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Unlocking the Potential of Agribusiness in Africa through Youth Participation: An Impact Evaluation of N-Power Agro Empowerment Program in Nigeria

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Received: 30 April 2020; Accepted: 11 July 2020; Published: 16 July 2020

Abstract: In a country of about 200million people, the government has over the years constituted various initiatives to address the issue of unemployment, food security, and youth involvement in agriculture. However, the impact of these initiatives has been minimal due to the inconsistency in government policies, changes in government, inadequate implementation mechanism amongst others. This study, therefore, evaluated the impact of the N-power Agro Program on youth employment and income generation through agribusiness in Nigeria. Six hundred and forty-five respondents were randomly selected from the database of N-Power. Structured questionnaires were used in obtaining the data. The statistical analysis of collected data applied descriptive methods, 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 ₦30,191.46 than for the nonparticipants. The result of the logistic regression model shows that age, level of education, years of agribusiness experience, and employment status significantly influenced the choice of creating employment through agribusiness and of participating in the N-Power Agro program. The impact of the N-Power Agro program for Nigeria's young men and women on employment and 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 and wider implementation in other countries in collaborations with youth, rural communities and private sectors will ensure that the government can bridge the skills deficit in Africa's youth, develop their capacities for entrepreneurship, and hence, increase jobs creation.

Keywords: youth unemployment; entrepreneurship; aspirations of youth; access to resources; higher education; rural development; training and skills development; sustainability and food security

1. Introduction

Africa's young people are faced with a major socioeconomic problem of unemployment [1] despite being 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 [2], and 60%–70% of the population is below 30 years [3]. According to the United Nations, the youth are individuals within the age group of 15 to 24 years [4]. However, the National Policy on Youth Development in Nigeria defines the youth as individuals within the age group of 18 and 35

years [5]. Since many of these young African men and women resides in rural areas, they tend to have limited opportunities for gainful employment [6]. Nevertheless, they have unexploited potentials to transform the agricultural sector through their youthfulness, innovation, and entrepreneurship [7].

Nigeria is a paradigm of widespread youth unemployment which has been a central issue to the economy, particularly as it relates to policies in agricultural transformation. The 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 [8]. This worrisome situation has led to several debates that have focused on the impacts of various patterns of structural changes in economies on the creation of jobs. Despite the various interventions by successive governments' in reducing the unemployment rate, the percentage remains high [9] and as at the third quarter of 2018, the unemployment rate rose to 23.13%, up from 21.1% in 2010; while the youth unemployment rate stood at 55.4% [10]. Since about 60% of the 200 million population being youth, and of which 55.4% of them are unemployed/underemployed; youth unemployment remains a challenge up until today [11]. Against this backdrop, agribusiness is seen as a good strategy out of this problem, since with increased investment and adequate policies, agribusiness and agricultural programs hold considerable potential to provide opportunities for gainful employment for the teeming Nigerian youth [12], and a few studies, such as Abioye and Ogunniyi; Lyocks et al.; Muhammad-Lawal et al.; Yunusa and Giroh [12–15] have investigated the role of agribusiness in employment generation for the youth. Although they all assert that the participation of the 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. Surprisingly, there is a dearth of evidence on what worked and what did not work well, making it difficult to make informed evidence-based policies.

To improve rural livelihood, provide employment (including youths) and ensure food security, the Nigerian government has over the years came up with different initiatives for agricultural development. Between 1985 and 2019, they introduced the small-scale industry and youth employment schemes under the Directorate of Food, Road, and Rural Infrastructure (DFRRI), National Directorate of Employment (NDE), [16], and Youth Enterprise with Innovation in Nigeria referred to as YouWIN. 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 [17,18]. While certain achievements were visible, others are contestable, depicting that DFRRI was a mixed bag of failure [17]. According to Ejue [17], 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 [16]. Similarly, in 2001, the New Nigeria Agricultural Policy was enacted. The main aims of this program were self-sufficiency in the basic food supply, attainment of food security by introducing improved seeds and recognition of the potentials of youth and small-scale farmers as the main food producers [19]. Although a 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 of agricultural products, with food insecurity still at its peak [20]. Some other programs were the National Economic Empowerment and Development Strategies (NEEDS), National Special Program for Food Security (NSPFS), and Growth Enhancement Support Scheme (GESS) [21,22]. While Yami et al. [23] 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 [12]. This hints at the lack of support for young people since they are the drivers

of the economy. To reverse this trend, the federal government of Nigeria (FGN) introduced N-Power as one of the National Social Investment Programs (NSIP) in 2016 which is currently still running.

This study, therefore, attempts to examine the impacts of the N-Power Agro Program on creating employment and improving income through agribusiness for the Nigerian youth. The program focused on improving the economy through training and creating employment opportunities for youth in Nigeria [24]. In this paper, after the introductory section, the next section discusses the empirical review of the N-power program. It is followed by the section on materials and methods. The fourth section is on results and their discussion. The article ends with the last section on the conclusion.

