IITA monograph
Impact of Agricultural Training Programs on Youth Agripreneurial Performance and Empowerment in Nigeria: The Case of Fadama GUYs Program
Impact of agricultural training programs on youth agripreneurial performance and empowerment in Nigeria: The case of Fadama GUYS Program

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October 2019
Published by the International Institute of Tropical Agriculture (IITA)
Ibadan, Nigeria. 2020

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ISBN 000-000-0000-00-0


Printed in Nigeria by IITA

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## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>v</td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>vi</td>
</tr>
<tr>
<td>Abstract</td>
<td>ix</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Background of the study</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the research problem</td>
<td>3</td>
</tr>
<tr>
<td>Objectives</td>
<td>4</td>
</tr>
<tr>
<td>Research questions</td>
<td>4</td>
</tr>
<tr>
<td>2. Literature review</td>
<td>5</td>
</tr>
<tr>
<td>Definition of terms</td>
<td>5</td>
</tr>
<tr>
<td>Youth unemployment in Nigeria</td>
<td>7</td>
</tr>
<tr>
<td>Youth entrepreneurship development</td>
<td>8</td>
</tr>
<tr>
<td>Youth empowerment in Nigeria</td>
<td>10</td>
</tr>
<tr>
<td>Factors affecting youth entrepreneurship performance</td>
<td>11</td>
</tr>
<tr>
<td>Economic environment</td>
<td>11</td>
</tr>
<tr>
<td>Culture and Education</td>
<td>14</td>
</tr>
<tr>
<td>Technological development</td>
<td>14</td>
</tr>
<tr>
<td>3. Research methodology</td>
<td>15</td>
</tr>
<tr>
<td>Conceptual framework</td>
<td>15</td>
</tr>
<tr>
<td>Theoretical framework</td>
<td>18</td>
</tr>
<tr>
<td>Study area</td>
<td>19</td>
</tr>
<tr>
<td>Abia State</td>
<td>19</td>
</tr>
<tr>
<td>Ekiti State</td>
<td>19</td>
</tr>
<tr>
<td>Kebbi State</td>
<td>20</td>
</tr>
<tr>
<td>Research design</td>
<td>20</td>
</tr>
<tr>
<td>Methods of data collection</td>
<td>21</td>
</tr>
<tr>
<td>Sampling procedure and size</td>
<td>21</td>
</tr>
<tr>
<td>Data type</td>
<td>22</td>
</tr>
<tr>
<td>Data collection methods</td>
<td>22</td>
</tr>
<tr>
<td>Data analysis</td>
<td>23</td>
</tr>
<tr>
<td>Descriptive statistics</td>
<td>23</td>
</tr>
<tr>
<td>Propensity score matching method</td>
<td>23</td>
</tr>
<tr>
<td>The three-stage estimation procedure</td>
<td>25</td>
</tr>
<tr>
<td>Description of variables in the logit model</td>
<td>28</td>
</tr>
<tr>
<td>Measure of agripreneurship performance</td>
<td>29</td>
</tr>
<tr>
<td>Measurement of youth empowerment</td>
<td>29</td>
</tr>
<tr>
<td>Asset index</td>
<td>32</td>
</tr>
<tr>
<td>Model diagnostic tests</td>
<td>34</td>
</tr>
<tr>
<td>Diagnostic tests for the logit model</td>
<td>34</td>
</tr>
<tr>
<td>Diagnostic tests for the propensity score matching</td>
<td>35</td>
</tr>
<tr>
<td>4. Results and Discussion</td>
<td>37</td>
</tr>
<tr>
<td>Socioeconomic and farm characteristics</td>
<td>37</td>
</tr>
<tr>
<td>Analysis of agripreneurship performance indicators</td>
<td>37</td>
</tr>
<tr>
<td>Factors impeding youth participation in agribusiness</td>
<td>40</td>
</tr>
<tr>
<td>Factors influencing the likelihood of participation in the Fadama GUYS Program</td>
<td>42</td>
</tr>
<tr>
<td>Impact of program training on agripreneurship performance</td>
<td>47</td>
</tr>
<tr>
<td>Results of PSM diagnosis test</td>
<td>47</td>
</tr>
</tbody>
</table>
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
Acknowledgement

I thank God for the strength, good health, and knowledge to write this report. My special appreciation goes to my supervisors, Prof. John Mburu (UoN) and Dr Djana Mignonu (IITA) for their professional advice and support. This research would not have been possible without their guidance from the initial step which enabled me to develop an understanding of the subject. It is indeed an honor to learn from these experts.

Also, I appreciate the International Fund for Agricultural Development (IFAD) and IITA for funding this research.

Finally, I thank the state coordinators and all the staff of the Fadama state offices in Abia, Ekiti, and Kebbi states for their support as well as all the youth who took part in the survey. May the almighty God bless you all abundantly.
Abstract

Agripreneurship is increasingly being adopted as a valuable means to address youth unemployment and livelihood improvement in Africa. This is because the agricultural sector is among the sectors with huge potential to contribute immensely to youth employment. Studies have shown that the sector has the capacity to employ more than 70 percent of the entire population. For this reason, the agricultural sector has received a lot of attention in recent times. Government and NGOs have invested in youth-specific training programs, particularly in the field of agriculture. However, there is little or no empirical evidence on the impact of these programs on agripreneurship performance and the empowerment of the youth. This study aims to investigate the impact of the Fadama Graduate Unemployed Youth and Women Support (GUYS) program on agripreneurship performance and the empowerment of the youth in Nigeria. A multistage sampling technique was employed to select 977 respondents comprising 455 participants of the Fadama GUYS program and 522 nonparticipants across three states in Nigeria. The study adopted the Propensity Score Matching method to analyze the impact of the program on youth agripreneurship performance. Findings showed a significant, positive, and robust impact of the program on youth agripreneurship performance with improvements up to 27%. The sensitivity analysis also revealed that the impact estimate was insensitive to unobserved selection bias. To analyze the impact of training on empowerment, the study adopted a three-stage estimation procedure, which combined the Endogenous Treatment Effect Regression (ETER) model with a Tobit regression model. The result showed that training, through agripreneurship performance, contributed to youth empowerment. Based on this, the study recommends increased investment in agricultural training programs such as the case study to empower and improve the agripreneurship performance of young people. Also, future training programs should incorporate mentorship into their program design to increase youth engagement in agribusiness.
1. Introduction

Background of the study

According to the UN Report (2015), over 35 percent of the entire African population is between 15 and 24 years old, while 27% are between 25 and 35 years old. Aggregating this, between 60 and 70% of Africans are between the ages of 18 and 35, which is the age category regarded as youth (African Development Bank [AfDB], Organization for Economic Co-operation and Development [OECD], and United Nations Development Programme [UNDP], 2017). The majority of people (70%) in this age category are living in rural areas (International Labour Organization 2012), where they face high poverty levels, food insecurity, critical cases of unemployment, and underemployment. Thus, young people in these areas are at the center of a critical economic crisis, which limits them in changing their social and economic status as well as their prospects (Allen et al. 2016). Another major challenge in much of sub-Saharan Africa (SSA) is the skewness and dysfunctionality of the labor markets against young people (ILO 2017). It is unfortunate that today, many young people in the rural areas barely survive on the paltry sources of livelihood, particularly young women who are usually marginalized by African cultural practices and norms (Mastercard Foundation 2015) where some 600 million people are currently under the age of 25. Many still do not have access to quality and reliable economic opportunities, either through self- or formal employment. The economic and social costs of this challenge are too high. It is time for the global youth jobs movement to take its work to a new level—a level that will create new economic opportunity for millions of young people. The challenges of youth underemployment and low productivity self-employment are multi-faceted. Solutions require a holistic approach at the level of individual young people, at the level of collaborating organizations and at the level of government leadership, so as to create enabling environments and remove obstacles to youth employment, entrepreneurship and productivity. The Foundation’s Economic Opportunities for Youth programs provide instructive examples of how holistic approaches can be designed and implemented in Sub-Saharan Africa. These programs are guided by three principles: There is a need to improve training, skills development and education by developing and testing models that deliver the foundational skills, experiential learning and non-cognitive skills young people need. There is a need to link young people to real opportunities.
that exist in the market in developing countries. There is an opportunity to explore the role that financial services and education can play in helping young people make a successful transition into their working years. While data on many aspects of this work are still emerging, a review of the Foundation’s programs and the broader literature reveals a number of important themes, principles and points of evidence that can help further guide practices in this field. The following are particularly important to note.

Thus, considering the large percentage of young people in rural areas, there is no doubt that many African countries, including Nigeria, are currently experiencing economic hiccups. The consistent challenge of youth employment in Nigeria is a clear indication that there is a need for urgent policy- and program-level interventions. One of the initiatives taken by the Federal Government of Nigeria to reduce youth unemployment was the inclusion of entrepreneurship studies in the curriculum of tertiary institutions (Aliu and Ibe 2008; Olorundare and Kayode 2014). This interest in youth entrepreneurship could be attributed to the high poverty level and reliance of many young people on the very limited, available white-collar jobs which compound the issue of unemployment and underemployment.

According to Mohamed and alSheikh (2017), entrepreneurship is a strategic and important instrument, which could change the economic status of young people and help them acquire relevant skills for their economic well-being and self-empowerment. Participation in entrepreneurship supports young people to enhance their confidence, attain financial independence, and bring them out of their inherent poverty. It also creates job opportunities for other youth who are not entrepreneurs and ensures economic growth (Sitoula 2015). Olorundare and Kayode (2014) opined that entrepreneurship activities bring about social changes through income and wealth generation. Following the numerous benefits embedded in entrepreneurship, the approach taken by the Federal Government could be the right initiative to reduce youth unemployment in Nigeria.
In addition to national efforts on entrepreneurship, development partners, including the World Bank, support local stakeholders to facilitate youth entrepreneurship development in Nigeria, particularly in the field of agriculture, by organizing programs that can help young people gain the necessary skills and capabilities to be successful agripreneurs. This is due to the vast employment potential in the agricultural sector, which has not been fully tapped over the decades. Several studies have reported that agriculture holds lots of potential to provide gainful and sustainable employment opportunities for a remarkable number of youth, provided adequate investments are channeled towards the direction, and it is supported by conducive legal environment and policy frameworks (Nwajiuba, 2012; Ogbalubi and Wokocha 2013; Koira, 2014; Girard, 2016; Ogunleye, 2017). This study, therefore, focuses on how youth involvement in agricultural programs impacts their agripreneurship performance and empowerment status.

Statement of the research problem

In view of the employment potentials embedded in the agricultural sector, the Nigerian government, with the support of her development partners, has shown its commitment towards empowering young people through agricultural training. According to Yami et al. (2019), one of the efforts of stakeholders to reduce youth dependence on formal jobs across Africa (which compounds the problem of unemployment) is to increase investments in agricultural programs aimed at promoting youth engagement in agribusiness. Awogbenle and Iwuamadi (2010) also reported that from 1986 till date, there has been a remarkable number of initiatives by various administrations to promote youth empowerment through the creation of gainful self-employment opportunities. However, despite these numerous interventions, there is a dearth of empirical evidence on what worked or what did not. This corroborates the findings of Yami et al. (2019) that even though there have been lots of interventions, little or no empirical evidence exists on the success or failure of these interventions, which has made it difficult to make practical policy recommendations from them. An example of such programs is the Fadama GUYS Program which was implemented in 2017 under a tripartite agreement between the Federal and State governments of Nigeria and the World Bank with the major aim of empowering young people in the field of agribusiness. The program primarily focused on training youth in different agribusiness fields including crop/livestock production, processing and marketing, risk management on-farm, and writing agribusiness plans. Many youth were trained under this program but, there is little or no
empirical evidence on its success and challenges since much research has not focused on this area.

