and household welfare.*African Journal of Agricultural and Resource Economics*, 4 (1): 82-109.

Uddin, M. N., Uddin, M. B., A., Mamun, M., Hassan, M. M. and Khan, M. M. H. (2012). Small Scale Dairy Farming for Livelihoods of Rural Farmers: Constraint and Prospect in Bangladesh. *Journal of Animal Science Advances*, 2(6): 543-550

Ugwu, D.S. (2010). Dairy Production among Small and Medium Scale Farmers in Nigeria: A Case Study of Kaduna and Kano States. *World Journal of Agricultural Sciences,* 6 (1): 01-06

Walker D.A.W. (1981). Livestock development in Nigeria. 1914-79. A brief historical review. Working Document 1. NLPD (national Livestock Project Division), Kaduna,Nigeria.

Webster, A. (1987). Introduction to the sociology of development.Second edition. Macmillan Education Ltd, London. P. 41

World Bank. (1992). Feasibilty study of the rehabilitation and operation of the Kaduna dairy plant. The World Bank, Washington, DC, USA.

World Bank, (2011).World Bank data. Available at http://data.worldbank.org/country/nigeria?display Accessed on: 25th February, 2014.

QUESTIONNAIRE

SECTION A:SOCIO-ECONOMIC CHARACTERISTICS OF THE FARMER

1. Sex: Male ( ) Female ( )
2. Age of respondent (years): ……
3. Marital status: (a)Single ( ) (b) Married ( ) (c) Widow ( ) (d) Widower ( ) (e) Divorce ( )
4. Household size: ……
5. Level of education……..…… (years)
6. What is your major occupation

   (a) Dairy farming ( ) (b) crop farming (c) Livestock farming (d) Trading ( ) (e) others ( )

7. Do you have any other source(s) of income? (a) Yes ( ) (b) No ( )
8. If yes, name it (them): …….....

9. What was the total amount of credit received? ..... (₦)
10. How many time did you visit or was visited by extension agents this year? .....
11. Are you a member of any cooperative group? Yes ( ) No ( )
12. If yes, is it a cooperative for dairy farmers? Yes ( ) No ( )
13. Do you work in dairy farm (s)? Yes ( ) No ( )
14. Are you the owner of the cattle farm (s)? Yes ( ) No ( )
15. For how long have you been in diary production? .....

SECTION B. DAIRY PRODUCTION

Please fill the following table as appropriate

Year	Daily Milk Production (Litre)	Daily Milk Production (Litre/cow)
2010		
2011		
2012		
2013		
2014		

SECTION C. LIVELIHOOD OF DAIRY FARMERS

1. INCOME

Year	**Dairy Income (₦)**
2010	
2011	
2012	
2013	

2014	

2. Assets of Dairy Farmers

Assets	2010		2011-2015	
	Quantity	**Value (₦)**	**Quantity**	**Value (₦)**
GSM/Mobile phone				
TV set				
Bicycle				
Motorcycle				
Tricycle				
Car				
Land				
House				
Shop				
Generator				
Herds of cattle				
Sheep				
Goat				
Tractor				
Tiller				
Harrower				
Ridger				