Unlocking the potential of agribusiness through youth participation: An impact evaluation of the N-Power Agro Program
Unlocking the potential of agribusiness through youth participation: An impact evaluation of the N-Power Agro Program

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Foreword

It is with great pleasure that we are producing this series of monographs. The series is published within the context of the project grant “Enhancing Capacity to Apply Research Evidence (CARE)” funded by the International Fund for Agricultural Development (IFAD) in partnership with the International Institute of Tropical Agriculture (IITA). CARE aims to strengthen the capacity of young African scholars in generating and disseminating evidence-based research results to inform future action plans for governments, policy makers, and rural communities.

The project presently has 80 awardees across Africa from countries such as Benin, Cameroon, DR Congo, Malawi, Morocco, Nigeria, Rwanda, Senegal, Tanzania, and Zambia to explore areas such as ICT access and use by young farmers; Youth unemployment in the development community and the role it plays in foreign direct investment; Motivating agribusiness entrepreneurship; the Employment status of youth in agribusiness in rural areas; Welfare effects of migrating youth on households, and the Rural-urban migration profile of youth. The purpose of this series of monographs is to present research and evidence-based information concerning the nature of the problem and potential solutions, to guide both policy development and program implementation on youth in agribusiness. In many instances, there is little scientific and technical data on aspects of youth growth-oriented agribusiness and rural economic entrepreneurs, despite the sector receiving significant attention.

The sustainability of agriculture and food production relies on young people remaining in rural areas and engaging in agriculture. Many organizations have started to recognize the important role of youth in the agri-food sector and they have acted upon it with success. Africa has the world’s most youthful population, with 60% of the population between the ages of 15 and 24 years. This youth population is being turned into an asset, to drive the transformation of African agriculture into a more productive and market-oriented sector. The traditional view of agriculture as a low productivity sector is now being challenged across Africa. Hordes of young agribusiness entrepreneurs across the continent, with the help of various development partners, are approaching agriculture as a business and speeding up this essential transformation from a low-income subsistence type of chore to an innovative and value-adding agribusiness enterprise. However, many challenges remain to be overcome. IITA,
through CARE, is exploring further how it can facilitate knowledge sharing to advance the work on engaging youth in the agri-food sector in Africa.

I would like to express our gratitude to the CARE awardees for their work on the monographs and their IITA research team in the social sciences, whose contributions and supervision made these publications possible. I sincerely thank IFAD for supporting this initiative. We greatly appreciate IFAD’s grant support to agricultural research and delivery, innovation, job creation, youth engagement in agribusiness, advocacy, and pro-poor technologies.

I hope that you will all enjoy reading this series of monographs, and we look forward to your feedback.

Happy reading,

Nteranya Sanginga
Acknowledgments

The author would like to acknowledge the support from the International Institute of Tropical Agriculture for providing grant funding for this research through the CARE Project. Furthermore, the author wishes to thank Dr Victor Manyong and Dr Tesfamichael Wossen of IITA for their guidance and supervision during the research work.
Summary

The current global financial crisis has had a negative impact on the macro- and micro-levels of Nigeria’s economy, bringing with it challenges which include youth unemployment, a high rate of poverty, and a lack of capacity and skills needed to move the economy forward. This study evaluated the impact of N-power Agro Program on youth employment. Six hundred and forty-five respondents were randomly selected for the study. The database of N-Power and structured questionnaires was used in obtaining the data. Collected data were subjected to statistical analysis, descriptive methods (frequency, percentage, mean, standard deviation), logistic regression model, and regression discontinuity design. The value of ATE of the regression discontinuity design of the income of the participants of N-Power Agro is greater by N30,191.46 than for the non-participants. The result of the logistic regression model shows that age ($P \leq 0.01$), level of education ($P \leq 0.01$), years of agribusiness experience ($P \leq 0.1$), and employment status ($P \leq 0.1$) significantly influenced the choice of being self-employed through agribusiness and of participating in the N-Power Agro program. The result of the Pearson chi2 shows that age, income, level of education, and agricultural skills were found to have a significant relationship with the choice to participate in the N-Power Agro program. The impact for Nigeria’s young men and women of the N-Power Agro program on income generation for participants was shown to be effective and positive with the RDD recording an increase in the beneficiaries’ income and a discontinuity in the design. Upscaling this program will ensure that the government is able to bridge the skills deficit in Nigeria’s youth, develop their capacities for entrepreneurship, and increase job creation.
Unlocking the potential of agribusiness through youth participation: An impact evaluation of the N-Power Agro Program IITA monograph 1.
1. Introduction

This report:

- Discusses the huge problem of unemployment facing young adults in Nigeria and Africa. It further highlights various interventions by successive Nigerian governments in reducing the high unemployment rate.
- Investigates the opportunities available to young people in taking up agribusiness opportunities in Nigeria.
- Beams its searchlight on the Npower-Agro empowerment program and its role in creating jobs for young adults in Nigeria.
2. The report aims to:

- Showcase the unique drivers and potentials possessed by young adults, which are vital for agribusiness development in Nigeria.
- Demonstrate factors that influence their decision or willingness to be self-employed through agribusiness.
- Establish the potential of the N-Power Agro Program to generate employment and income for the youth.
- Estimate the effect of N-Power’s monthly stipends and entrepreneurial training on the generation of employment for the youth.
3. Background

Africa’s young people are faced with the major socioeconomic problem of unemployment (Ayegba 2015), although Africa is home to the youngest and most quickly growing population in the world. There are over 330 million people aged between 15 and 30 years, with about 195 million currently living in the rural areas (Brooks et al. 2013), and 60 to 70% of the population is below 30 years (AfDB 2017). According to the United Nations, the youth are individuals within the age group of 15 to 24 years. However, the National Policy on Youth Development in Nigeria defines the youth as individuals within the age group of 18 and 35 years (YEDA 2007). Since many of these young African men and women reside in rural areas, they tend to have limited opportunities for gainful employment (Allen et al. 2016). However, they have unexploited potentials to transform the agricultural sector through their innovation and entrepreneurship (Betcherman and Khan 2015).