2. Empirical Review

2.1. N-Power Program

N-Power program or N-Power, in short, is a part of the federal government of Nigeria's (FGN) Development Plan 2015–2020. N-Power is the largest post-tertiary jobs program in Africa which is coordinated by the Office of the Vice President [25]. As an arm of the NSIP, it is designed to create jobs and empower Nigerians between the ages of 18 and 35 years. With the average age of farmers in Nigeria placed at 50–60 years, the government strategically targets young people with this initiative to encourage their participation in agriculture and agribusiness; this is because the present state of decline in agriculture production is dimming the hope of attaining the vision of food security by 2050. This program, therefore, aims at equipping young men and women with the skills and experience necessary to improve their employability and entrepreneurial potentials. Its modus operandi is based on learn–work–entrepreneurship (LWE) [24]. This is created to helping them in acquiring and developing a life-long skill needed to become solution providers in their communities and vital players in the 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 [24]. With the empowerment program, the Nigerian government desires to tackle the unemployment challenge while also integrating the youths in agricultural activities. The modular programs under N-Power ensured that each participant learned and practiced most of what is 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 the 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 and also working as 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 [26]. It 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 and also currently rolled out applications to empower another 400,000 youth by July 2020. This success was largely attributed to efficient coordination [27]. Operationally, these N-Power volunteers are paid a monthly stipend of ₦30,000 and given mobile 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.

2.2. N-Power Agro Program

N-Agro volunteers who form part of the 500,000 N-Power Corps participants are trained to provide support and advisory service 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 have been acting 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 [28]. N-Power Agro program is vital to empowering the youth since many of the youths involved in agriculture during the production season often tend to take non-farm jobs to ensure stable income during the off-season, hence the need for an intervention program that will ensure that youths are actively involved in agriculture all year round in order to achieve food security [18]. Therefore, it is one of the ways that the FGN planned to diversify the economy towards attaining self-sufficiency in continuous food production for the country. Furthermore, an effective and well-coordinated agricultural extension system is seen as vital to the attainment of sustainable national food self-sufficiency. To establish this system, FGN 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 before deployment. Moreover, participants also benefited 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 cooperatives management, pest control companies, self-employment or working as a farming consultant [28].

3. Materials and Methods

3.1. Study Area

The study was conducted in southwestern Nigeria. Our targeted population was the N-Power Agro applicants from southwestern Nigeria (Oyo, Ogun, and Lagos States). These states were selected based on their similarities in terms of regional agricultural engagements and also have a fair representation of larger youth covered by the program.

3.2. Sampling Procedures and Types of Data/Analytical Techniques

The data for this study were collected using a well-structured pre-tested questionnaire and the N-Power administrative dataset (which contains contact details of applicants and the sampling frame of participants and non-participants). Data were collected on socio-economic 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). 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 nonparticipants from the nine clusters/villages using probability proportional to size (i.e., more individuals were selected in larger villages). This sampling procedure resulted in a sample size of 645 individuals, 345 participants and 300 nonparticipants. It is important to note that to ensure uniformity, we sampled both participants and nonparticipants that share similar characteristics in terms of sex, age, educational level and income. The survey was carried out using face-to-face interviews with questionnaires by trained enumerators. The questionnaires (See Supplementary Materials for full detail) were administered to the participants during their monthly group meetings

at the local government area offices while for the nonparticipants, we visited them individually across the study areas which was very difficult to achieve. The difficulty in obtaining data from the nonparticipants is due to their dispersed nature, therefore, leading to unequal representation from both groups. The data collected from the field were analyzed with the STATA® 14 software using descriptive techniques (frequency counts, percentages, standard deviation and means) and inferential techniques (logistic regression model and sharp regression discontinuity). Information obtained using the questionnaires include youth perception to agribusiness; factors influencing their decision to engage in agribusiness; the potential of N-Agro to generate employment; online test score during registration; perception about the N-Power in reducing unemployment among the youths; the willingness of the respondent to take up agribusiness as an occupation and the aspiration of the youth after the N-Power Agro program.

3.2.1. 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.

3.2.2. Logistic Regression Models

Logistic regression was developed by a statistician named David Cox in 1958 [29]. The logistic model (or logit model) is a widely used statistical model that, in its basic form, uses a logistic function to model a binary dependent variable, many more complex extensions exist. Logistic regression (or logit regression) involves estimating the parameters of a logistic model; which is a form of binomial regression. The advantages of using the logistic regression model are; the output is more informative than any other classification algorithms, and it expresses the relationship between an outcome variable and each of its predictors. To analyze the factors influencing the decision to create employment through agribusiness, following Anila and Kiani [30], the logit model was employed to predict the probability of willingness, since the dependent variable is binary. To choose whether to use the Logit or Probit model, we checked the data distribution through “xy” scatter plot and calculated the value of kurtosis. Since the kurtosis value was positive, we then settled to choose Logistic regression to analyze the factors influencing the decision or choice of young people to be self-employed through agribusiness. Like in linear regression we assume that some sets of independent variables are useful for predicting the dependent values. The model is specified thus;

$$P = \beta_0 + \beta_1Z_1 + \beta_2Z_2 + \beta_3Z_3 + \beta_4Z_4 + \beta_5Z_5 + \beta_6Z_6 + \beta_7Z_7 + \beta_8Z_8 + \epsilon_i \quad (1)$$