Furthermore, it is worth mentioning that several studies have been conducted on the development of youth entrepreneurship in Nigeria but, only a few have analyzed the impact of agricultural training programs on youth agripreneurship using a case study. The majority of the previous studies focused on factors determining participation rather than measuring the impact on economic outcomes (Awogbenle and Iwuamadi, 2010; Okoli and Okoli 2013; Chidiebere et al. 2014). This study, therefore, intends to address this research gap by assessing the impact of agricultural training programs on youth agripreneurship performance and empowerment so as to narrow the knowledge gap in the area and provide empirical evidence which could drive practical policy making.

Objectives

Generally, the study intends to evaluate the impact of agricultural training programs on youth agripreneurship performance and empowerment in Nigeria, using the case of the Fadama GUYS Program.

Specifically, the study seeks to:

- Identify factors impeding youth engagement in agribusiness.
- Identify factors which influenced youth participation in the Fadama GUYS program.
- Analyze the impact of the program on youth agripreneurship performance.
- Analyze the impact of the program on youth empowerment.

Research questions

Empirically, the study seeks to provide answers to the following questions:

- What are the factors impeding youth engagement in agribusiness?
- What factors influenced youth participation in the Fadama GUYS program?
- What is the impact of the program on youth agripreneurship performance?
- What is the impact of the program on youth empowerment?
2. Literature review

Definition of terms

- **Youth**
  Within the context of this study, the word youth refers to all young males and females between 18 and 35 years (Nigeria Youth Policy Document 2009). This definition agrees with the one proposed by ILO (2005). Even though the definition appears too broad, it is based on the justification that the majority of young people go through significant changes and different life circumstances during these times as they transition from childhood to adulthood. The same document also explained that for people in this specified age category to be able to realize their full potential, they require economic, social, and political support.

- **Unemployed**
  For this study, unemployed persons are defined as individuals who are not in any form of employment and did not seek employment during the reference period. Those who expect to be employed in the future or have made arrangements to start a future job, as well as those involved in skills training or programs designed and organized to promote employment are also classified as unemployed (ILO 2011).

- **Entrepreneurship**
  Within the context of this study, entrepreneurship is defined as an innovative process which involves identifying new business opportunities and the armament of sufficient productive resources to start a new enterprise or invigorate an existing one, under risky and uncertain conditions for the ultimate aim of generating income and making profit (Adenutsi 2009). This agrees with the definition of Egwu (2014). A good number of studies have established a positive relationship between entrepreneurship and employment generation, poverty alleviation and economic development. It is for this reason that various governments in Nigeria over the past three decades implemented a number of policies and programmes aimed at addressing the high rate of unemployment, wide-spread poverty and low level of economic development. Unfortunately, the various policies and programmes have failed to achieve the desired results.
This paper attempts to identify the causal factors that militate against the effectiveness of government efforts at entrepreneurship development. Major government programmes are examined to identify inherent weaknesses. Supported by empirical and theoretical literature, this paper asserts that the treatment of all small businesses as entrepreneurial constrains the development of entrepreneurship in Nigeria and in other developing economies, as policies and programmes are implemented across the board. It canvasses a distinctive categorization to distinguish entrepreneurial firms from non-entrepreneurial small businesses and the development and implementation of policies and strategies that are suitable for each class of small businesses. While all small businesses need support, entrepreneurial firms need higher level of support to enable them play their catalytic role in employment generation and economic development. Other group of challenges identified by empirical studies, which militate against the development of small businesses, entrepreneurial and non-entrepreneurial, should be properly addressed. These include environmental hazards, infrastructural inadequacies, high level of insecurity and the incidence of wide-spread corruption.

Agripreneurship

Bairwa et al. (2014) defined agripreneurship as the gainful marriage between entrepreneurship and agriculture. More specifically, this study adopted the definition by Volkmann et al. (2010) who defined agripreneurship as a concept which involves risk-taking and accepting uncertainties for the purpose of developing a business venture ultimately to make profits. Thus, the definition of agripreneurship and entrepreneurship cannot be clearly differentiated since both involve taking a risk, establishing a business, and using resources for income generation. Thus, agripreneurship is a subunit of entrepreneurship which solely focuses on the agricultural sector.
Youth unemployment in Nigeria

According to United Nations (UN) Report (2015), Nigeria is projected as the world’s third most populous country by the year 2050. The National Population Commission (2013) reported that more than half of the population is aged between 18 and 35 years (youth). However, as the population continues to grow geometrically, the percentage of unemployed youth also continues to grow in the same direction (Akande 2014). Youth unemployment has been rising since 2014. In the third quarter of 2017, the rate of youth unemployment in Nigeria rose to 33.10 percent from 29.50 percent recorded in the second quarter. Between 2014 and 2017, the mean rate of youth unemployment in Nigeria was 21.73%, thereby reaching the highest record of 33.10 percent in 2017 as opposed to the low record of 11.70% recorded in the fourth quarter of 2014 (Trading Economics, 2018). This implies that the number of young people that were unemployed increased by 64% within a space of three years.

The resultant effect of youth unemployment is not limited to depression which in reality is widespread, but also has an adverse effect on both economic and social costs (Schoof 2006). This is because unemployment and poverty go hand-in-hand and are both philosophical and precipitants resulting from a plethora of contemporary challenges in the society from leadership, security, governance, etc., that are unfavorable to human existence (Oduwole 2015). Ruhl (2011) stressed that the issue of youth unemployment in Nigeria could be more attributed to the demand-side, implying job shortage and high competition for very limited available jobs. The author also stressed that the key problem of high unemployment is rarely associated with poor education, poor skills, or ill-equipment of young people for the workforce. In fact, there are better educated and skilled youth today than in the past. Surajo (2016) attributed unemployment to the neglect of young people by policymakers as well as unfavorable economic conditions faced by many young people, particularly those in the rural areas.

Surajo’s argument, however, may have likely changed because there have been several efforts by policymakers to reduce youth unemployment rate in recent times. For instance, the N-Power program was introduced in 2014 for the sole aim of addressing the challenge of youth unemployment in the country through the provision of structures for relevant and appropriate work skills acquisition as well as development. Tambari and Imoh-Ita (2016) Akwa Ibom, Bayelsa and Rivers State. The purpose was achieved through purposive sampling design. The sample size consisted of 614 respondents drawn from the three states under study. The data collected were analyzed using Standard Deviation.
Two hypotheses were formulated for the study. The findings of the study demonstrate that youth unemployment is common to the three states. However, there are variations in the intensity of crime in the study states. It is low in Akwa Ibom, and very high and frequency in Bayelsa and Rivers. The study noted further that the presence of job seekers, skill labour with large population of unskilled youths and above all, the urge for quick money making, created high rate of crime in Bayelsa and Rivers State. Based on these, the study suggests holistic development in the area.

Youth entrepreneurship development

Fadeyi et al. (2015) argued that creating and developing a modern, flexible, and knowledge-based economy requires entrepreneurship development across all sectors. This is because, according to the World Bank (2008), entrepreneurship brings out the economic potential of young people who account for over 60% of the world’s population. In agreement, OECD (2013) posited that entrepreneurship development will bring about job creation, increased innovation, increased competition, economic opportunities, and positive externalities which will contribute to wealth creation and nation building. Chekalyuk (2017) stated that entrepreneurship a sustainable solution to the problem of unemployment due to its potentials to create new jobs based on the opportunities it generates for more people to enter the labor force either by being self-employed or by working for new establishments.

White and Kenyon (2000) reported that youth entrepreneurship development is critical to promoting innovation and resilience since it involves finding new ideas and
methods of doing things. The authors also explained that entrepreneurship gives young people, especially the marginalized ones, a sense of “meaning” and “belonging” which, in turn, shapes their identity and encourages others to treat them as equal members of society. Okolie et al. (2014) concluded that entrepreneurship empowers individuals by equipping them with the capabilities to maximize their output, income and wealth, thereby, helping them to escape poverty, become labor employers, and contribute to economic development.

Osemeke (2012) it treats numerous issues (an overview inclusive opined that entrepreneurship development helps to enhance and improve the knowledge and skills of prospective or existing entrepreneurs, usually through human capacity building programs such as training. Therefore, the major objective behind entrepreneurship development is to increase the number of individual-owned businesses so as to reduce the rate of unemployment. This is supported by the findings of Osemeke (2012); it treats numerous issues (an overview inclusive that entrepreneurship development contributes to employment creation, which fosters economic growth and development. Thus, the development stage focuses more on people who intend to either start a business or expand an existing business firm and capitalizes on innovation and the potential for growth.

Entrepreneurship development, according to Kumar et al. (2015), involves stimulating the motivation of individuals towards entrepreneurship, providing them with relevant support, and helping them with the sustenance and management of their business ventures. Hence, motivation is an important element in the development process. In reality, the perception and drive of people stimulate their attitude towards activities.

Musengi-ajulu (2008) explained that the increased focus on youth entrepreneurship in many African countries is driven by the potentials embedded in entrepreneurship to facilitate youth participation in economic activities. Chidiebere et al. (2014) stated that the development and transformation of the Nigerian economy highly depends on youth entrepreneurship development, which can result in empowerment. The same study also emphasized that entrepreneurship development in Nigeria becomes necessary due to the single fact that it can provide a lasting remedy to extreme hunger and poverty associated with high rates of unemployment.

Obaji (2014) highlighted three major elements which contribute to entrepreneurship development based on literature. The first element is risk-taking. The author described
risk-takers as people who have a business idea but are not sure of the survival of the business. However, when the business succeeds, the individual is motivated to expand and employ more people, thereby creating employment opportunities and wealth within the society.

The second element is innovativeness and creativity which, according to OECD (2013), strategically drives economic development. This corroborates the argument of Obaji (2014) that creativity is crucial to economic development because it concentrates on science and technology-based knowledge.

The third element is motive to start a new business. The author described this element as entrepreneurial intention which drives an individual to become an entrepreneur. This, however, can be attributed to several factors such as the zeal to be successful, innovative, be a boss, and be independent. However, for these three elements to play out well, there is a need for favorable government policies and support.

Youth empowerment in Nigeria

Usman (2014) conceptualized youth empowerment as various ways through which young people can be equipped and assisted to achieve self-sustained national development as opposed to being a national burden and ultimately depending on government for the provision of their basic needs. Meredith et al. (2013) also conceptualized it as a multilevel construct which calls for an understanding of individual adaptation, organizational development, and community life evolution. The authors further posit that it can be a process as well as outcome-oriented activity which involves endowing young people with skills and capabilities which allows them to have greater control in organizational and community decision-making.

Ibrahim (2013) suggested that embarking on empowerment and development programs in agriculture and other important sectors will help Nigeria to secure its future prosperity. He further suggested seven important directions to which empowerment efforts could be channelled among which are entrepreneurship promotion, improved skills, and training.

Youth empowerment has been a popular song in Nigeria. In fact, different government regimes come with different empowerment programs. However, there is very little evidence to show that the youth were indeed empowered through them. The rates of
unemployment, underemployment, and crime, especially among the youth continue to rise. This questions the success and extent to which these programs achieved the stated objective.