Nigeria is a paradigm of widespread youth unemployment, which has been a central issue as a backdrop to the economy, particularly as it relates to policies in agricultural transformation. Youth unemployment poses grave economic and social problems and requires urgent attention since the youth are the engine room that propels any society to greater heights (Sambo and Anpe 2017). The situation leads to various debates that have focused on the impacts of various patterns of structural change of economies on the creation of jobs. Despite various interventions by successive governments in reducing the unemployment rate, the percentage remains high (Adesugba and Mavrotas 2016) and in the third quarter of 2018, the unemployment rate was 23.1%, up from 21.1% in 2010 (Nigeria Data Portal 2019). With an estimated population of about 200 million people and a nominal GDP of £207.11 billion, youth unemployment remains a challenge until today (Garba 2010). While agribusiness is seen as a way out of this problem, a few studies, such as Abioye and Ogunniyi (2018); Lyocks et al. (2014); Muhammad-Lawal et al. (2009), and Yunusa and Giroh (2017) have investigated the role of agribusiness in employment generation for the youth. Although they all assert that the participation of youth in agribusiness would create more employment and reduce poverty among them, none has been able to evaluate the impact of existing agricultural programs on employment creation among young people in Nigeria. It is important to mention that with increased investment and adequate policies, agribusiness and agricultural programs hold considerable potential
to provide opportunities for gainful employment for the teeming Nigerian youth (Koira 2014).

The Nigerian government came up with different initiatives for agricultural development to improve rural livelihoods, provide employment, and ensure food security. Between 1985 and 2019, the government introduced the small-scale industry and youth employment schemes under the Directorate of Food, Road, and Rural Infrastructure (DFRRI), National Directorate of Employment (NDE), (Ezeanokwas and Nwachukwu 2014), YouWIN, and currently the N-Power program. DFRRI was established in 1985 to reduce rural-urban migration and poverty among the youth but inconsistency in policy and inadequate involvement of rural farmers and young adults hampered the program. While certain achievements were visible, others are contestable, depicting that DFRRI was a mixed bag of failure (Ibietan 2011). According to Ejue (1998), DFRRI eventually collapsed and died a natural death from the lack of a culture of continuity in government policies and programs. The NDE established in 1986 provided micro-credit to participants to start a project of their choice as well as to become self-employed (Ezeanokwas and Nwachukwu 2014). Similarly, in 2001, the New Nigeria Agricultural Policy was enacted. The main aims of this program were self-sufficiency in basic food supply, attainment of food security by introducing improved seed, and recognition of the potentials of youth and small-scale farmers as the main food producers (Ering et al. 2014). Although the major part of this policy was in favor of the youth and smallholders, there is no literature capturing the evaluation after the expiration of the policy. Also, the subsequent introduction of the Agricultural Transformation Agenda (ATA) policy in 2011 to address the problems not tackled by past policies shows that the problems are still in existence and there is still much more to be achieved. Despite the restructuring objectives of the ATA policies, a high rate of youth unemployment still exists. There is a high level of importation and food insecurity is still at its peak (Ering 2014). Some other programs were National Economic Empowerment and Development Strategies (NEEDS), National Special Program for Food Security (NSPFS), and Growth Enhancement Support Scheme (GESS) (Adebayo and Okuneye 2005; Jibowo and Ajayi 2005). While Yami et al. (2019) opine that governments and development partners have implemented various interventions to inspire the youth to engage in agribusiness, agriculture in Nigeria has not received substantial support from the government because the country has failed to achieve the 10% minimum budgetary allocation to agriculture following the Mozambique Maputo declaration in 2014 (Koira 2014). This evidently hints at a lack of support for young people since they are the drivers of the economy. To reverse this
trend, the Federal Government introduced N-Power as part of the National Social Investment Program (NSIP) in 2016.

This study, therefore, attempts to examine the impacts of the N-Power Agro Program on creating employment for Nigerian youth. The program focused on improving the economy through training and creating employment opportunities (Nwaobi 2019). The N-power program is designed to provide entrepreneurial skills and enable savings that can translate into the creation of a small business venture. The participants of the N-Power Agro arm of N-power are not only given experience but also trained and paid stipends to enable them to accumulate future start-up capital. The aim of the program is to impart skills, attitudes, aspirations, and competencies mostly in the youth, and provide funding to enable them to practice entrepreneurship or create self-employment as well as help generate employment for others (Abdullah et al. 2009; Samian and Buntat 2012). The rationale for the incorporation of the MSME clinic in the N-Power program is to encourage more small ventures to spring up. This research is, therefore, focusing on the regional evaluation of the N-power Agro program in generating employment with a focus on the emergence of agri-businesses.
4. Technical content

Conceptual framework

Empirically, an impact evaluation seeks to establish and quantify how an intervention affects the outcomes that are of interest to analysts and policymakers. Thus, to establish causality between a program and an outcome, we shall use impact evaluation methods to rule out the possibility that any factor other than the program of interest explains the observed impact (Gertler et al. 2011). Various examples in the literature have considered the ex-post evaluation of policy interventions, but a difficulty was noted to exist in capturing overall balance impacts resulting from large-scale interventions using micro-level survey data even with a well-designed and executed evaluation process. Gittinger (1984), Baum and Tolbert (1985), and Brent (1990; 2006) show in their work on benefit-cost analysis the possibility of the above effects significantly influencing project outcomes. There is a possibility of programs generating spill-over effects, which can benefit non-participants or compete for resources, thereby affecting the programs indirectly. Upscaling such successful small-scale pilot programs will ensure it generates spill-over effects.