P= Willingness/choice to create employment through agribusiness (Yes = 1, No = 0)

Z₁= Age (years)

Z₂= Sex (1 if male, 0 if female)

Z₃= Locality (1 if urban; 0 if rural)

Z₄= Level of education (years)

Z₅= Household size (numbers)

Z₆= Agricultural skill (Yes=1, No=0)

Z₇= Years of agribusiness experience (years)

Z₈= Employment status (employed =1, Not employed = 0)

3.2.3. Sharp Regression Discontinuity Designs (RDD)

RDD is an important model in the toolkit of any applied researcher interested in unveiling the causal effects of policies. Thistlethwaite and Campbell [31] were the ones to first introduce the concept regression discontinuity design (RDD), which is an alternative method for evaluating social

programs. They were interested in identifying the causal impacts of merit awards, assigned based on observed test scores, on future academic outcomes. Their approach created much criticism which later died down. This approach was later revived by some economists [32–34]; Hahn, Todd and van der Klaauw [32] formalized it; Imbens and Wooldridge [35] reinforced its estimation approaches which enables it to be applicable to answer various research questions. Over the last twenty years, the use of RDD has increased exponentially as researchers have used it to evaluate including, anti-discrimination laws; electoral accountability; the impact of unionization; SME policies; social assistance programs (conditional cash transfers program) and educational programs such as delayed school enrolment, school grants and financial aids [32,33,36–38].

Sharp Regression Discontinuity

To evaluate the potential of the N-Power Agro Program to generate income for the youth, the Sharp RD method was employed. We used a “sharp” RD design instead of “fuzzy” RD design since the treatment variable is a deterministic function of the regression variable (test score). In the sharp version of the RD design, every subject (respondent) is assigned a score and a treatment is given to all units whose score is above the cutoff and withheld from all units whose score is below it. The probability of treatment changes from 0 to 1 at the cutoff. If there are no crossovers and no no-shows, the design is then said to be sharp. Following Rubin; Imbens and Lemieux [39,40], the sharp regression discontinuity (RD) design was employed to estimate the causal effects and treatment effects on the potential outcomes. It is used when treatment status is a deterministic and discontinuous function of a covariate, x_i . 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 cutoff actually received the treatment, and all units with scores below the cutoff 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 Y_{i1} . Typically, the focus of this study is on the differences $Y_{i1} - Y_{i0}$. The fundamental problem of causal inference is that we never observe the pair Y_{i0} and Y_{i1} together. We therefore typically focus on the average effects of the treatment, that is, averages of $Y_{i1} - Y_{i0}$ over (sub)populations, rather than on unit-level effects. For unit i is the outcome corresponding to the treatment received and $T_{i0,1}$ denotes the treatment received with $T_i = 0$ if unit i was not exposed to the treatment and $T_i = 1$ if otherwise, Porter [33] states that the outcome observed can then be written as

$$Y_i = 1 - T_i \cdot Y_{i0} + T_i \cdot Y_{i1} = Y_{i0} \text{ if } T_i = 0 \quad Y_{i1} \text{ if } T_i = 1 \quad (2)$$

In the sharp RD design, the treatment assignment (T_i) 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 cutoff. 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

$$T_i = f(x_i) \geq c \quad (3)$$

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:

$$E Y_i | X_i = x - E Y_i | X_i = x \quad (4)$$

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

$$\text{sharp RD} = E Y_{i1} - Y_{i0} | X_i = c \quad (5)$$

There is a possibility of encountering a sharp turn in $E[Y_i|X_i]$ which may be mistaken for a jump from one regression line to another. To reduce the likelihood of such mistakes, we looked only at data in a neighborhood around the discontinuity. Therefore, a nonparametric approach to RD requires good estimates of the mean of y_i in small neighborhoods to the right and left of X_0 . Obtaining such estimates is tricky. The first problem is that working in a small neighborhood of the cutoff means that we do not have much data. In addition, the sample average is biased for the population average in the neighborhood of a boundary (N-Power cutoff score). A solution to this problem is the use of a nonparametric version of regression called local linear regression [34]. 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 cutoff point. However, this approach of comparing means in the two bins adjacent to the cut-point is generally biased about the cutoff point [41]. 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 should be used [32]. 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 cutoff point. Another advantage of the local linear regression is that it does not require functional forms assumption and put more weight on observation closest to the cutoff [35]. 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:

$$Y_i = \alpha + \beta_0 \cdot T_i + \varepsilon_i \quad (6)$$

α =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 ;

T_i =1 if observation i is assigned to the treatment group and 0 otherwise;

β_0 =the coefficient, for treatment assignment, represents the marginal impact of the program at the cutoff point.