Factors affecting youth entrepreneurship performance

In their study on youth unemployment and entrepreneurship development, Chidiebere et al. (2014) classified the factors affecting youth entrepreneurship development based on economic and human resources. Economic resources include labor, land, capital, and entrepreneurial skills, which when combined contribute a great deal to output. These factors are further discussed under the following headings.

Economic environment

The economic environment exercises the most direct and immediate influence on youth entrepreneurship performance. Many empirical studies have perceived opportunity as a driver of entrepreneurial action and explained that youth entrepreneurship depends on the environment and that environmental changes create opportunities for business start-up (Edelman and Yli-Renko 2010). Objective environmental conditions are considered to be the source of entrepreneurial opportunities and thus drivers of subsequent entrepreneurial action. The "creation" view, in contrast, is based on entrepreneurial perceptions and socio-cognitive enactment processes. While empirical studies have separately utilized each of these perspectives, few attempts have been made to integrate insights from both theories to empirically examine the interrelationships among environmental conditions, entrepreneurial perceptions, entrepreneurial action, and outcomes. In this article, we explicate the roles that both objective environmental conditions and entrepreneurial perceptions of opportunity and resource availability play in the process of firm creation. Utilizing longitudinal data on nascent entrepreneurs, we find that as hypothesized, entrepreneurs’ opportunity perceptions mediate between objective characteristics of the environment and the entrepreneurs’ efforts to start a new venture. Contrary to our expectations, we do not find a similar mediating effect for perceived resource availability. These findings have important implications for further theory development in entrepreneurship as well as for practice and education in the field.

However, two theories have been captured to differentiate between types of youth entrepreneur and these categories have important effects on the performance of youth-owned enterprises. The first theory known as the Discovery Theory assumes that start-up decision is driven by opportunities and that the decision-making context within which entrepreneurs operate is risky. The implication of this is that the decision to start a business is based on certain a economic environment and as soon as the environment changes, their businesses collapse (Alvarez and Barney, 2007; Edelman and Yli-Renko, 2010). Objective environmental conditions are considered to be the source of entrepreneurial opportunities and thus drivers of subsequent entrepreneurial action. The "creation" view, in contrast, is based on entrepreneurial perceptions and socio-cognitive enactment processes. While empirical studies have separately utilized each of these perspectives, few attempts have been made to integrate insights from both theories to empirically examine the interrelationships among environmental conditions, entrepreneurial perceptions, entrepreneurial action, and outcomes. In this article, we explicate the roles that both objective environmental conditions and entrepreneurial perceptions of opportunity and resource availability play in the process of firm creation. Utilizing longitudinal data on nascent entrepreneurs, we find that as hypothesized, entrepreneurs’ opportunity perceptions mediate between objective characteristics of the environment and the entrepreneurs’ efforts to start a new venture. Contrary to our expectations, we do not find a similar mediating effect for perceived resource availability. These findings have important implications for further theory development in entrepreneurship as well as for practice and education in the field.
The other theory (Creation Theory) assumes that youth entrepreneurs create opportunities through an emergent and iterative search process. Therefore, for this second group, the environment does not really have an impact on start-up decision and future performance (Alvarez and Barney 2007; Edelman and Yli-Renko 2010). Objective environmental conditions are considered to be the source of entrepreneurial opportunities and thus drivers of subsequent entrepreneurial action. The “creation” view, in contrast, is based on entrepreneurial perceptions and socio-cognitive enactment processes. While empirical studies have separately utilized each of these perspectives, few attempts have been made to integrate insights from both theories to empirically examine the interrelationships among environmental conditions, entrepreneurial perceptions, entrepreneurial action, and outcomes. In this article, we explicate the roles that both objective environmental conditions and entrepreneurial perceptions of opportunity and resource availability play in the process of firm creation. Utilizing longitudinal data on nascent entrepreneurs, we find that as hypothesized, entrepreneurs’ opportunity perceptions mediate between objective characteristics of the environment and the entrepreneurs’ efforts to start a new venture. Contrary to our expectations, we do not find a similar mediating effect for perceived resource availability. These findings have important implications for further theory development in entrepreneurship as well as for practice and education in the field.

Nevertheless, the performance of an enterprise in terms of productivity of goods and services needs a favorable economic environment. There are continuous and increasing efforts by both the public and private sectors to support young people with training, technical support, and in some cases small credit. All these are done to encourage them to be self-employed and reduce the failure associated with youth enterprises as well as address critical challenges and issues during the start-up process (Llisterri et al. 2006).
Culture and Education

Culture is one of the essential elements which drives youth entrepreneurship and influences the behaviours of people in a society (Morris and Schindelhutte 2005). Business experience and education have a direct and strong influence on youth entrepreneurial intention, self-confidence, risk-taking ability, innovation, and performance (Turker and Sonmez-Selcuk 2009). It is equally important to map out the future context of entrepreneurship. The purpose of this paper is to fill this void by analysing the impacts of some contextual factors on entrepreneurial intention of university students.

Design/methodology/approach

In the study, a model was proposed and empirically tested on a sample of 300 university students in Turkey. The entrepreneurial support model (ESM). For instance, youth whose parents are entrepreneurs have a higher probability of becoming entrepreneurs compared to their counterparts. Culture is an important source of innovation, personal development, intuition, creativity, and vision. Also, education enhances youth entrepreneurial progress. Educational institutions are the places where youths develop ideas about their career choices and future aspirations (Ljaz et al. 2012).

Technological development

The model of research and development in economic growth shows that better research results positively affect the growth rate of output per capita. In other word, it states that the most dynamic and competitive knowledge-based economy in the world, which is capable of sustaining economic growth, creating more and better jobs and opportunities, with greater social cohesion as well as respect for the environment and success in business depends on better technology, which is brought about by research development (Blanco et al. 2016).

This theory, therefore, implies that technological progress can help youth to be more effective in their activity which will inevitably lead to better performance. For instance, social network is an important tool for business expansion. It should be easier for a person who has access to social media to expand his business than someone without access.

These elements are important and directly affect the efficiency of training on youth performance.
3. Research methodology

Conceptual framework

The conceptual framework (Fig.1) is based on the Entrepreneurial Performance Model (E/PM) introduced by Van Vuuren and Nieman (1999). The model looks at the different elements which drive individual entrepreneurial performance. The model can be described as the blueprint which forms the framework of an entrepreneurship intervention. The model considers the structure within which entrepreneurship training programs operate as well as the approaches they utilize. Furthermore, it describes the minimum requirements for learning programs which improves participants’ ability to gain the competence and capabilities needed for entrepreneurial development.

The model is presented as the multiplicative construct shown in Equation (1):  
$$E/P = f[M(E/S \times B/S)]$$  
(1)

Where: $E/P =$ Entrepreneurial performance; $M =$ Performance motivation; $E/S =$ Entrepreneurial skills; $B/S =$ Business skills.

From this, it can be deduced that any upward or downward change in entrepreneurial performance is a multiplicative result of performance motivation ($M$); entrepreneurial skills ($E/S$), and business skills ($B/S$). Pretorius, Nieman, and Van Vuuren (2005) the best possible education model is required. The creation of more entrepreneurs is at least partially dependent on the creation and advancement of efficient educational models. Design/methodology/approach First, this paper briefly describes the two independently developed models for entrepreneurial education. Second, an in-depth qualitative analysis of the individual model constructs is presented to evaluate the contributions and limitations of each. Third, this paper proposes an integrated model that identifies certain weaknesses of each of its building-blocks, which are eliminated by the integration. Findings The paper concludes that the integrated model for entrepreneurial education enhances the body of knowledge and highlights the key role of facilitators of entrepreneurial education programmes. Originality/value Suggests that research should be conducted into the facilitation skills, entrepreneurial and business experience of existing facilitators and potentially those of business advisers that act as mentors. Keywords Entrepreneurialism, Educational development, Training
Figure 1.c Conceptual Framework.

Agricultural entrepreneurial training

Youth engagement in agribusiness

Agricultural production skills
- Livestock production
- Crop production
- Farm management

Entrepreneurial skills
- Financial management skills
- Innovative skills
- Risk taking ability
- Business orientation

Personality traits
- Behaviour
- Ambition
- Intention

External Environment/Institutional Factors
P- (Policies, laws, programs, and political dynamics)
E- (Economy and Environment)
S- (Sociocultural factors)
T- (Technology and Infrastructure)

Better youth agripreneurship performance
- Creation of new agribusiness enterprise
- Improvement in the performance of youth-owned business enterprises
- Income generation
- Gross profit margin
- Sales turnover

Youth Empowerment

Income generation
- Gross profit margin
- Sales turnover
Paper type Research paper", "author": [ { "dropping-particle": "", "family": "Pretorius", "given": "Marius", "non-dropping-particle": "", "parse-names": false, "suffix": "" }, { "dropping-particle": "", "family": "Nieman", "given": "Gideon", "non-dropping-particle": "", "parse-names": false, "suffix": "" }, { "dropping-particle": "", "family": "Vuuren", "given": "Jurie", "non-dropping-particle": "Van", "parse-names": false, "suffix": "" } ], "container-title": "International Journal of Educational Management", "id": "ITEM-1", "issue": "5", "issued": [ { "date-parts": [ [ "2005" ] ] } ], "page": "413-427", "title": "Critical Evaluation of Two Models for Entrepreneurial Education: An Improved Model through Integration", "type": "article-journal", "volume": "19" ], "uris": [ "http://www.mendeley.com/documents/?uuid=09b3ff8f-f38d-45ee-81b0-a6ba6971dea" ] }, "mendeley": { "formattedCitation": "(Pretorius, Nieman, & Van Vuuren, 2005 identified motivation as an important factor which contributes towards qualities like persistence, inner control, decisiveness, leadership, sheer guts, and determination. Hisrich et al. (2005) argued that the difference between a manager and an entrepreneur is shown in the development of specific skills, such as risk-taking, innovativeness, and leadership. Antonites (2003) also argued that good business skills such as financial management, human resource management, and marketing are germane for better performance.

Therefore, considering Figure 3.1, the agricultural training program focuses specifically on introducing new concepts and principles of agripreneurship and agribusiness management to the participants to help them to start an agribusiness enterprise on their own and also acquire skills (agripreneurial skills and business skills) for better performance. Thus, participants are trained in different agribusiness fields to help them develop and improve these skills. According to Karanja (2014), entrepreneurship (agripreneurship) training will lead to skill acquisition which will result in better performance. The training will also contribute to the improvement of youth personality traits such as agripreneurial behavior, intention, and attitude.

It is also very important to note that various external environment and institutional factors such as policies, programs, and laws may also have a direct effect on training programs, youth skills, traits, and agripreneurship performance. For instance, various government regulations or policies could affect the implementation of training programs and youth agripreneurship performance, either positively or negatively.

In addition, the individual youth personality traits, such as behaviors, ambition, and personal interests also have direct implications on their performance. Positive interaction
between all these factors will contribute positively to agripreneurship performance since performance is a multiplicative function of the variables. Better agripreneurship performance denotes agribusiness development or expansion, higher income, increased productivity and profitability, better livelihood, etc., which will contribute positively to youth empowerment.