While agribusiness is simple to comprehend, the broadness of its concept makes it complicated to define (Baruah 2000). Agribusiness is a combination of three sectors: input, production, and processing/manufacturing. According to Obst et al. (2007), agribusiness is defined as activities involving the production, processing, and distribution of agricultural goods and services and all related activities. Adesina (2008) and El-Rufai (2011) argued that with the recent focus on agriculture by the Nigerian government, there is a potential of it boosting the economy, reducing unemployment by creating various employment opportunities, and ensuring sustainable development of the country.

In decreasing the rate of youth unemployment, various approaches comprising labor demand, labor supply, and labor market interventions had been initiated by the government in the past. However, according to Salami (2013), the impact has been minimal. This, of course, indicates the extent to which these initiatives and interventions had been ineffective in reducing youth unemployment. Despite these
programs focusing on employment and rural livelihoods with improvements towards achieving food security and sufficiency in production, corruption and inconsistency in policies hampered many of such interventions in having major impacts on the lives of the participants (Ogunmodede 2019). The driving forces of economic growth and social development are known to be skills and knowledge (Amadi 2012). With the current rate of unemployment, there is a need to harness the potentials of the youth through proper skill development which will aid in providing opportunities towards promoting innovation and productivity. Harnessing the young demography through appropriate skill development efforts provides an opportunity to achieve inclusion and productivity within the country (Samian and Buntat 2012). The vision of the NSIP project is to move Nigerians out of the poverty line and ensure the direct support and capacity building of the populace. For NSIP to achieve its aims as an umbrella body, it was broken down into four programs as follows: Government Enterprise and Empowerment Program (GEEP), N-POWER Volunteer Corps, National Home-Grown School Feeding Program (NHGSFP), and the Conditional Cash Transfer (CCT) (N-SIP 2019a). The four programs aim to reduce the widespread disparities and inequalities among the populace; reduce youth unemployment through training and job creation; feed children with nutritious meals to encourage and increase the rate of primary school enrolment and attendance; provide targeted monthly social funding transfer to poor and vulnerable households for beneficial households to move from poverty to improved consumption thereby providing livelihood support; and provide affordable credits to MSMEs (N-SIP 2019d).

N-power is a part of the Federal Government of Nigeria’s Development Plan 2015-2020. N-Power is the largest post-tertiary job program in Africa which is coordinated by the Office of the Vice President (Nyeche 2018). N-Power as an arm of the NSIP is designed to create jobs and empower Nigerians between the ages of 18 and 35 years. The program aims at equipping young men and women with the skills and experience necessary to improve their employability and entrepreneurial potential. Its modus operandi is based on Learn-Work-Entrepreneurship (LWE) (Nwaobi 2019). This will help them in acquiring and developing a life-long skill needed to become solution providers in their communities and vital players in national and international markets. The core policy thrust of the N-Power Program is large-scale skill development. This program is linked to the government’s policies in the economic, employment, and social development arenas. It is aimed at addressing the challenges of youth unemployment by providing a structure for large-scale and relevant acquisition and development of work skills while linking its core and outcomes to fixing inadequate
public services and stimulating the larger economy (Nwaobi 2019). The modular programs under N-Power ensured that each participant learnt and practised most of what was necessary to find or create work. The N-Power Volunteer Corps involved a wide-scale deployment of 500,000 trained graduates who are assisting in improving the inadequacies in our public services in agriculture, education, health, and civic education. Some of these graduates have been helping in bringing to action Nigeria’s economic and strategic aspirations of achieving food security and self-sufficiency. N-Power is also a platform for diversifying the economy. N-Power is preparing young Nigerians for a knowledge economy where, equipped with world-class skills and certification, they become innovators and movers in the domestic and global markets. Nigeria will have a pool of software developers, hardware service professionals, animators, graphic artists, building services professionals, artisans, and others (N-SIP 2019c). N-Power also focuses on providing non-graduates with relevant technical and business skills that enhance their outlook for work and livelihood. Following the wide acceptance of the program, it currently runs across Nigeria’s 36 states and the FCT. By the last quarter of 2018, the N-Power program had successfully empowered over 500,000 young men and women nationwide. This was largely attributed to efficient coordination (NBS 2013). Operationally, these N-Power volunteers are paid a monthly stipend of #30,000 and given devices with relevant content for continuous learning to facilitate their ability to successfully implement their selected vocation while enabling them to take ownership of their lives.