4. Results and Discussion

4.1. Socioeconomic Characteristics

Table 1 shows the frequency distribution of respondents according to their socioeconomic characteristics. The majority (76%) of respondents were male, similar to the findings by Enimola et. al.; Ayanwuyi et. al, Ogunremi et al. [42–44]. This reveals that males are more inclined to farming (physical strength) and entrepreneurship and also have a higher tendency to utilize ICT better thereby favoring their selection during the application.

Most (53.57%) of the respondents that participated in N-Power Agro fall within the age bracket of 26 to 31 years with a mean age of 30 years and a standard deviation of 3.86. This agrees with the definition of youth by FGN, but in contrast to the findings of Enimola et. al.; Ayanwuyi et al. [42,43] that found out that most 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.

About 60% of both groups of respondents (participants and non-participants) were single. This conforms with the findings of Ogunremi et al. [44] who opine that since a high percentage of the

youth are single and young; they had latent energy in them to go into entrepreneurship training without distraction from family members. Similarly, the youth do not marry early due to lack of job or just starting on a job which is in contrast with the findings of Ayanwuyi et al. [43] who argue that youth tend to get married early.

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. [42] while about 66.48% of those that did not participate in N-Power Agro also attained BSc degree. The high level of literacy observed among the respondents supports FAO [45], which argued that the youth literacy rate in Nigeria has been on the rise since 1991, it grew from 66.4% in 2008 to about 80% in 2015. It also implies that education is accorded higher importance in Southwestern Nigeria.

Most (53.57%) of the respondents that participated in N-Power Agro have the household size that ranges between 4 and 6 people while about 54.95% of those that did not participate in N-Power Agro has the same household size corroborating the result obtained by Hyeladi et al. [46].

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. This result is similar to the findings of Muhammad-Lawal et al. [15].

Above 51% of the respondents that participated in N-Power Agro own an agribusiness while about 60% of those that did not participate in N-Power Agro do not own an agribusiness. This result is similar to the findings of Muhammad-Lawal et al. [15]. The high percentage of not owning an agribusiness among the nonparticipants may likely be a result of not benefiting from the program. This shows that N-Power Agro has led to the creation of more employment among the beneficiaries.

The majority (87.14%) of the respondents that participated in N-Power Agro had gained various agricultural skills from their higher education institution while about 75% of those that did not participate in N-Power had also gained various agricultural skills. This, therefore, implies that most of them will be willing to invest their savings into various agribusiness ventures.

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

Variable	Participants% (n=345)	Nonparticipants% (n = 300)
Sex		
Male	76.79	75.00
Age		
20–25 years	7.50	23.35
26–31 years	53.57	38.74
32–37 years	38.21	37.64
Above 37 years	0.71	0.27
Marital status		
Single	60.00	59.07
Educational Background		
NCE	20.36	19.23
B.Sc.	52.50	66.48
M.Sc.	27.14	12.91
PhD		1.37
Household size		
1–3 persons	18.57	20.60
4–6 persons	53.57	54.95
≥ 7 persons	27.86	24.45
Agribusiness Farming experience		
1–5 years	72.14	76.37
6–10 years	21.07	17.03

11–15 years	2.14	3.85
≥16 years	4.64	2.75
Own an Agribusiness		
Yes	51.02	42.03
Agricultural skills		
No	12.86	25.00

4.2. Factors Influencing the Decision or Choice of Young Adults to Create Employment through Agribusiness

Table 2 presents the results from the logistic regression about the factors influencing the decision or choice of young people to create employment through agribusiness. The model fitted the data well since the LR $\chi^2(8) = (21.77)$ and the corresponding $\text{Prob} > \chi^2 = 0.0034$, indicating that all the independent variables taken together statistically and significantly explained the variation in the probability of willingness to create employment through agribusiness by respondents. The age significantly (positive) affected the willingness to create employment by respondents at a 1% level. The sign on the age coefficient implies that a 1% increase in age will increase by 29% the probability of choosing to create employment through agribusiness. This means that the younger the participants, the higher their probability of creating employment. According to Jibowu [47], people in this age category possess some characteristics such as innovation proneness, minimal risk aversion, faster reaction rate, less fear of failure, greater physical strength, greater knowledge acquisition propensity, love for adventure and faster rate of learning among others. This indicated that most of the participants were in their active productive years, which revealed that N-Power trains youth who could be regarded as productive assets to the society and vital sources of employment creation. Therefore, the age variable has helped in creating employment for the participants.

The level of education significantly (negative) affected the willingness to create employment by respondents at a 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 create employment through agribusiness, meaning the higher the youth become educated beyond a bachelor degree, the lower the likelihood of creating self-employment. The negative significant impact of increasing level of education on influencing the decision of young people to create jobs through agribusiness was expected as many youths see agriculture as unattractive. With most participants 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.