Theoretical framework

The study is anchored on the theory of change. According to Rogers (2014), the theory is the building block for impact evaluation. It is a key which underpins any impact evaluation, given the cause-and-effect focus of the research (Gertler et al. 2016). The theory was developed by Weiss in 1995 and it describes how and why an initiative (such as training intervention) works. In other words, it explains how the activities undertaken by an intervention (such as a project, program, or policy) contributes to the result or the set of results which lead to expected or observed impacts. Also, it recognizes the context in which a program is being evaluated as well as the characteristics of the participants (Rogers 2014; Blamey and Mackenzie 2007). It describes how an intervention delivers the desired results. According to Gertler et al. (2016), the theory describes a chain of events which result into outcomes, explore the conditions needed to arrive at the outcome, and clearly show the causal logic behind the program.

To build on this, Connell and Kubisch (1998) and Stein and Valters (2012) define the theory as a “systematic and cumulative study of the links between activities, outcomes, and contexts of the initiative,” which implies that the building block of any program evaluation entails a determination of the expected outcomes as well as the activities to be implemented to achieve the desired outcomes. For instance, the ultimate goal of the Fadama GUYSS program was to empower young people through agribusiness. To achieve this, the primary initiative taken was agricultural training which captures training on animal/crop production, marketing of agricultural products, processing, and financial management practices.

According to Weiss (2011), anchoring program evaluation on this model has three important advantages. The first is that it helps to focus on the key aspects of the program. Secondly, it facilitates the aggregation of evaluation results into a wider base of program and theoretical knowledge. Thirdly, it provides evidence which has more influence on practical policy-making.
Study area

The survey was conducted in three states in Nigeria between January and March 2019: Abia, Ekiti, and Kebbi, which represent the Southeastern, Southwestern, and Northwestern regions, respectively.

Abia State
Abia state is located in the South-eastern region of Nigeria with Umuahia as its capital. The state occupies a total land area of about 4900 km² and lies approximately within latitudes 4°40’ and 6°14’ North, and longitudes 7°10’ and 8° East. The state is low-lying with an annual heavy rainfall of about 2400 mm, which is particularly intense between the months of April and October. Going by the 2006 population census which predicted a population growth rate of 2.7%, the estimated population as of 2016 was about 3,699,168 people (National Bureau of Statistics 2011).

The majority of the population is engaged in agriculture due to the rich agricultural soil across the state. However, up to 70% practice subsistence farming (Christain Aid, 2017). The state is rich in arable land and produces yam, maize, potatoe, rice, cashew, plantain, taro, and cassava (Hoiberg 2010). The most important cash crop grown in the state is oil palm. Young people are majorly involved in cassava processing for the production of starch and flour as well as vegetable and fruit canning (processing and packaging) (Christain Aid 2017). The common language spoken is Igbo. According to (UNDP 2018), as of 2017, the poverty incidence rate in the state was 44.4% with an unemployment rate of 39.6%.

Ekiti State
Ekiti State, with Ado-Ekiti as its capital city, is mainly an upland zone with a total land area of about 6,353 km². The State is located in the southwestern region and indigenes speak Yoruba-Ekiti dialect. The State is located along latitude 7°15” and 8°71” north and longitude 4°47”east of the equator. The mean annual temperature and rainfall are 27 °C and 1400 mm, respectively. The climate pattern has two distinct seasons which are the rainy season, between April and October and the dry season between November and March. As of 2006, the state had a population of 2,398,957 people (National Bureau of Statistics 2011).

More than 75% of the population is actively engaged in agriculture (Ajayi 2017). The state is highly rich in cocoa production. Other major resources for development in the
state apart from cocoa include arable crop cultivation of yam (81,000 ha), rice (120,000 ha), maize (159,000 ha), and cassava (87,000 ha). Tree crops include 8500 MT palm kernel and 32,681 MT cocoa (Ajayi 2017). According to Ajayi (2017), the youth are actively involved in crop/livestock production (rice, cassava, aquaculture, poultry), nursery operations, crop and livestock processing, storage and packaging, and marketing of agricultural products. According to (UNDP 2018), as of 2017, the poverty incidence rate in the state was 30.6% with an unemployment rate of 18.6%.

Kebbi State

Kebbi State is located in the northwest geopolitical zone of Nigeria with its capital at Birnin Kebbi, an ancient town that dates back to the 14th century. The State is bordered by Niger, Sokoto, Zamfara, Benin republic, and Niger republic. The total land area is about 36,985 km² out of which 12600 km² is cultivated for agricultural purposes. The mean annual rainfall is about 1000 mm in the south and 800 mm in the north. The mean annual temperature is as high as 26 °C across the state. According to the 2006 national population census, the total population is estimated at 3,256,541 (National Bureau of Statistics 2011).

The majority of the population is economically engaged in agriculture. The state is dominated by Fulani-Hausa people who depend mostly on cattle rearing and crop production. Much of the land in the state is used for grazing goats, sheep, and cattle. The common cash crops cultivated include rice, cotton, and groundnuts. Subsistence crops include millet, sorghum, onions, and cowpeas. The youth are actively involved in all of these agricultural activities. The State has two important agricultural lands which are Fadama (floodplains) and dryland. These agricultural lands are the key source of income to millions of people in the State (Usman et al. 2016).

The state is rich in historical structures which include the tomb of Abdullahi Fodio, the Girmace Shrine of the Zulu, and the Yelwa Museum of Archaeology. The state capital is connected by road to Bunza (45 km southwest), Jega (35 km southeast), and Argungu (45 km northeast). According to (UNDP 2018), as of 2017, the poverty incidence rate was 82.3% with an unemployment rate of 11.6%.

Research design

This study adopted a quasi-experimental research design. This design was chosen on the basis that the study required data from a large group of persons from two different
target audiences (program participants and nonparticipants). This study was conducted to assess the impact of the Fadama GUYS program on two specific outcome variables (performance and empowerment). Thus, adopting the “With and Without” treatment approach of impact assessment, the study population was stratified into two categories (Treatment and Control). The treatment group comprised youth who were trained under the Fadama GUYS program in 2017 while the nonparticipants were other youth who reside in the study area, but did not participate in the training. The design facilitated data collection from the two groups and also made it possible to attribute any difference between the participants and nonparticipants to the assignment variable (training). This desirable feature of the design makes it appropriate for the study since the objective is to compare these two groups so as to attribute any difference between their outcomes to the program.

Methods of data collection

Sampling procedure and size
The study adopted a multistage sampling technique. In the first stage, three states were purposively selected. The choice of these states was based on the relatively high number of participants in the Fadama GUYS program in 2017, to ensure representation of at least three regions in which the program was conducted, and to ensure that they are similar in terms of specific characteristic since the three states ranked high is agricultural activities (more than 70% of the population in all the states are engaged in agriculture). The aim of this was to ensure that the respondents are comparable to allow aggregation of analysis. In the second stage, the study population was divided into two strata: participants and nonparticipants. The third stage involves the random selection of respondents. The sample size of participants was determined based on the formula proposed by Krejcie and Morgan (1970). A sampling frame was used to gather the participants from the complete list of youth trained under the program in 2017 obtained from the Fadama office in each state. This was followed by the random selection of respondents from the sampling frame via random numbers generated using Microsoft Excel.

The total number of participants in the Fadama GUYS program from the three states was 900, with 300 from each state. Using Krejcie’s formula, the total sample size generated was:

$$n = \frac{N(1-P)}{X + (N - 1)}$$

Where

$$X = \frac{Z^2 \cdot P(1-P)}{e^2}$$
sample size; N = population size; e = margin of error; p = sample proportion (0.5); z = the confidence interval (1.96).

Thus; \( n = 1067 \)

\( = 488 \)

However, some of the respondents were out of reach and could not be contacted, hence, the total number of youth who participated in the surveyed was 455 across the three states.

Since the total population of the control group was unknown, the sample size for the nonparticipants was generated using the error margin formula proposed by Bartlett et al. (2001). According to the formula, the sample size of an unknown population can be determined using the formula specified in Equation (i):

\[ (i)\text{Thus, } n = 600 \]

However, due to resource constraints, transportation limitations, and the busy schedule of some of the respondents, only 522 youth participated in the survey.

The total number of youth surveyed for both groups was 977.

Data type
Primary data was used in this study. Specifically, quantitative data were collected on important variables which were classified into different categories including: demographic information, entrepreneurship training, agripreneurship skills, business skills, agripreneurship behaviour, livelihood, and youth empowerment. Data was also collected on socioeconomic characteristics such as age, gender, education, and marital status.

Data collection methods
Primary data was collected using a semi-structured questionnaire. Questionnaires are deemed to be the best instrument to gather large amounts of information in a cost-effective and timely manner. The questionnaire was designed based on previous literature on similar studies and in consultation with the research supervisors to ensure relevance of the solicited information in achieving the study objectives as well as to ensure conformity to academic standards. Variables measured and means of measurement were programmed on Open Data Kit (ODK) and data was collected using phones and tablets by trained enumerators.
Data analysis

Data were analyzed using both descriptive and inferential statistics. The study employed descriptive statistics such as frequency, mean, and charts to describe the socioeconomic characteristics of the respondents and identify factors impeding youth engagement in agribusiness. Inferential statistics such as the test of mean difference (mean comparison – t-test) was used to compare the average index scores of agripreneurship performance between treatment and control group and also the difference between both groups in terms of their socioeconomic characteristics. Propensity Score Matching was adopted to evaluate the impact of the program on youth agripreneurship performance and sensitivity analysis was conducted to address possible selection bias. A three-stage estimation method was adopted to analyze the impact of training on youth empowerment.

Descriptive statistics

Descriptive statistics such as mean, percentage, and frequency distribution was used to analyze the first objective. In addition, subsample comparisons based on different explanatory variables was conducted using Kruskal-Wallis, t-test, and chi-square.

Propensity score matching method

This method was adopted in estimating the impact of training on performance. According to Haji and Legesse (2017), Propensity score matching (PSM) is one of the rigorous methods commonly used in impact evaluation. This is because it considers the issue of the counterfactual (what would have happened to those who participated in the training, had they not been involved in the training) and it also addresses possible selection bias and contamination problems (White et al. 1999). The method matches subjects based on propensity scores as opposed to matching on multiple variables which is common in traditional impact evaluation methods. Since, in practice, participation in most training programs is not random, the propensity score is a suitable single-index balancing score to identify matching partners (Haji and Legesse 2017).

The preference for PSM is because randomization and baseline data are not required. Also, another advantage is that it relaxes the assumptions of functional forms that are imposed by parametric regression models, such as ordinary least squares (OLS). According to Ravallion (2005), the method allows the estimation of mean impacts without arbitrary assumptions about functional forms and error distributions.
The basic idea behind this approach is to find the group of youth who did not participate in the program but have similar pre-treatment observable characteristics with the treatment group. This approach assumes that after controlling for all pre-intervention observable characteristics that are correlated with participation and the outcome variables, the treatment group will have the same average outcomes that non-participants would have had if they had also participated. Once this is accomplished, differences in outcomes of this adequate control and treatment group can be attributed to the training program only.

On this note, randomly selected participants (treatment group) were matched with similar nonparticipants (control group), and the difference in the outcome indicators was evaluated statistically.

According to Caliendo and Kopeinig (2008), propensity score matching method follows the following steps:

- Estimate propensity scores.
- Choose the best matching algorithm.
- Check for overlap.
- Assess the matching quality.
- Estimate the treatment effect.
- Perform sensitivity analysis if significant differences are observed after matching.

These scores can be estimated using either a logit or probit model, which involves regressing the treatment status on observed pretraining characteristics. Thus, the treatment and control groups were matched on propensity scores obtained from the results of the logit model and the scores were used in selecting comparison groups through the best matching estimator.