N-Agro volunteers who form part of the 500,000 participants are trained to provide support and advisory services to farmers across the country by way of disseminating the required knowledge in the area of extension services as well as gathering data of Nigeria’s agricultural assets. They act as intermediaries between the farmers and the research institutions. They operate as facilitators and communicators, helping farmers in their decision-making and ensuring that appropriate knowledge is implemented to obtain the best results on farms (N-SIP 2019b). One of the ways that the FGN planned to diversify the economy is by attaining self-sufficiency in producing the food we consume. An effective and well-coordinated agricultural extension system is vital to the attainment of sustainable national food self-sufficiency. To establish this system, the Federal Government engaged qualified young Nigerians through the N-Power Agro program in December 2016. N-Agro relies on the use of technology as the country aspires to identify soil types, farm sizes, and irrigation data, and ensure that our farmers are operating optimally. By March 2017, N-Power Agro volunteers started to function as intermediaries between research and farmers after they had undergone
induction training. They operated as facilitators and communicators, helping farmers in their decision-making and ensuring that appropriate knowledge is implemented to obtain the best results on farms (YEDA 2007). In addition, participants will also benefit from a compulsory development program for employability and entrepreneurship skills. Although the government aimed at the attainment of sustainable national food self-sufficiency through the N-Agro volunteers they also will build the participants for a long-life career around agriculture or in allied fields with destinations such as Agricultural Extension Services Consultant, seeds, fertilizers, and other input aggregators, farm managers, public sector jobs in agriculture, various industries and manufacturers of agricultural products, farming co-operatives management, pest control companies, self-employment, or working as a farming consultant (N-SIP 2019b).

**Theoretical framework**

This study has its foundation on the theory of consumer choices. The youth are faced with a bundle of choices or options $X_1...X_n$. But since the decision to participate in the program has only two sets of alternatives, then the sets are represented as follows:

Thus let $\text{Y} = \{X_1; X_2\}$ .......................................................... 1)

Where $Y$ is a bundle of choices $X_1$ is the decision to participate and $X_2$ is the decision not to participate. However, rationality includes considering the end and long-term results versus short-term results. The end and long-term results are usually not known with certainty and they are based on one’s beliefs (Grune-Yanoff 2010a), then $X_1$ and $X_2$ become lotteries and thus equation (1) becomes:

$\text{Y} = \{X_1, p; X_2, p-1\}$ .......................................................... (2)

Where $p$ is the probability such that $1 = p(X) = 0$ and $p + (1-p) = 1$.

In relation to utility, income maximization is used instead of profit maximization because the youth’s in Nigeria are employees (Caviglia-Harris 2003), and thus the probability relates to the outcome as:

$(X) = \Sigma_{i}[p_i \times U(X_i)]$ ......................................................... (3)

This is because the utility of a lottery is equal to the sum of outcome utilities weighted by the probability of that outcome. Thus, the youth will choose the alternatives depending on the utility that they derive from that alternative such that if:
\[(X_i) = \sum_i [pi \times U(Xi)] > U(X_2) = \sum_2 [(1-p) \times U(X_2)] \]  
then the youth choose X1 and vice versa. But the utilities \(U(X_i)\) and \(U(X_2)\) are in the context of uncertainty since the youth do not know with certainty the outcome and also a summation of utilities derived from the decision (for example, higher production, higher income), thus utility derived is expected utility (Varian 2010). Thus, the expected utility can be computed as:

\[E [(X_1)] - E [U(X_2)] > 0 \] \hspace{1cm} (5)

\[E [(1-p)] - E [U(X_2)] < 0 \] \hspace{1cm} (6)

Hence if \(Y^*\) be a latent variable denoting N-Power Agro participation or not, and Yi is the indicator of whether household I participate or not, so that Yi =1 if it participates and Yi = 0 if not, then:

\[Y_i = Yi = 1 \hspace{1cm} E [(X_1)] - E [U(X_2)] > 0 \] \hspace{1cm} (7)

\[Y_i = Yi = 0 \hspace{1cm} E [(X_1)] - E [U(X_2)] < 0 \] \hspace{1cm} (8)

Equation 7 and 8 thus show the dependent variable as dichotomous in nature, with the values 1 if the youth participates and 0 if not, thus allowing us to use binary choice models. Equation 7 and 8 show that the youth would participate in the program if the utility derived from participating is higher than the utility derived from not participating (Caviglia-Harris 2003).
5. Methodology

Study area

The study was conducted in southwestern Nigeria. Nigeria is a country in West Africa that shares land borders with the Republic of Benin in the west, Chad and Cameroon in the east, and Niger in the north. Its coast lies on the Gulf of Guinea in the south and the country borders Lake Chad to the northeast (Ayinde et al. 2015).

Types and sources of data

The data for this study were collected using a well-structured, pre-tested questionnaire and N-Power administrative dataset (which contains contact details of applicants, and the sampling frame of participants and non-participants). Data were collected on socioeconomic characteristics of the youth, mobilization strategies using ICT, incomes, benefits, and constraints on mobilization under the N-Power Program. Our targeted population was N-Power Agro applicants from southwestern Nigeria (Oyo, Ogun, and Lagos states).

Sampling procedures

Two-stage cluster sampling techniques were employed for data collection for this study. The first stage involved dividing each state into three agricultural zones/clusters. The second stage involved a random selection of N-Power participants and non-participants from the nine clusters using probability proportional to size at 20%. In all, a total number of 645 selected young men and women constituted the sample size for this study.

Analytical techniques and model specification

The data collected from the field were analyzed using descriptive techniques (frequency counts, percentages, standard deviation and means) and inferential techniques, (Pearson Chi- logistic regression model, and regression discontinuity design).
Descriptive analysis
Descriptive statistics such as frequencies, tables, percentages, mean, and standard deviation were used to describe the unique characteristics possessed by young people which are vital for agribusiness development in Nigeria and the perceived benefits for youth involvement in N-Power Agro.