Years of agribusiness experience were found to be positive and significant at the 10% level. The sign on the coefficient implies 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 to be 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%. The factors influencing the decision or choice of young people to create employment through agribusiness are similar to existing findings Ayinde et al.; Sudarshanie; Ayanwuyi et al. [43,48,49].

From the results discussed above, the level of education, employment status, years of agribusiness experience, and age were all significant at 10%, 5%, and 1% probability level with different signs. This implied that the predictors included in the model are jointly capable of predicting the choice to create employment through agribusiness.

Table 2. Logistic regression estimates of the factors influencing the decision of young people to be self-employed through agribusiness.

Willingness/choice	Coef.	Std. Err.	z	P > z
Cons	-4.470734	3.38232	-1.32	0.186
Age	0.2991807 ***	0.1046157	2.86	0.004
Sex (1=male, 0=female)	-0.8212896	0.6763278	-1.21	0.225
Locality	-0.1069604	0.7514916	-0.14	0.887

Household size	-0.0581269	0.5651311	-0.10	0.918
Level of education	-0.5304102 ***	0.2173812	-2.44	0.007
Agricultural skill (yes=1, no=0)	-0.6603783	1.085353	-0.61	0.543
Agribusiness years of experience	1.806457 *	1.079454	1.67	0.094
Employment status (yes=1, no=0)	-1.73311 *	1.044354	-1.66	0.097
LR chi ² (8)	21.27			
Prob > chi ²	0.0034			
Pseudo R ²	0.2061			

*, ***significant at 10%, or 1%, respectively.

4.3. Regression Discontinuity Plots

N-Power participants were selected based on the test score; an online test taken by unemployed graduate youth. RDD was used to determine whether the selected participants for the program can increase their income due to their participation. Sharp RD compares the income of applicants just above and just below the cutoff point (80 marks). It is generally expected that applicants with higher scores to be more likely to earn a higher income by been selected for the program, but this effect was be controlled by fitting a regression to the relationship between income and scores, at least in the neighborhood of the test cutoff. It is this jump in regression lines that gives RD its name [50]. The applicants who scored just below and above 80 (score ranges from 71–89) have similar characteristics such as age, education, and being youth, but the applicants who scored 80 and above got been selected and those below were not, i.e., RDD was used to compare the applicants below and above the 80 marks and consider the differences in outcomes to give the program effect. We now formally exploit the discontinuity in income by estimating the RD models discussed in Section 3.2 above. After some experiments, we decided to limit our analysis to test scores 71–89 because the data outside this range are of little use for helping to fit the model around the discontinuity point. In any case, we showed through RD plots below (Figures 1–4) that our results are very robust to the choice of the test score range. The plots give an idea of the overall fit while also exhibiting graphically the sharp RD estimate. To get the RD plot, we constructed figure using the local sample means over nonoverlapping bins partitioning restricted support of X_i , together with polynomial regression curve estimates for control and treatment units separately. We also included the binned means to capture the behavior of the cloud of points and to show whether there are other discontinuities in the data away from the cutoff.

Figures 1–4 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 or no no-show and there is a jump in density of observation at the cutoff. Thus, the design is sharp. However, the idea of focusing on observations near the cutoff value— what Angrist and Lavy [33] called a “discontinuity sample” - suggests valuable robustness. In Figure 1 above, a linear regression line was fitted, and this shows that there is a discontinuity between the regression lines at the cutoff, which leads to the conclusion that the treatment (N-Power program) was effective and there was no manipulation of the assignment variable. In this case, the relationship between the income, test score, and outcome is approximately linear. This is the best-case scenario as we used the data from the whole distribution to identify the slope of the line on either side.

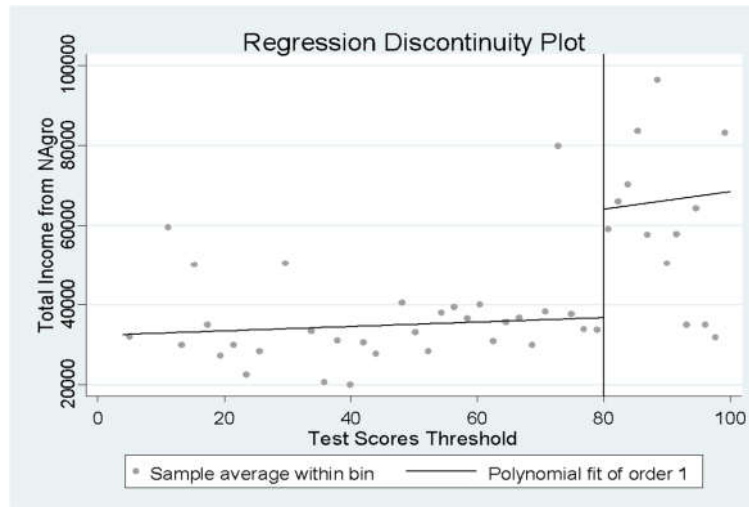


Figure 1. Polynomial fit of order 1.