To investigate the impact of the Fadama GUYs training program on agripreneurship performance, the following equation was estimated:

Let $Y_i^T$ and $Y_i^C$ be the outcome variable for the participants (treated) and nonparticipants (control), respectively. The difference in outcome between treated and control groups can be seen from equation 3.1:

$$
\Delta_i = Y_i^T - Y_i^C
$$

(3.1)

$Y_i^T$: Outcome of treatment (Youth agripreneurship performance of the i-th individual, when he/she participates in the training program).
\[ \text{ATE} = E(Y^T_i | D_i = 1) - E(Y^C_i | D_i = 0) \]

\( Y^T_i \): Outcome of the untreated individuals.

\( \Delta_i \): Change in the outcome as a result of training for the i-th individual.

Let Equation 3.1 be expressed in causal effect notational form, by assigning \( D_i = 1 \) as a treatment variable taking the value 1 if the individual received the treatment (training) and 0 otherwise.

Then the Average Treatment Effect of an individual i can be written as:

\[ \text{ATE} = E(Y^T_i \mid D_i = 1) - E(Y^C_i \mid D_i = 0) \quad (3.2) \]

Where \( \text{ATE} = \) Average Treatment Effect, which is the effect of treatment on the outcome variables:

E: Average outcomes for an individual, with treatment, if he/she was involved in the training \((= 1)\).

E: Average outcome of untreated, if he/she has not received training, or absence of treatment \((= 0)\).

The Average Effect of Treatment on the Treated (ATT) for the sample is given by:

\[ \text{ATT} = E(Y^T_i \mid Y^C_i = 1) = E(Y^T_i \mid D_i = 1)E(Y^C_i \mid D_i = 1) \quad (3.3) \]

The three-stage estimation procedure

In many economic examples, participation in interventions or programs is not random and potentially endogenous. Several methods for estimating endogenous participation models have existed in literature since the early 1970s. The endogenous participation models are closely related to the double-hurdle model of Heckman (1976) and Cragg (1971). One of the notable models in this category is the ETER which was first brought into the limelight by Heckman (1976). The model considers the impact of an endogenous selection binary variable on a continuous outcome variable. One of its unique advantages over other models such as the Ordinary Least Squares (OLS) model, the PSM procedure, and the Heckman selection model is that it helps to eliminate the problem of endogeneity which could lead to overestimation or underestimation of impact. In addition, the model allows for specific correlation structure between the unobservable that affect the outcome variable and those that affect the treatment thereby yielding a more robust result. It has been applied by many authors for impact evaluation (Balde et al. 2019; Izuchukwu 2019; Adebayo et
al. 2018; Mekonnen 2017). Even though two-step analysis procedures have proven to yield robust impact estimates, Burke et al. (2015) argued that a three-step procedure will yield better results. Thus, in our present analysis, we followed the Jumbe and Angelsen (2007) three-step approach in analyzing the impact of the program on youth empowerment. To do this, we established the link between training, agripreneurship performance, and youth empowerment. It was conceptualized that training will impact youth empowerment through agripreneurship performance. In other words, agricultural training was conceptualized to improve youth agripreneurship performance through skill acquisition and behavior modelling. This improvement in performance on the other hand is conceptualized to have a positive impact on youth empowerment. Thus, in addition to the commonly used two-stage procedure, we included an additional stage to obtain a more robust result, thus employing a three-stage estimation procedure following Burke et al. (2015) and Jumbe and Angelsen (2007). According to Burke et al. (2015), a three-stage estimation procedure has a significant advantage over two-stage procedures in general since it allows for the simultaneous existence of both the censored and selected zeros.

The key model is the Tobit empowerment equation, which is a function of youth agripreneurship performance and other relevant covariates. However, participation is endogenous in nature and was estimated first. Since participation may not necessarily be random, the issue of potential selection bias may arise. We correct for this by using the endogenous treatment regression model.

Thus, the empirical model is specified as a system of simultaneous equations to account for the interrelationships among program participation (training), youth agripreneurship performance, and youth empowerment as follows:

\[ Z_i^* = \beta X_i + \upsilon_i \text{ (participation in the program—first stage—probit)} \]  
\[ Y_i = \alpha K_i + \eta Z_i + \varepsilon_i \text{ (agripreneurship performance—second stage—OLS)} \]  
\[ E_i = \mu T_i + \lambda \hat{Y}_i + \epsilon_i \text{ (Youth Empowerment—third stage—Tobit)} \]

where \( Z_i \) is an indication variable for participation which takes the value of 1 if a youth participated and 0 otherwise; \( Y_i \) denotes youth agripreneurship performance measured as a multiplicative function of agripreneurship skills, business skills, and agripreneurship behaviour/status; \( E_i \) denotes youth empowerment and \( \hat{Y}_i \) is the predicted value of youth agripreneurship performance from the second stage; \( X_i, K_i, \) and \( T_i \) are vectors of exogenous variables that determine participation, youth agripreneurship performance, and youth empowerment, respectively; \( \beta, \alpha, \eta, \mu, \) and \( \lambda \) are unknown parameters and \( \upsilon_i, \varepsilon_i, \) and \( \epsilon_i \) are error terms. In our analysis, \( Y_i \) is observed for a Youth \( i \) together with covariates and \( K_i \) and \( X_i \) if \( Z_i = 1 \).
Three-stage model specification

We estimate our model in three systematic stages as follows: The first two stages were modelled using the endogenous treatment regression model. The first stage aims to obtain the inverse Mills’ ratios (IMR) to correct for endogeneity in the estimates of youth agripreneurship performance. The first stage thus distinguishes participants from nonparticipants using probit analysis. The decision to participate in the program was measured as a dichotomous variable which assumes the value of 1 if a youth participated and 0 otherwise. From Equation 3.4, we specified the following reduced form participation model as follows:

\[ Z_i = \begin{cases} 1 & \text{iff } Z_i^* \geq 0 \\ 0 & \text{otherwise} \end{cases} \quad (3.7) \]

The second stage aims to obtain the predicted estimates of youth agripreneurship performance after correcting for endogeneity. According to Jumbe and Angelsen (2007), applying OLS to equation 3.5 will generate an inconsistent estimate of the outcome variable because the expected value of the error term conditional on participation is non-zero. This therefore raises the issue of endogeneity, which validates the appropriateness of using ETER for the first two stages. Thus, the conditional mean of the outcome variable in equation 3.5 is:

\[ E(Y_i | Z_i = 1) = \alpha K_i + E(\varepsilon_i / X_i, u_i) = \alpha K_i + E(\varepsilon_i / u_i) \quad (3.8) \]

Such that \( E(\varepsilon_i / u_i) \neq 0 \)

Therefore, we can specify the conditional expected value of the two error terms as:

\[ E(\varepsilon_i / u_i) = E(\varepsilon_i / u_i \leq \beta X_i) = E(\sigma_e, \rho / u_i) = \rho \sigma_e \phi(\beta X_i) / \Phi(\beta X_i) \quad (3.9) \]

Where \( \Phi(\cdot) \) and \( \phi(\cdot) \) denote the cumulative distribution functions and standard normal density, respectively.

The IMR derived in the first stage was included as an explanatory variable in the second stage as an endogeneity-correction term. This is because it is a standard for the second stage estimation to include at least one imposed exclusive restriction that is justifiable (Burke et al., 2015). The statistical significance of the coefficient of the inverse Mills’ ratio implies the presence of endogeneity which justifies the use of ETER.

The third step estimated the impact of youth agripreneurship performance on empowerment (Equation 3.6). From Equation 3.5, we derive the predicted estimates of youth agripreneurship
performance which was denoted as $\hat{P}_1$. We then specified our empowerment model with the predicted estimates of youth agripreneurship performance as one of the explanatory variables as shown in Equation 3.6, where $\lambda$ is the parameter of interest. The third stage was modelled using the Tobit regression model, which is most appropriate given the truncated nature of the dependent variable (youth empowerment index).

Description of variables in the logit model

Based on reviewed literature, the hypothesized independent variables that could influence youth participation in the program and their expected signs are presented in Table 3.1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Measurement</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARTICIPATION</td>
<td>Dependent variable indicating youth participation in the Fadama GUYS program</td>
<td>Dummy (Participants = 1, Non-participants = 0)</td>
<td></td>
</tr>
<tr>
<td>AGE</td>
<td>Age of the youth</td>
<td>Age in years</td>
<td>+/-</td>
</tr>
<tr>
<td>EDUC</td>
<td>Education level of the youth</td>
<td>Years of formal education</td>
<td>+/-</td>
</tr>
<tr>
<td>GENDER</td>
<td>Gender of the youth</td>
<td>Dummy (Male = 1, Female = 0)</td>
<td>+/-</td>
</tr>
<tr>
<td>MARITAL_STAT</td>
<td>Marital status of the Youth</td>
<td>Dummy (Married = 1, Otherwise = 0)</td>
<td>+</td>
</tr>
<tr>
<td>HHSIZE</td>
<td>Household size of the youth</td>
<td>Number of household members</td>
<td>+</td>
</tr>
<tr>
<td>MIGR_STAT</td>
<td>Migration status of the youth from their original place of birth/residence</td>
<td>Dummy (Migrated = 1, Not Migrated = 0)</td>
<td>-</td>
</tr>
<tr>
<td>AGRIB_INT</td>
<td>Youth intention to engage or remain in agribusiness</td>
<td>Dummy (Positive intention = 1, otherwise = 0)</td>
<td>+</td>
</tr>
<tr>
<td>ASSET</td>
<td>Ownership of productive asset</td>
<td>Continuous index</td>
<td>+</td>
</tr>
<tr>
<td>TRAIN_PERC</td>
<td>Youth perception about training programs</td>
<td>Dummy (Positive perception = 1, otherwise = 0)</td>
<td>+</td>
</tr>
<tr>
<td>AGRIB_PERC</td>
<td>Youth perception about agribusiness</td>
<td>Dummy (Positive perception = 1, otherwise = 0)</td>
<td>+</td>
</tr>
<tr>
<td>AGRIB_OWN</td>
<td>Ownership of any agribusiness venture</td>
<td>Dummy (owns a venture = 1, otherwise = 0)</td>
<td>+</td>
</tr>
</tbody>
</table>
Measure of agripreneurship performance

Many studies tend to use farm output or income as a proxy for performance. Also, prior work on the measurement of agripreneurship performance is extremely limited. The only relatively relevant study was conducted by Niewoudt (2016) who developed a generalized index for entrepreneurship competence. Following Niewoudt’s approach, we developed a continuous agripreneurship index based on the entrepreneurial training performance (ETP) model postulated by Vuuren and Nieman (2004). According to the ETP model, performance is measured as a multiplicative function of entrepreneurship skill, business skill, and motivation. We adopted these three indicators and modified them to capture the elements of agripreneurship as opposed to the generalized nature of the model. However, to generate a more robust index, we included an additional indicator which measures agripreneurship behavior. This is because behavior is a strong determinant of performance (Ajzen 2009; Anagnosti et al. 2013). Thus, the agripreneurship performance model is presented in Equation 3.10 as the multiplicative function of agripreneurship skill, business skill, and agripreneurship behavior/status:

\[ A/P = A/S \times B/S \times AB/S \]  

(3.10)

Where \( A/P \) is agripreneurship performance; \( A/S \) is agripreneurship skill; \( B/S \) is business skill, and \( AB/S \) is agripreneurship behavior.