Logistic regression models
The logistic regression model was used to analyze the factors influencing decision or choice of young people to be self-employed through agribusiness. The model is specified thus:

\[ P = \beta_0 + \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 + \beta_4 Z_4 + \beta_5 Z_5 + \beta_6 Z_6 + \beta_7 Z_7 + \beta_8 Z_8 + \beta_9 Z_9 + \beta_{10} Z_{10} + \epsilon_i \] ............................ (9)

\( P \) = Willingness/choice to be employed through agribusiness (Yes = 1, Otherwise = 0)
\( Z_1 \) = Age (years)
\( Z_2 \) = Sex (1 if male; 0 if otherwise)
\( Z_3 \) = Locality (Urban 1; 0 if otherwise)
\( Z_4 \) = Level of education (years)
\( Z_5 \) = Household size (Numbers)
\( Z_6 \) = Agricultural skill (Yes = 1, No = 0)
\( Z_7 \) = Years of agribusiness experience (years)
\( Z_8 \) = Employment status (Employed = 1, Not employed = 0)

Sharp regression discontinuity
Following Rubin (1974) and Imbens and Lemieux (2008), the Sharp RD design was employed to estimate the causal effects and treatment effects on the potential outcomes. In the basic setting for the sharp RD design, there are three fundamental components in the RD design which are (i) the score is continuously distributed and has only one dimension, (ii) there is only one cut-off, and (iii) compliance with treatment assignment is perfect, i.e., all units with scores equal to or greater than the cut-off actually received the treatment, and all units with scores below the cut-off failed to receive the treatment and instead received the control condition. This setup is known as the Sharp RD design. The effect of the treatment is potentially heterogeneous across units. Let \( Y_{i0} \) and \( Y_{i1} \) denote the pair of potential outcomes for unit \( i \). \( Y_{i0} \) is the outcome without exposure to the treatment and \( Y_{i1} \) is the outcome given exposure to the treatment. Interest is in some comparison of \( Y_{i0} \) and
Yi1. Typically, the focus of this study is on the differences Yi1-Yi0. The fundamental problem of causal inference is that we never observe the pair Yi0 and Yi1 together. We therefore typically focus on the average effects of the treatment, that is, averages of Yi1-Yi0 over (sub)populations, rather than on unit-level effects. For unit i is the outcome corresponding to the treatment received and Ti0,1 denotes the treatment received with Ti = 0 if unit i was not exposed to the treatment, and Ti = 1 if otherwise. Porter (2003) states that the outcome observed can then be written as

\[ \text{Yi = 1-Ti.Yi0+Ti.Yi1 = Yi0 if Ti = 0 Yi1 if Ti = 1} \]

In the sharp RD design, the treatment assignment (Ti) rule implies that if we know the unit’s score, we know with certainty whether that unit was assigned to the treatment or the control condition. This is a key defining feature of any RD design: the probability of treatment assignment as a function of the score changes discontinuously at the cut-off. Sharp RD setup was employed because compliance with treatment is perfect against fuzzy where treatment is imperfect. Thus, in the sharp RD design, the assignment is a deterministic function of one of the covariates, the forcing (or treatment-determining) variable

\[ \text{Ti = fXi≥c} \]

All units with a covariate value of at least c are assigned to the treatment group (and participation is mandatory for these individuals). All units with a covariate value less than c are assigned to the control group (members of this group are not eligible for the treatment). In the sharp RD design, the focus is on the discontinuity in the conditional expectation of the outcome given the covariate to uncover an average causal effect of the treatment:

\[ \text{E Yi|Xi = x – EYi|Xi = x} \]

which is interpreted as the average causal effect of the treatment at the discontinuity point

\[ \text{sharp RD = EYi1–Yi0|Xi = c} \]

Local linear regression
The estimation procedure employed in this study is the local linear regression. In the RD context the straightforward way to estimate treatment effects is to take the
difference between mean outcomes for the treatment and control bins immediately next to the cut-off point. However, this approach of comparing means in the two bins adjacent to the cut-point is generally biased about the cut-off point (Imbens and Lemieux 2008). Using the means for the two bins with bandwidth \( h \) immediately to the right and left of the cut-point produces a biased estimator. As the bandwidth decreases, the bias decreases, but it can still be substantial. To reduce this boundary bias, it is recommended that instead of using a simple difference of means, local linear regression be used (Hahn et al. 2001). The local linear regression can simply be thought of as estimating a linear regression on the two bins adjacent to the cut-point, allowing the slope and intercept to differ on either side of the cut-off point. Another advantage of the local linear regression is that it does not require assumption of functional forms and puts more weight on observation closest to the cut-off (Jacob et al. 2012). This is equivalent to estimating impacts on a subset of the data within a chosen bandwidth \( h \) to the left and right of the cut-point, using the following regression model:

\[
Y_i = \alpha + 0.T_i + \epsilon
\]

\( Y_i \) = the average value of the outcome for those in the treatment group after controlling for the rating variable.
\( Y_i \) = the outcome measure for observation \( i \);
\( Ti = 1 \) if observation \( i \) is assigned to the treatment group and 0 otherwise;
\( 0 \) = the coefficient for treatment assignment represents the marginal impact of the program at the cut-off point.
6. Results and Discussion