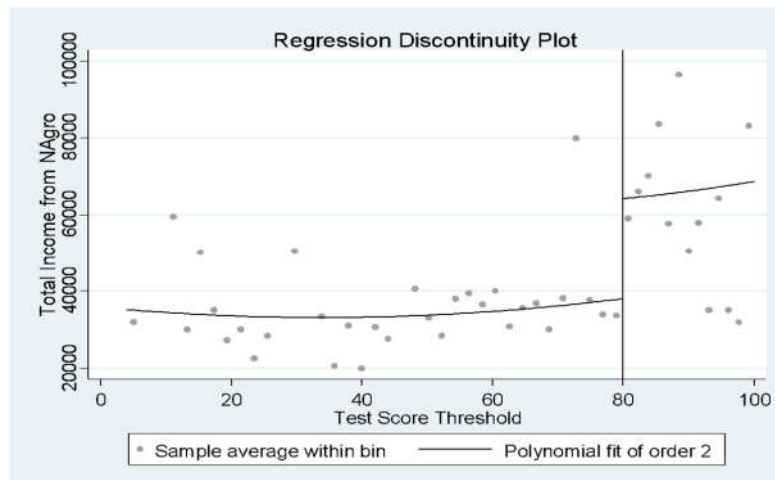


Figure 2. Polynomial fit of order 2.

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 constructed over nonoverlapping regions of the support of the running variable X_i , for control and treatment units separately. This sample means provided us with an approximation of the population regression functions, but they also help to visualize the dispersion of the data, which was used to detect other potential discontinuities away from the cutoff (80, as a form of a validation test). The graphic 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 modeled.

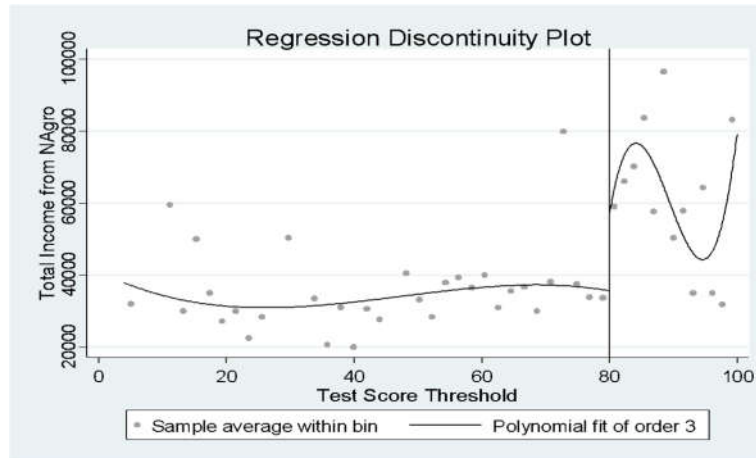


Figure 3. Polynomial fit of order 3.

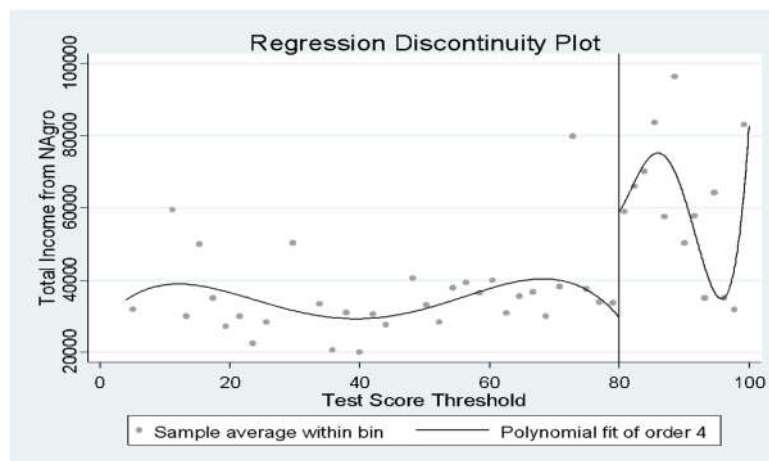


Figure 4. Polynomial fit of order 4.

4.4. Sharp Regression Discontinuity Design for Average Treatment Effects (ATE) on the Treated

Table 3 below shows the estimate of the ATE on the treated. The ATE shows that participation in the N-Power program increased the income of participants on average by ₦30,191.46 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 participant’s income generation. The diagnostics revealed that the prob > F was significant at 1% which shows that the model is a good fit. Post-estimation tests to validate the ATE shows that the optimal bandwidths of 9.75 at the left and right of the cutoff estimated using the uniform kernel approach and samples nearest to the cutoff were valid. This was revealed in the conventional, bias-correction, and robustness values which were all statistically significant at 1% in Table 3 below. This, therefore, implies that the participants are more likely to engage in agribusiness as a result of their participation in the N-Power Agro program than would be the case among youths not selected for the program. This further implies that participation in the program had a positive and significant impact on their income and on the decision to engage in agribusiness.