Each indicator was assessed by seven items measured on a five-point Likert-scale (see Appendix 1). The agripreneurship performance index was generated as the multiplicative function of the three indexes. This became the second outcome variable. The performance index generated was continuous in nature. According to Mburu (2015), one major advantage of using a continuous index is that it allows the inclusion of all the respondents (youths) in the model regardless of their score.

Measurement of youth empowerment

Principal component analysis (PCA) was used to generate a composite index called Youth Empowerment Index (YEI). PCA was adopted because it is a data reduction method, which assigns more weights to indicators than simple summation (Moser and Felton 2007). The indicators, which was grouped into six empowerment domains as presented in Appendix 2, were extracted from existing literature on youth and women empowerment (International Labour office, Tunisia 2018; Muiruri 2015). Fifteen indicators were subjected to PCA in order
to extract the essential components required to construct a non-standardized YEI. According to Muiruri (2015), it is possible for the researcher to determine the number of components to retain. However, this will not be an efficient approach. Thus, according to Kaiser’s criteria, components to be retained must have an Eigenvalue of one or above. Based on this, only six components were retained after the scree plot (Fig. 3.2). The KMO value showed that the retained component represents 72.42 percent of the variation in the data which is good for the PCA (Antony and Rao 2007). Health, nutritional status, and standard of living (G.M., 2015) are major indicators in determining the real standard of living. Poverty, standard of living, and human development depend on multiple factors. The existing indices, such as HDI and HPI, use income indicators to measure the standard of living, and do not take into account diet and nutritional status indicators. The proposed index was found to be more suitable for measuring the real standard of living and human development, as it is a comprehensive index of income and non-income indicators. Further validation may be carried out for different populations.

**RESULTS**

Demographic, socio-economic, health, and dietary indicators play a major role in determining the real standard of living. Poverty, standard of living, and human development depend on multiple factors. The existing indices, such as HDI and HPI, use income indicators to measure the standard of living, and do not take into account diet and nutritional status indicators. The proposed index was found to be more suitable for measuring the real standard of living and human development, as it is a comprehensive index of income and non-income indicators. Further validation may be carried out for different populations.

**CONCLUSIONS**

Discriminant function analysis and factor analysis were used to assess health inequality and standard of living among Indian states. The proposed multi-dimensional index may provide a better picture of human development. Further work is of interest for other populations.
Where:

PC = Principal component
i = Value of retained PC
= Non-standardized Youth Empowerment Index

Following Equation 3.11, the range of the continuous index generated was standardized to between 0 and 1.

\[
YEIS = \frac{YEINS_{i\ldots n} - Min\ YEINS_{i\ldots n}}{Max\ YEINS_{i\ldots n} - Min\ YEINS_{i\ldots n}}
\]  

(3.12)

Where:

\( YEIS \) = Standardized Youth Empowerment Index
\( YEINS \) = Non-standardized Youth Empowerment Index
\( Min\ YEINS_{i\ldots n} \) = Minimum non-standardized Youth Empowerment Index
\( Max\ YEINS_{i\ldots n} \) = Maximum non-standardized Youth Empowerment Index
### Table 2. Indicators of youth empowerment

<table>
<thead>
<tr>
<th>Six Domains of Empowerment (6DE)</th>
<th>Indicators</th>
<th>Policy Issues that are triggered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access and decision to credit</td>
<td>1. Access to credit</td>
<td>• Economic Empowerment</td>
</tr>
<tr>
<td></td>
<td>2. Decision and use of credit</td>
<td>• Decision-making</td>
</tr>
<tr>
<td></td>
<td>3. Credit repayment</td>
<td>• Representation</td>
</tr>
<tr>
<td>Asset Ownership</td>
<td>4. Agricultural assets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Personal household assets</td>
<td></td>
</tr>
<tr>
<td>Youth Livelihood</td>
<td>6. Personal living condition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Contribution to household income</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Life contentment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Household living condition</td>
<td></td>
</tr>
<tr>
<td>Financial Freedom</td>
<td>10. A consistent source of income</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Control over the use of income</td>
<td></td>
</tr>
<tr>
<td>Group Membership and Relationship</td>
<td>12. Dependence on my parents for basic needs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13. Membership of association</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14. Closeness to family members and relatives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15. Relationship with family</td>
<td></td>
</tr>
</tbody>
</table>

### Asset index

The asset index was also generated using PCA to provide accurate weights for the asset variables. The index was built on principles similar to those of the Youth Empowerment Index. The data subjected to the PCA were binary in nature where 1 represents if a youth has a particular asset and 0 otherwise. Five components were retained for the construction based on the screen plot analysis. Also, the KMO value showed that these components explained 71.62 percent of the variation in the asset data. According to Antony and Rao (2007) health, nutritional status and standard of living.
and do not take into account diet and nutritional status indicators. The proposed index was found to be more suitable for measuring the real standard of living and human development, as it is a comprehensive index of income and non-income indicators. Further validation may be carried out for different populations.

CONCLUSIONS Discriminant function analysis and factor analysis were used to assess health inequality and standard of living among Indian states. The proposed multi-dimensional index may provide a better picture of human development. Further work is of interest for other populations.

Figure 3. Scree plot for the eigenvalues after PCA.
Model diagnostic tests

Diagnostic tests for the logit model
The following diagnostic tests were carried out to assess the validity of the logit model used in the study:

(i) Test for multicollinearity
Multicollinearity arises when two or more explanatory variables in the regression model are correlated (Daoud 2017). It is a situation whereby there is an exact or perfect linear relation among some or all explanatory variables of a regression model (Gujarati 2001). Multicollinearity may not necessarily be a problem when the objective is to predict a dependent variable, Y from a set of explanatory variables (Xs). However, it becomes a serious problem when the aim is to understand the impact or effect of the explanatory variables on the dependent variable, Y (Paul 2010). Therefore to assess multicollinearity in this study, we computed Pearson’s correlation matrix. According to Gujarati (2001), variables are said to be highly correlated if their correlation coefficient is higher than 0.8. Also, the Variance Inflation Factor (VIF) and the tolerance level tests were conducted. A VIF value of over 10 and tolerance level of less than 60 percent clearly shows the presence of multicollinearity. The result of this test is presented in the Appendix.

(ii) Test for goodness-of-fit
Generally, the goodness of fit of a statistical model is assessed by relating how well the model fits the observed dataset (Guffey 2012). Thus, it summarizes the difference
between the expected and observed values of a model (Judith 2014). For this study, the test of goodness of fit was conducted using the Hosmer-Lemeshow test. The test is more appropriate when data are obtained from a random sample (Shah and Barnwell 2003). The test is used to assess whether the expected values from the logistic regression model reflect the observed values in the data. Based on this, data are ranked according to the predicted probability of the results from the logistic model which is under evaluation. Data are therefore categorized into g-groups, most especially in a group of 10 and in each group, the expected outcomes are compared to the observed ones. The null hypothesis of Hosmer and Lemeshow’s test is that the model is fit. A p-value of less than 0.05 implies an unfit model which leads to the rejection of the null hypothesis. For the models used in this study, the p-values were greater than 0.05 which implies that the models were fit enough for the analysis.

(iii) Test for heteroscedasticity

Heteroscedasticity is one of the violations of the basic assumption of OLS. According to Greene (2003), it occurs when the regression disturbances do not have a constant variance, leading to biased and inefficient estimators. According to Wooldridge (2015), the presence of heteroscedasticity implies that the OLS estimates are no longer best linear unbiased estimator (BLUE), which nullifies statistical tests of significance leading to rejection of the null hypothesis even when it is true (Gujarati 2001). To test for the heteroscedasticity, this study adopted the Breusch-Pagan/Cook-Weisberg test which tests the null hypothesis that the error variances are constant. Based on the results for the logit model ($[1] = 0.31; \text{Prob} >= 0.5797$), we failed to reject the null hypothesis of homoscedasticity (constant variance) and concluded that heteroscedasticity was not a problem.

Diagnostic tests for the propensity score matching

(i) Covariate balancing test

In this study, balancing of covariate was checked using the tests of mean differences before and after matching. According to Caliendo and Kopeinig (2008), the test ensures
that all the covariates are well balanced for the matching exercise so as to avoid bad matches. Balancing is achieved when there are no significant differences between the covariates of the control and treatment groups after matching even if they were significantly different before matching. This test was conducted to ensure that the control and treatment groups were similar based on pre-treatment observable characteristics.

(ii) Indicators of matching quality
Matching quality test was conducted to make sure that treatment and control groups are similar in terms of observable pre-treatment characteristics. The major indicators used in this study are those recommended in literature including Caliendo and Kopeinig (2008), Douglas et al. (2016), and Haji and Legesse (2017). The pseudo R2 and likelihood ratio were compared before and after matching to assess whether the matching procedure was able to balance the characteristics of the treatment and comparison groups and also to make sure that the control group is a reliable counterfactual. According to these authors, an insignificant likelihood ratio test and low pseudo R2 after matching shows that the two groups have the same covariates’ distribution and are comparable. By standard, the pseudo R2 must be lower after matching (Caliendo and Kopeinig 2008). In addition, the number of matched sample size and insignificant variables after matching were assessed. According to Haji and Legesse (2017), the matched sample must be large enough for the PSM analysis. Thus, number of cases lost to common support should be minimal.

(iii) Validity test (Propensity score [PS] histogram)
To test for the validity of the propensity score estimates, a PS histogram was generated using the psgraph command in stata14. This was done to verify the common support region and ensure that the common support conditions are met. The basic underlying assumption is that the likelihood of participating in any program or intervention lies between 0 and 1 (Haji and Legesse 2017). Thus, following the visual assessment method proposed by Lechner (2011), the propensity score distribution was visually assessed to check if the common support condition was met. This was done by observing if there was enough overlap between the two groups.

(iv) Sensitivity analysis for the hidden bias
To check if there were unobserved variables affecting assignment into treatment and the outcome variable, the bounding approach proposed by Rosenbaum (2002) was adopted in testing the null hypothesis that unobserved characteristics have no effect on the impact estimate (Hujer et al. 2004). The gamma level, which is the odds ratio of differential treatment effect as a result of unobserved characteristic, was reported at the point where 5% significance level is exceeded (Hujer et al. 2004).
4. Results and Discussion

Socioeconomic and farm characteristics

The results presented in Table 4.1 show that the mean age of participants was 27 years while that of nonparticipants was 24 years. The difference between the mean age for the two groups was found to be significant at 1%. About 65 percent of the participants were male against 68% for the nonparticipants. The difference between the two groups when disaggregated by gender was not statistically significant. About 40% of the participants were married compared to only 14% of the nonparticipants. The difference between the two groups was statistically significant at 1%.

The mean years of formal education was almost 15 years for participants compared to 13 years for nonparticipants. This high literacy rate among both groups may be attributed to the high value placed on education in Nigeria. According to FAO (2018), the youth literacy rate in Nigeria has been rising since 1991; it grew from 66.4% in 2008 to 79.9% in 2015. The two means were significantly and statistically different at 1%.