Socioeconomic characteristics

Table 1 shows the frequency distribution of respondents according to socioeconomic characteristics. The majority (41.43%) of the respondents that participated in N-Power Agro are from Oyo State while most (38.46%) of those that did not participate in N-Power Agro are also from Oyo. About 76.79% of the respondents that participated in N-Power Agro are males while about 75% of those that did not participate in N-Power Agro are females. This is similar to the findings by Enimola et al. (2019). Most (53.57%) of the respondents that participated in N-Power Agro fall within the age bracket of 26 to 31 years, which, in contrast to the findings of Jacob Enimola et al. (2019), that found out the majority of the participants fell within the age range 21 to 25 years; about 38.74% of those that did not participate in N-Power Agro fall between the ages of 26 and 31 years. The majority (60%) of the respondents that participated in N-Power Agro are single while about 38.74% of those that did not participate in N-Power Agro are also single. About 52.50% of the respondents that participated in N-Power Agro attained a BSc degree, which is in contrast to the findings of Enimola et al. (2019), while about 66.48% of those that did not participate in N-Power Agro also attained a BSc degree. Most (53.57%) of the respondents that participated in N-Power Agro have a household size that ranges between 4 and 6 people while about 54.95% of those that did not participate in N-Power Agro have the same household size. Most (72.14%) of the respondents that participated in N-Power Agro have agribusiness experience that ranges between 1 and 5 years while about 76.37% of those that did not participate in N-Power Agro also have the same length of agribusiness experience. About 51.07% of the respondents that participated in N-Power Agro own an agribusiness while about 57.97% of those that did not participate in N-Power Agro do not own an agribusiness. The majority (87.14%) of the respondents that participated in N-Power Agro had gained various agricultural skills while about 75% of those that did not participate in N-Power had also gained various agricultural skills.
Unlocking the potential of agribusiness through youth participation: An impact evaluation of the N-Power Agro Program IITA monograph 1.

Table 1. Distribution of respondents according to their socioeconomic characteristics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Participants</th>
<th>Non-Participants</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>State</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagos</td>
<td>77</td>
<td>27.50</td>
<td>127</td>
<td>34.89</td>
</tr>
<tr>
<td>Ogun</td>
<td>87</td>
<td>31.07</td>
<td>97</td>
<td>26.65</td>
</tr>
<tr>
<td>Oyo</td>
<td>116</td>
<td>41.43</td>
<td>140</td>
<td>38.46</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>215</td>
<td>76.79</td>
<td>273</td>
<td>75.00</td>
</tr>
<tr>
<td>Female</td>
<td>65</td>
<td>23.21</td>
<td>91</td>
<td>25.00</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–25 years</td>
<td>21</td>
<td>7.50</td>
<td>85</td>
<td>23.35</td>
</tr>
<tr>
<td>26–31 years</td>
<td>150</td>
<td>53.57</td>
<td>141</td>
<td>38.74</td>
</tr>
<tr>
<td>32–37 years</td>
<td>107</td>
<td>38.21</td>
<td>137</td>
<td>37.64</td>
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<tr>
<td>Above 37 years</td>
<td>2</td>
<td>0.71</td>
<td>1</td>
<td>0.27</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
</tr>
<tr>
<td>Mean ± std dev</td>
<td>30 ± 3.86</td>
<td></td>
<td>29 ± 4.16</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>168</td>
<td>60.00</td>
<td>215</td>
<td>59.07</td>
</tr>
<tr>
<td>Married</td>
<td>112</td>
<td>40.00</td>
<td>149</td>
<td>40.93</td>
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<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
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<tr>
<td>Educational Background</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCE</td>
<td>57</td>
<td>20.36</td>
<td>70</td>
<td>19.23</td>
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<tr>
<td>BSc</td>
<td>147</td>
<td>52.50</td>
<td>242</td>
<td>66.48</td>
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<tr>
<td>MSc</td>
<td>76</td>
<td>27.14</td>
<td>47</td>
<td>12.91</td>
</tr>
<tr>
<td>PhD</td>
<td>5</td>
<td>1.37</td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
</tr>
<tr>
<td>Household size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–3 persons</td>
<td>52</td>
<td>18.57</td>
<td>75</td>
<td>20.60</td>
</tr>
<tr>
<td>4–6 persons</td>
<td>150</td>
<td>53.57</td>
<td>200</td>
<td>54.95</td>
</tr>
<tr>
<td>≥ 7 persons</td>
<td>78</td>
<td>27.86</td>
<td>89</td>
<td>24.45</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
</tr>
<tr>
<td>Agribusiness Farming experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–5 years</td>
<td>202</td>
<td>72.14</td>
<td>278</td>
<td>76.37</td>
</tr>
<tr>
<td>6–10 years</td>
<td>59</td>
<td>21.07</td>
<td>62</td>
<td>17.03</td>
</tr>
<tr>
<td>11–15 years</td>
<td>6</td>
<td>2.14</td>
<td>14</td>
<td>3.85</td>
</tr>
<tr>
<td>≥16 years</td>
<td>13</td>
<td>4.64</td>
<td>10</td>
<td>2.75</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
</tr>
<tr>
<td>Own an Agribusiness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>134</td>
<td>48.98</td>
<td>211</td>
<td>57.97</td>
</tr>
<tr>
<td>Yes</td>
<td>143</td>
<td>51.07</td>
<td>153</td>
<td>42.03</td>
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<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
</tr>
<tr>
<td>Agricultural skill</td>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>36</td>
<td>12.86</td>
<td>91</td>
<td>25.00</td>
</tr>
<tr>
<td>Yes</td>
<td>244</td>
<td>87.14</td>
<td>273</td>
<td>75.00</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>100</td>
<td>364</td>
<td>100</td>
</tr>
</tbody>
</table>