Table 3. Sharp regression discontinuity (RD) and treatment effects estimate outcome using local polynomial regression.

Method	Coef.	Std. Err.	Z	P > z	[95% Conf. Interval]
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Conventional	27,234	3885.1	7.0098	0.000	19,619.34	34,848.3
Bias-corrected	26,630	3885.1	6.8544	0.000	19,015.3	34,244.6
Robust	26,630	5625.9	4.7335	0.000	15,603.4	37,656.5
Income	Coef.	Std. Err.	t	P > t 	[95% Conf. Interval]	
Treated	30,191.46	2960.704	10.20	0.000	24,376.41	36,006.51
_cons	35,373.13	1676.631	21.10	0.000	32,080.1	38,666.17

4.5. Perceived Benefits for the 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 benefits by N-Power Agro participants. It shows that respondents selected multiple choices and it was shown that a majority, 48.10% of the participants opted for monthly stipends while a minority, about 5.19%, choose monthly stipends & Extension services. This shows that most of the participants depended on the program due to the monthly incentives (stipends) they are getting from it and not really because of the skills and training. This is similar to the findings of Ogunremi et al. [44].

Table 4. Distribution of participant respondents by perceived benefits in N-Power Agro.

Perceived Benefits	Percentage (n = 345)
Extension services	12.11
Monthly stipends	48.10
Training and skills development	13.84
Monthly stipends & training and skills development	20.76
Monthly stipends & extension services	5.19
Total	100.00

4.6. Saving Potentials of the Youth in the N-Power Agro Program

Figure 5 below shows the results of the savings potentials of participants from their stipends to start an agribusiness venture. It shows that about 80% of the participants cannot start any new agribusiness venture as they do not make enough savings from their monthly stipends. This implies that the government needs to move away from incentivizing youths, but rather empower them to have enough capital to start agribusiness.

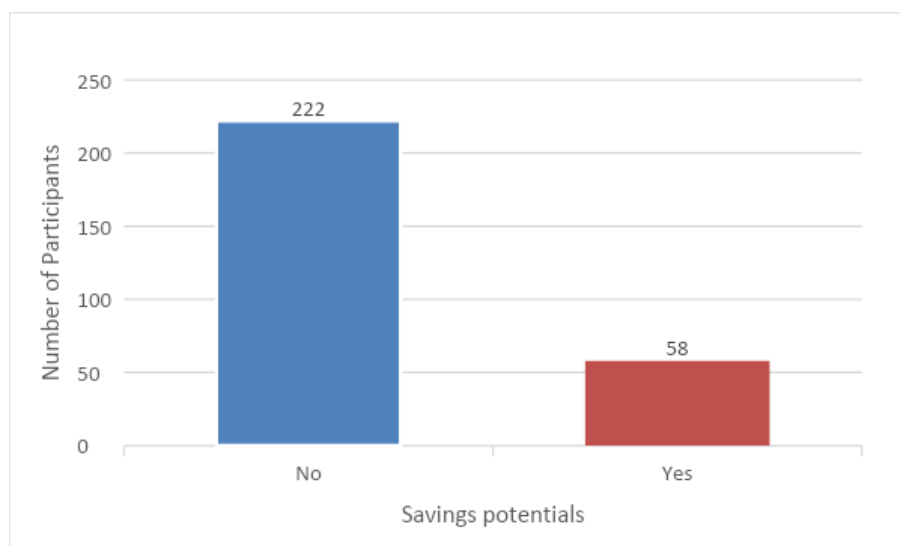


Figure 5. Savings potentials from N-Agro stipends to start an agribusiness venture.

5. Conclusions

The centrality of agribusiness as the interface between the youth, agriculture, and the rural sector cannot be easily rejected. Africa needs a vibrant agribusiness sector to create jobs and wealth and that will not be possible without capable and ambitious youth entrepreneurs. This is because agribusiness can create vast employment opportunities, higher incomes, and the poverty reduction mechanism for the crowds of unemployed young people in Africa. Therefore, engaging the youth especially those living in the rural areas in agribusiness has become an important strategy to create employment opportunities globally and Africa in particular. To achieve this, various African governments and organizations have implemented various interventions that facilitate youth engagement in agribusiness for several years. Surprisingly, there is a dearth of evidence on what worked and what did not work well, making it difficult to make informed evidence-based policy. Therefore, in this context, this paper evaluated the impacts of the N-Power Agro Program in creating employment and improving income through agribusiness for the youth. The program aimed to improve the economy through training and creating employment opportunities for youth in Nigeria.