Averagely, participants had a household size of about five persons while nonparticipants had an average of six persons. The average household size is defined in terms of the average number of people who live and dine under the same roof as the participant. This result corroborates the results of Hyeladi, Alfred, and Gyang (2014) who found that the mean household size in Nigeria is between 4 and 6 persons. The difference between the household size for the two groups was significant at less than 1%.
Table 3. Socioeconomic and farm characteristics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pooled n = 977</th>
<th>Treated n = 455</th>
<th>Control n = 522</th>
<th>z-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of Respondents</td>
<td>25.72</td>
<td>27.33</td>
<td>24.33</td>
<td>–10.92***</td>
</tr>
<tr>
<td>Education (Years)</td>
<td>14.10</td>
<td>14.48</td>
<td>13.77</td>
<td>–3.78***</td>
</tr>
<tr>
<td>Household Size</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>4.03***</td>
</tr>
<tr>
<td>Experience in Agriculture (Years)</td>
<td>2.07</td>
<td>2.13</td>
<td>1.95</td>
<td>–1.80*</td>
</tr>
<tr>
<td>Productive Asset Index Score</td>
<td>4.50</td>
<td>4.68</td>
<td>4.35</td>
<td>–1.99**</td>
</tr>
<tr>
<td>Average Monthly Income</td>
<td>₦24761.84</td>
<td>₦28897.80</td>
<td>₦21156.74</td>
<td>–4.38***</td>
</tr>
<tr>
<td>Average Monthly Farm Income</td>
<td>₦12740.74</td>
<td>₦18890.55</td>
<td>₦7380.23</td>
<td>–8.81***</td>
</tr>
<tr>
<td>Gender (Male)</td>
<td>67.04</td>
<td>65.49</td>
<td>68.39</td>
<td>0.96</td>
</tr>
<tr>
<td>Marital status (Married = 1)</td>
<td>26.10</td>
<td>39.56</td>
<td>14.36</td>
<td>–8.94***</td>
</tr>
<tr>
<td>Access to Credit</td>
<td>23.23</td>
<td>25.67</td>
<td>20.44</td>
<td>–1.93**</td>
</tr>
<tr>
<td>Ownership of Agribusiness</td>
<td>47.49</td>
<td>62.20</td>
<td>34.67</td>
<td>–8.59***</td>
</tr>
<tr>
<td>Type of Employment</td>
<td>9.11</td>
<td>7.47</td>
<td>10.53</td>
<td>1.66*</td>
</tr>
<tr>
<td>Intention on Agribusiness</td>
<td>46.67</td>
<td>70.77</td>
<td>25.67</td>
<td>–14.09***</td>
</tr>
<tr>
<td>Perception about Training</td>
<td>87.92</td>
<td>92.30</td>
<td>84.09</td>
<td>–3.93***</td>
</tr>
<tr>
<td>Abia</td>
<td>34.80</td>
<td>37.14</td>
<td>32.76</td>
<td>–1.44</td>
</tr>
<tr>
<td>Ekiti</td>
<td>28.97</td>
<td>29.89</td>
<td>28.16</td>
<td>–0.59</td>
</tr>
<tr>
<td>Kebbi</td>
<td>36.23</td>
<td>32.97</td>
<td>39.08</td>
<td>1.58</td>
</tr>
</tbody>
</table>

Source: Author’s Computation, 2019. Note: p > 0.1 = *, p > 0.05 = **, p > 0.01 = ***

The mean years of experience in agribusiness for participants was 2.13 years and 1.95 years for nonparticipants. Even though the result showed that participants had more years of agribusiness experience compared to the nonparticipants, an average of two years is still considered to be very little. This, therefore, implies that both groups had very little experience in agribusiness. The difference between the two groups was statistically significant at 10%.

Also, only about 7% of the participants were formally employed against 10% of the nonparticipants. The difference between the two groups was significant at 10%. The majority of the participants (62.20%) had their own agribusiness enterprise against only 34.67% among the nonparticipants. This high percentage among the participants may likely be as a result of their participation in the training program. The difference between the two groups was significant at 1%.
The average monthly income of participants and nonparticipants was equivalent to approximately US$80 and US$59, respectively, translating to about US$2.55 per day for participants and US$1.87 for non-participants. This implies that going by the global poverty line of US$2, participants were better off compared to the non-participants. The difference between the average monthly income of the two groups was significant at less than 1%.

Data collected also showed that 25.67% and 20.44% of the participants and non-participants, respectively, had access to credit. The difference was significant at 1%. In terms of ownership of productive assets, on the average, participants had a higher index score of 4.68 compared to nonparticipants at 4.35. The difference was statistically significant at 5%. About 71% of the participants intended to engage in agribusiness compared to only about 26% of the nonparticipants. This could be attributed to the positive influence of training on the participants. The difference between the two groups was significant at 1%. Similarly, the majority of the participants (92%) compared to the nonparticipants (84%) perceived agricultural training as an important factor for better performance. This positive perception of agriculture is contrary to the common belief that young people perceive agriculture as an occupation for the poor. This may be attributed to the changing outlook of agriculture and the introduction of agribusiness in most African countries. The difference between the two groups was significant at 1%.

Analysis of agripreneurship performance indicators

The results presented in Table 4.2 show that in terms of agripreneurship skills, participants had a mean score of 4.33 while nonparticipants had an average of 3.29. This higher score recorded by the participants could be attributed to their participation in the training programs as they were able to acquire more skills through the program. The mean difference between the two groups was statistically significant at 1%.

Similarly, participants had a higher score (4.24) for agribusiness skills when compared to nonparticipants (3.02). The difference was statistically significant at 1%. In terms of entrepreneurship behaviour, participants also had a higher score of 3.79 compared to that of nonparticipants (2.64). The difference was also statistically significant at 1%.

Based on these results, it is evident that the training program led to skill acquisition/improvement among the participants.
### Table 4. Comparison of the means of respondents agripreneurship indicators.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pooled n = 977</th>
<th>Treated n = 455</th>
<th>Control n = 522</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agripreneurship Skills</td>
<td>3.78</td>
<td>4.33</td>
<td>3.29</td>
<td>−1.04***</td>
</tr>
<tr>
<td>Business Skills</td>
<td>3.58</td>
<td>4.24</td>
<td>3.02</td>
<td>−1.22***</td>
</tr>
<tr>
<td>Entrepreneurship Behavior</td>
<td>3.18</td>
<td>3.79</td>
<td>2.64</td>
<td>−1.15***</td>
</tr>
</tbody>
</table>

Source: Author’s Computation, 2019. Note: p > 0.1 = *, p > 0.05 = **, p > 0.01 = ***

### Factors impeding youth participation in agribusiness

As shown in Figure 4.1, the majority of the youth (79%) identified “lack of access to finance” as the major factor impeding them from engaging in agribusiness. This, in fact, is not surprising. One of the commonly stated barriers to business start-up in literature is the lack of capital coupled with the difficulties of getting funds from relevant agencies (Adesina and Eforuoku 2017; Kimaro, Towo, and Moshi 2015; Njeru and Gichimu 2014; Ohene 2013) Vision 2030 positions agriculture as a key driver for delivering a 10% annual economic growth and is expected to have an average growth rate of 7% by 2015. Agriculture contributes over 80% of all employment opportunities in the country, but Kenyan youths are not taking advantage of these opportunities since 64% of them are unemployed. To advance the 7% average growth rate, it is pertinent that the Kenyan youth be fully involved in agricultural development. However, agriculture is perceived unattractive to the youth and its potential has not been fully realized. The purpose of this review is to find out the influence of land and finances on youth participation in agriculture and to identify the interventions that can make agriculture attractive to the youth in Kenya. This information will be useful to the government, the farming community, agriculturalists, policy makers and non-governmental organisations in laying strategies that will make agriculture attractive to the youth. This will subsequently enhance youth participation in agriculture resulting in increased food production, employment creation and income generation for the youth. Engaging the youth in agricultural activities will contribute in reducing crime and other social problems attributed to the youth.”

Agribusiness requires notable start-up capital which is usually far above what an unemployed youth with no source of consistent income can afford. Apparently, in most cases, such investments go beyond personal savings. This challenge is further compounded by the high-interest rate (13.50% in Nigeria) and “ridiculous” collateral such as land title deeds and physical assets demanded by most financial institutions. Sacerdoti (2005) explained that interest rates are relatively high in developing countries specifically, on micro-credits and small loans. In addition, administrative costs do not favor youth scale of operations. This is supported by the finding of Chebet (unpublished, 2016) who identified lack of collateral as one of the major challenges young people face when trying to access funds from financial institutions. Similarly, Sharu and Guyo (2015) found that young people have difficulties in accessing credit because they lack self-sustaining resources, substantive credit history, and sufficient collateral or guarantees to secure loans. To overcome these barriers, there is a need to facilitate youth access to commercial credit through borrowers group formation among those willing to engage in agribusiness.
The second barrier identified was a lack of mentorship. About 11% of the youth explained that they were more likely to engage in agribusiness if there were professionals to mentor them. This is a very important factor which should not be discarded easily. Yami et al. (2019) reported that continuous mentorship on both technical and financial aspects of youth-run agribusiness projects greatly enhanced youth engagement in agribusiness in Kenya. A way to accomplish this is by incorporating post-training mentorship programs into training program designs.

Finally, 10% of the respondents ranked lack of information as a challenge. Access to information is key to any successful business venture. This may actually give innovative insights to youth regarding agribusiness development. This corroborates the findings of Davis et al. (2008) who found that access to information yielded favorable outcomes in shaping youth attitudes towards engagement in agribusiness.

Thus, relevant information can be disseminated through the internet. While the use of social media has been abused, it can still serve as a useful means of getting information to a large number of the intended audience. Information can also be disseminated through relevant government service centers and youth social networks.

Factors influencing the likelihood of participation in the Fadama GUYS Program

The test for multicollinearity showed that there was no statistically significant correlation between the variables as all the coefficients were less than 0.5, indicating that there was no noticeable
problem of multicollinearity among the variables. Also, the Hosmer and Lemeshow’s goodness-of-fit test result had a chi-square (8) of 7.88 with a p-value of 0.4457, which implies that the null hypothesis stating that the model is fit could not be rejected, implying that the model was fit for the analysis. In addition, the mean value of the VIF was less than 10 and tolerance level (1/VIF) had values which were all greater than 0.6 confirming further that there was no problem of multicollinearity. Again, the result of the null hypothesis of Bruesch-Pagan/Cook-Weisberg test for the presence of heteroscedasticity had a chi-square of 0.31 and a p-value of 0.5797 indicating that the null hypothesis of homoscedasticity could not be rejected. Thus, it was concluded that there was no problem of heteroscedasticity in the model.

Out of the 12 independent variables hypothesized to influence participation, nine were statistically significant. These include age, years of formal education, gender, household size, ownership of agribusiness, migration status, perception about agricultural training, and perception about agribusiness (table 4.3). Non-significant variables include asset index, marital status, and head of household years of formal education.