Factors influencing the decision or choice of young adults to be self-employed through agribusiness

Table 2 presents the logistic regression result of the factors influencing the decision or choice of young people to be self-employed through agribusiness. The logistic model estimated was found to be a good predictor of choice, as observed from the test of goodness of fit (Chi2 test). The model has a Chi-square statistic of 21.27, which is statistically significant at the 1% confidence level. This implied all predictors included in the model are jointly capable of predicting choice to be self-employed through agribusiness. Age of respondents was found positive and significant at 1% level. The sign on the age coefficient implies that a 1% increase in age will increase by 29% the probability of choosing to be self-employed through agribusiness. Level of education was found negative and significant at 1% level. The sign on the coefficient implies that a 1% increase in the level of education will reduce by 53% the probability of choosing to be self-employed through agribusiness. Years of agribusiness experience was found positive and significant at the 10% level. The sign on the coefficient implies, in fact, that a 1% increase in years of agribusiness experience will increase the probability of choosing to be self-employed through agribusiness by 100.8%. Employment status was found negative and significant at the 10% level. The sign on the coefficient implies that a 1% increase in employed respondents will reduce the probability of choosing to be self-employed through agribusiness by in fact 100.7%.

<table>
<thead>
<tr>
<th>Willingness/choice</th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>z</th>
<th>P&gt;z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cons</td>
<td>-4.470734</td>
<td>3.38232</td>
<td>-1.32</td>
<td>0.186</td>
</tr>
<tr>
<td>Age</td>
<td>0.2991807</td>
<td>0.1046157</td>
<td>2.86</td>
<td>0.004</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.8212896</td>
<td>0.6763278</td>
<td>-1.21</td>
<td>0.225</td>
</tr>
<tr>
<td>Locality</td>
<td>-0.1069604</td>
<td>0.7514916</td>
<td>-0.14</td>
<td>0.887</td>
</tr>
<tr>
<td>Household size</td>
<td>-0.0581269</td>
<td>0.5651311</td>
<td>-0.10</td>
<td>0.918</td>
</tr>
<tr>
<td>Level of education</td>
<td>-0.5304102</td>
<td>0.2173812</td>
<td>-2.44</td>
<td>0.007</td>
</tr>
<tr>
<td>Agricultural skill</td>
<td>-0.6603783</td>
<td>1.085353</td>
<td>-0.61</td>
<td>0.543</td>
</tr>
<tr>
<td>Agribusiness years of experience</td>
<td>1.806457</td>
<td>1.079454</td>
<td>1.67</td>
<td>0.094</td>
</tr>
<tr>
<td>Employment status</td>
<td>-1.73311</td>
<td>1.044354</td>
<td>-1.66</td>
<td>0.097</td>
</tr>
<tr>
<td>LR chi²(8)</td>
<td>21.27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prob &gt; chi²</td>
<td>0.0034</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.2061</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s computation 2019.
N-Power Agro regression discontinuity design for average treatment effects on the treated

Table 3 shows the estimate of the average treatment effect on the treated. The coefficient of the average treatment effect implies that the income of the participants of N-Power Agro is greater by 30,191.46 than the non-participants of N-Power Agro.

**Table 3.** Treatment effects estimation of the regression discontinuity design.

| Income | Coef.     | Std. Err. | t     | P>|t| | 95% Conf. | Interval    |
|--------|-----------|-----------|-------|-----|------------|-------------|
| Treated| 30191.46  | 2960.704  | 10.20 | 0.000 | 24376.41   | 36006.51    |
| cons   | 35373.13  | 1676.631  | 21.10 | 0.000 | 32080.1    | 38666.17    |

Source: Author’s computation 2019.

Regression discontinuity plots

The regression discontinuity plot gives an idea of overall fit while also exhibiting graphically the sharp RD estimate. In most empirical applications, this figure was constructed using the local sample means over nonoverlapping bins partitioning restricted support of Xi, together with polynomial regression curve estimates for control and treatment units separately. The binned means are usually included to capture the behavior of the cloud of points and to show whether there are other discontinuities in the data away from the cut-off.

![Regression Discontinuity Plot](image)

*Sample average within bin  
Polynomial fit of order 1

Source: Author’s computation 2019.
Unlocking the potential of agribusiness through youth participation: An impact evaluation of the N-Power Agro Program IITA monograph 1.

Figure 2. Polynomial fit of order 2.

Source: Author’s computation 2019.

Figure 3. Polynomial fit of order 3.