Following the completion of conclusive research, descriptive statistics were used to show the unique characteristics possessed by youths which are vital in agribusiness development. Factors such as age, marital status, agricultural skill, agricultural graduate, and employment status significantly influenced the choice of participating in the N-Power Agro program. More than 50% of the participants have attained a Higher Educational qualification at the university level. This implies that education is accorded higher importance in Southwestern Nigeria. Most of the respondents have also gained entrepreneurship skills from their higher educational institutions. This shows the significant role higher educational institutions in Nigeria are playing to enshrine entrepreneurial skills into the lives of their graduates. Similarly, more than 50% of the participants own or have created employment than nonparticipants. This implies that the N-Power empowerment program has been able to create employment and agribusinesses for the participants of this program than nonparticipants through their monthly stipends. Therefore, the N-Power empowerment program implemented to inspire the engagement of the youth in agriculture has succeeded in influencing their willingness towards agribusiness. Finally, the collective entrepreneurial training and skills (gained before or after participation) were paramount to enhancing the self-employment of the youth in agribusiness.

In the final stage of the study, findings from RDD established that the impact of the N-Power Agro program on income generation of Nigeria's youth was positive with the regression discontinuity design analysis recording an increase in the participants' income than for nonparticipants. The ATE shows that participation in the N-Power program increased the income of participants on average by ₦30,191.46 compared to non-N-Power participants and this estimate is statistically significant at 1%. Thus, the N-Power program had a slightly positive impact above their monthly stipends on the participant's income generation.

Nevertheless, despite the many positive outcomes of this intervention, with most 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 startup capital as they are unable to make considerable savings from their ₦30,000 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 the males.

Finally, for Nigeria's and African 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 young men and women who can meet up with global technological development that will lead to increased agricultural productivity. In addition, wider implementation of the N-Power Agro program in other countries could help improve incomes, transform employment economies and develop agricultural markets in Africa, but that will require not just innovative thinking and willingness to change within governments and higher education institutions, but also the support of

development partners and other key stakeholders. Young people can develop the African agribusiness sector to create youth employment, promote food security, increase consumption, and improve agricultural export earnings. With the multiplier effect, this will raise the standards of living and community welfare, and ultimately stimulate socio-economic transformation in Africa to achieve the African Development Bank's vision of the Feed Africa Strategy which is to transform African Agriculture into a competitive and inclusive agribusiness sector that creates wealth, improves lives and secures the environment.

6. Policy Recommendations

Consequent upon the findings of the study, this study makes the following policy recommendations.

1. The government and policymakers 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 to provide more employment, job creation, and at the same time increase income generation, hence improving the standard of living of female youth;
2. Rather than scrap or lay-off current participants, the FGN should engage them 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 attainment of the sustainable development goals on food security rather than incentivizing them monthly;
3. Intervention programs that particularly focus on younger people between 20 and 35 years who have much passion for agribusiness should be established;
4. Incentivizing youth through empowerment programs should be discouraged, but rather to empower the youths into active participation by taking ownership of their business venture. The government should rather empower the youth into venturing into agribusiness by supporting them with capital, land, training, and also ensuring proper monitoring;
5. Nigeria's agricultural value chain is slowly evolving with limited diversification in an environment that yet undermines the progress, therefore, there is a need for policy interventions that will address the constraints inherent in the space;
6. The policymakers must know that the central part of policies should target youth as partners and leaders in development. It should be a collaborative intervention that will ensure youths are fully consulted and integrated into the decision-making process.

Limitation of the study: To the best of our knowledge, this study is the first to investigate the impact evaluation of the N-Power program on income and employment creation through agribusiness among the youth in Nigeria using regression discontinuity design. Despite the above important contributions, our study relies on cross-sectional data which limits the generalizability of the results beyond one year. As a result, we could not estimate income changes over time. Moreover, since our data are not nationally representative, the results and policy implications should be interpreted with caution. We hope our approach could be replicated in future studies based on a longitudinal survey that will fill the above gaps.

Supplementary Materials: The following are available online at www.mdpi.com/2071-1050/12/14/5737/s1, File S1: IITA Questionnaire

Author Contributions: All authors have made substantial contributions to the research design, data collection, data analyses, and write-up of the manuscript. The submitted version is checked and approved by all authors. The views expressed in this paper are the sole responsibility of the authors. All authors have read and agreed to the published version of the manuscript.

Funding: This research is funded by the International Institute of Tropical Agriculture (IITA) that received a grant #2000001374 from the International Fund for Agricultural Development (IFAD) on a project titled

“Enhancing Capacity to Apply Research Evidence (CARE) in Policy for Youth Engagement in Agribusiness and Rural Economic Activities in Africa”.

Acknowledgments: Authors will like to acknowledge all the supports given by The Apostolic Church Student’s Fellowship of Nigeria, Olabisi Onabanjo University CAS Ayetoro; the University of Ibadan, Department of Agricultural Economics Postgraduate class 2016/2017; and Oyo, Ogun, and Lagos N-Power State Ambassadors. Furthermore, thanks are also due to Dr. Tesfamicheal Assfaw Wossen for his comments on the earlier draft of this manuscript and his supervisory role. Finally, the authors gratefully acknowledge the efforts of the anonymous reviewers and the editors for their useful comments and suggestions.

Conflicts of Interest: The authors confirm that there are no conflicts of interest.

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