Source: Author’s computation 2019.
Figures 1-4 above illustrate the identification strategy in the sharp RD setup. Based on the population values, the conditional probability of receiving the treatment, \( \Pr(T_i = 1|X = x) \) against the covariate \( x \). At \( x = 80 \) the probability jumps from 0 to 1. There were no crossovers and there is a jump in density of observation at the cut-off. In Figure 1, a linear regression line was fitted, and this shows that there is a discontinuity between the regression lines at the cut-off, which leads to the conclusion that the treatment (N-power program) was effective and there was no manipulation of the assignment variable. To further test the validity of the underlying relationship, a higher order polynomial fit was imposed on the data in Figures 2-4. The higher-order polynomial regression curves were estimated using the sample means and are constructed over nonoverlapping regions of the support of the running variable \( X_i \), for control and treatment units separately. This sample means provide an approximation of the population regression function but they also help to visualize the dispersion of the data, which could be used to detect other potential discontinuities away from the cut-off (as a form of a validation test). The graphical illustration in Figures 2-4 reveals that there is a discontinuity in the design and concludes that the treatment had an effect and the interaction term was correctly modelled. The average treatment effect shows that participation in the N-power program increased the income of participants on average by N30,191.46 compared to non-N-power participants and this estimate is statistically significant at 1%. Thus, the N-power program had a positive impact on the participants. The diagnostics show that the prob>F was significant at 1% which shows
that the model is a good fit. Post-estimation tests to validate the average treatment effect shows that the optimal bandwidths of 9.75 at the left and right of the cut-off estimated using the uniform kernel approach and samples nearest to the cut-off were valid. This was revealed in the conventional, bias-correction and robustness values which were all statistically significant at 1%.

Perceived benefits for involvement of the youth in N-Power Agro and the effect of entrepreneurial training on the generation of youth employment.

Table 4 shows the results of the distribution of the perceived benefit by N-Power Agro participants. It shows that respondents selected multiple choices and it was shown that a majority, about 48.10% of the participants opted for training and stipends while a minority, about 0.35%, chose supervision, extension services, and training grant.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension services</td>
<td>6</td>
<td>2.08</td>
<td>2.08</td>
</tr>
<tr>
<td>Extension services, Stipends</td>
<td>42</td>
<td>14.53</td>
<td>16.61</td>
</tr>
<tr>
<td>Stipends</td>
<td>22</td>
<td>7.61</td>
<td>24.22</td>
</tr>
<tr>
<td>Supervision, Extension services</td>
<td>1</td>
<td>0.35</td>
<td>24.57</td>
</tr>
<tr>
<td>Supervision, Stipends</td>
<td>9</td>
<td>3.11</td>
<td>27.68</td>
</tr>
<tr>
<td>Training</td>
<td>11</td>
<td>3.81</td>
<td>31.49</td>
</tr>
<tr>
<td>Training, Extension services</td>
<td>48</td>
<td>16.61</td>
<td>48.10</td>
</tr>
<tr>
<td>Training, Grants</td>
<td>1</td>
<td>0.35</td>
<td>48.44</td>
</tr>
<tr>
<td>Training, Stipends</td>
<td>139</td>
<td>48.10</td>
<td>96.54</td>
</tr>
<tr>
<td>Training, Supervision</td>
<td>10</td>
<td>3.46</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>289</strong></td>
<td><strong>100.00</strong></td>
<td></td>
</tr>
</tbody>
</table>


Figure 5 shows the results of the savings potentials of participants from their stipends to start an agribusiness venture. It shows that 79.29% of the participants cannot start any agribusiness venture as they did not have any savings from their monthly stipends.
Figure 5. Savings potentials from N-Agro stipends to start an agribusiness venture.
7.0 Conclusion and Recommendations

The centrality of agribusiness as the interface between the youth, agriculture, and the rural sector cannot be easily rejected. This is because agribusiness has the capacity to create vast employment opportunities, higher incomes, and the poverty reduction mechanism for the crowds of unemployed young people. Results revealed that the N-Power empowerment program implemented to inspire the engagement of the youth in agriculture has succeeded in influencing their willingness towards agribusiness. Findings also show that the collective entrepreneurial training and skills (gained before or after participation) are paramount to enhancing the self-employment of the youth in agribusiness. This study established that the impact of the N-Power Agro program on job creation and income generation of Nigeria’s youth was positive with the regression discontinuity design analysis recording an increase in the participants’ income than for non-participants. It, therefore, concludes that the age, marital status, agricultural skill, agricultural graduate and employment status significantly influenced the choice of participating in the N-Power Agro program. Despite the many positive outcomes of this intervention, with the majority of participants being older in the youth bracket and having at least a bachelor’s degree, their probability of choosing to be self-employed through agribusiness tended to decline especially when they have the opportunity of white-collar jobs and further studies. Nevertheless, the majority are willing to venture into agribusiness but are hampered by a lack of start-up capital as they are unable to make considerable savings from their N30,000 monthly stipend. Similarly, the requirement of strength demanded by agriculture hindered the females from benefiting much from this program as shown by the large participation by males. Consequent to the findings of the study, this study recommends that:

1. The government and policy-makers should upscale this program by strengthening, monitoring and encouraging measures that would promote more female participation (especially in the input and processing sector) in the N-Power Agro program so as to provide more employment, job creation, and at the same time increase income generation, hence improving the standard of living.

2. The beneficiaries of N-power Agro should be engaged to grow and supply the necessary agricultural products needed for the Home-grown School Feeding
Program initiated by the government. This will surely boost the confidence of the youth to do more and boost food production in the country towards ensuring the attainment of the sustainable development goals on food security.

3. Intervention programs that focus on younger people between 20 and 25 years who have much passion for agribusiness should be established.

4. Incentivizing youth through empowerment programs should be discouraged but rather empower the youths into active participation. The government should rather empower the youth into venturing into agribusiness by supporting them with capital, land, training, and also ensuring proper monitoring.

For Nigeria’s agriculture to regain its lost glory of ensuring food security and relevance in the world economy through exportation, the aging farmers need to be replaced by vibrant and educated young men and women who can meet up with global technological development that will lead to increased agricultural productivity.
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