Table 5. Factors influencing youth participation in the training program.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coef.</th>
<th>S.E.</th>
<th>t-value</th>
<th>Marginal Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>0.110</td>
<td>0.025</td>
<td>4.48***</td>
<td>0.027</td>
</tr>
<tr>
<td>EDUC(Years)</td>
<td>0.074</td>
<td>0.031</td>
<td>2.35**</td>
<td>0.018</td>
</tr>
<tr>
<td>GENDER</td>
<td>−0.417</td>
<td>0.183</td>
<td>−2.27**</td>
<td>−0.104</td>
</tr>
<tr>
<td>HHSIZE</td>
<td>−0.067</td>
<td>0.028</td>
<td>−2.36**</td>
<td>−0.017</td>
</tr>
<tr>
<td>AGRIC_ENT</td>
<td>0.940</td>
<td>0.218</td>
<td>4.31***</td>
<td>0.231</td>
</tr>
<tr>
<td>MIGRATION</td>
<td>0.397</td>
<td>0.182</td>
<td>2.19**</td>
<td>0.098</td>
</tr>
<tr>
<td>AGRI_INTENT</td>
<td>0.674</td>
<td>0.072</td>
<td>9.32***</td>
<td>0.167</td>
</tr>
<tr>
<td>ASTINDEX</td>
<td>−0.042</td>
<td>0.033</td>
<td>−1.30</td>
<td>−0.011</td>
</tr>
<tr>
<td>TRAIN_PERC</td>
<td>0.593</td>
<td>0.296</td>
<td>2.01**</td>
<td>0.142</td>
</tr>
<tr>
<td>AGIB_PERC</td>
<td>0.821</td>
<td>0.271</td>
<td>3.03***</td>
<td>0.192</td>
</tr>
<tr>
<td>HoHEDUC(Years)</td>
<td>0.013</td>
<td>0.027</td>
<td>0.48</td>
<td>0.003</td>
</tr>
<tr>
<td>MARITAL_STAT</td>
<td>0.042</td>
<td>0.254</td>
<td>0.17</td>
<td>0.011</td>
</tr>
<tr>
<td>State Dummies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abia State</td>
<td>0.845</td>
<td>0.204</td>
<td>4.14***</td>
<td>0.208</td>
</tr>
<tr>
<td>Ekiti State</td>
<td>−0.907</td>
<td>0.212</td>
<td>−4.27***</td>
<td>−0.216</td>
</tr>
<tr>
<td>Kebbi State</td>
<td>0.078</td>
<td>0.235</td>
<td>0.03</td>
<td>0.019</td>
</tr>
<tr>
<td>Constant</td>
<td>−7.152</td>
<td>0.802</td>
<td>−8.91***</td>
<td></td>
</tr>
</tbody>
</table>

PseudoR2 = 0.257; LR chi2 (p-value) = 346.47 (0.000); Hosmer-Lemeshow chi2 (8) = 7.88
Prob >chi2 = 0.4457; Bruesch-Pagan/Cook-Weisberg chi-square (1) = 0.44
Prob >chi2 = 0.5074

Source: Author’s Computation, 2019. Note: p > 0.1 = *, p > 0.05 = **, p > 0.01 = ***
Age of respondent was positive and significant at 1%. The value of the marginal effect of 0.027 implies that as age increases by one year, the likelihood of participation increases by 2.7%. This implies that the older youth are more likely to participate in the program compared to the younger ones. This is because the younger youth are more likely to still depend on their family/parents for means of livelihood, unlike the older youths who are more likely to be married and in the labor market in search for employment or means of livelihood. Nnadi and Akwiwu (2008) attributed the positive relationship between age and participation to the increased consciousness of the importance of agriculture as people grow older (experience). This result is consistent with the findings of Nnadi and Akwiwu (2008); Abdul-Hakim and Che-Mat (2011); Akudugu (2012); Ayanwuyi et al (2013); Muhammad-Lawal et al. (2015); and Ayinde et al. (2016).

Gender was significant at 5%, but negatively related to the likelihood of participating in the program. This implies that female youth are 10% more likely to participate in the program compared to their male counterparts. This could be attributed to the fact that women play a remarkable role in household food production and provide most of the farm labor in the Africa context. As a result, they are more likely to choose to participate in agricultural programs which will improve their skills and empower them to increase their productivity. This is similar to the findings of Judith (2014) who found that female farmers were 24% more likely to participate in agricultural-based programs in Kenya and that of Senkondo et al. (2004) who found that compared to men, women were more actively involved in the Rain Water Harvesting (RWH) project in Tanzania.

Years of formal education was significant at 5% and positively related to the likelihood of participating in the program. The marginal effect shows that as the years of formal education increase by one year, the likelihood of participation will increase by 0.018. This was not expected but could, however, be attributed to the unconducive struggle for white-collar jobs after graduation, which has driven many young graduates to look for alternative employment (particularly in the agricultural sector) outside their professional career. It could also be attributed to the role of education in accessing timely information on such programs through social media and other sources. This agrees with the argument of Ayinde et al. (2016) that a higher level of education is a vital means of accessing information. Also, Amaza and Tashikalma (2003) posited that education is capable of influencing people towards embracing innovations. However, this was contrary to the findings of Sudarshanie (2015) who attributed the negative relationship between participation and the level of formal education to the preference of more educated people for wage employment.

Household size was significant but negatively related to participation in the program. The marginal effect shows that a unit increase in household size will lead to a 0.017 decrease in the log-odds of
participation in the training program, holding all other independent variables constant. This was contrary to expectation, but could be attributed to the possibility of households having different occupations that are not related to agriculture. For instance, those from households involved in the construction business are likely to help in the running of the family business. This is common in the Eastern part of Nigeria where family labor is mostly employed in family businesses. This finding is contrary to the findings of Adesina and Eforuoku (2017); Eneyew and Bekele (2015); Abdul-Hakim and Che-Mat (2011); Alkaeli (2010); and Nnadi and Akwiwu (2008).

Ownership of agribusiness enterprise was positive and significant at 1%. The implication is that ownership of agribusiness enterprise increases the likelihood of participating in the program by 23%. This could be attributed to their work flexibility and the fact that they already have some of the productive assets, such as land and capital, required for running a successful agribusiness venture. Thus, their major need is likely to range from resource mobilization to agribusiness expansion. They are therefore more likely to seek knowledge on how to expand their enterprise which might have influenced their decision to participate in the program. Many studies have identified lack of access to land as one of the major factors hindering young people from engaging in agribusiness (Ovwigho and Ifie 2011; Afande et al. 2015; Adesina and Eforuoku 2017).

Youth intention to engage in agribusiness was positive and significant at 1%, implying that those who have a positive intention towards agribusiness are more likely to participate in the program. This aligns with expectations as intention is defined as a drive to action and achievement. According to Ajzen (2009), most of the motivational factors which tend to influence behavior are reflected by intentions. Thus, youth positive intention towards agribusiness will inspire them to participate in agricultural training since the aim of the program is to empower them in the field of agribusiness. This corroborates the findings of Anagnosti et al. (2013) that entrepreneurial intention positively influences people’s attitudes towards entrepreneurship and therefore has a positive influence on the decision to participate in entrepreneurship training.

Youth perception of agribusiness was positive and significant at 1%. This implies that positive perception about agribusiness increases the likelihood of participating in the program by approximately 20%. This may be attributed to the changing traditional perception of most youth regarding agribusiness. According to Robbins et al. (2012), “Perception is a process by which individuals organize and interpret their sensory impressions to give meaning to their environment.” Perception can influence human behavior positively or negatively as it pertains to decision-making (Ohene 2013). Thus, youth who perceive agribusiness to be an occupation with potentially high economic returns and a means of escaping unemployment are more likely to participate in training programs compared to those who think otherwise. Muathe (2016) explained that good
perception of agribusiness will increase the rate of youth entrance into the field. Evidence from Kenya as reported by Yami et al. (2019) showed that young people now perceive agribusiness as a socially accepted career option. This also agrees with the findings of Adesina and Eforuoku (2017). However some studies have reported a contrary result. For instance, Abdullah et al. (2012) indicated that many youth are not interested in engaging in agriculture because they do not perceive the field as an attractive work area. Also, MoFA (2011) explained that youth who have a negative perception about farming do not participate in agricultural programs.

The state dummies included in the model are Abia, Ekiti, and Kebbi states. Only two of the dummies had a significant influence on youth participation in the program. The Abia State dummy was positive and significant at 1%, implying that youth in the state are more likely to participate in the training program. This is expected owing to the high rate of youth unemployment in the state. Olurinola and Fadayomi (2014), using evidence from the labor market survey, reported that the rate of youth unemployment in Abia State as of 2015 was 38.96% ranking among the states with very high rates. According to Essien and Onukwubiri (2015), this high rate of youth unemployment in the state is aggravated by inadequate functioning industries coupled with unfavourable policies to absorb the large youth population. Based on this, many youth may opt for any empowerment program capable of restructuring and changing their economic status. Also, the National Bureau of Statistics (2010) reported that the agricultural sector is the highest employer of labour in Abia State, accounting for 19.4% of total employment. This clearly shows the role agricultural programs can play in the State.

Conversely, the Ekiti state dummy was negative but significant at 1%, suggesting that the youth in this state are less likely to participate in the program. This could be ascribed to the high outward migration of youth from the state. According to the Ekiti State government, most of the youth who are supposed to engage in agriculture have migrated in large numbers to the urban centers in search of formal employment.1 This corroborates the findings of Aremu and Akinwamide (2018) that the majority of the youthful population who are supposed to drive sustainable rice production in the State (a crop in which the State has a competitive advantage) have departed to urban centers in the name of finding greener pasture.

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Impact of program training on agripreneurship performance

Results of PSM diagnosis test

This objective was achieved using the PSM method. The analysis was preceded by a number of diagnostic tests.

Results of different matching algorithms

Table 4.4 shows that, compared to other algorithms, the NNM algorithm with four matches best satisfied the criteria outlined by Caliendo and Kopeinig (2008) and Haji and Legesse (2017). It yielded the lowest pseudo $R^2$ of 0.005 after matching, large number of matched sample (941), and lowest mean standardized bias of 4.1%, which falls within the percentage recommended in literature (Augurzky and Kluve 2007; Caliendo and Kopeinig, 2008; Austin 2014; Almeida and Bravo-Ureta 2017; Haji and Legesse 2017). Also, all the covariates were insignificantly different after matching.

<table>
<thead>
<tr>
<th>Matching algorithm</th>
<th>Number of insignificant variables after matching</th>
<th>Pseudo $R^2$ after matching</th>
<th>Matched sample size</th>
<th>Mean SB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nearest Neighbor Matching Algorithm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>0.012</td>
<td>941</td>
<td>4.9</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>0.009</td>
<td>941</td>
<td>4.7</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>0.007</td>
<td>941</td>
<td>4.7</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>0.005</td>
<td>941</td>
<td>4.1</td>
</tr>
<tr>
<td>Kernel-based Algorithm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.01</td>
<td>12</td>
<td>0.007</td>
<td>922</td>
<td>4.7</td>
</tr>
<tr>
<td>0.1</td>
<td>12</td>
<td>0.009</td>
<td>941</td>
<td>5.3</td>
</tr>
<tr>
<td>0.5</td>
<td>4</td>
<td>0.065</td>
<td>941</td>
<td>17.2</td>
</tr>
<tr>
<td>Calliper-based Algorithm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.01</td>
<td>11</td>
<td>0.009</td>
<td>922</td>
<td>4.1</td>
</tr>
<tr>
<td>0.05</td>
<td>11</td>
<td>0.012</td>
<td>941</td>
<td>4.9</td>
</tr>
<tr>
<td>0.25</td>
<td>11</td>
<td>0.012</td>
<td>941</td>
<td>4.9</td>
</tr>
<tr>
<td>0.5</td>
<td>11</td>
<td>0.012</td>
<td>941</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Source: Field survey data (2019) using psmatch
Result of the validity test

Figure 4.2 shows that very few cases of the sample were lost to common support restriction. Also, the distribution of the estimated propensity scores for participants and nonparticipants shows clearly that the common support condition was fulfilled since the propensity score distribution of both groups had enough overlap for the matching exercise. This, therefore indicates the assumption of common support condition was satisfactorily attained since the treatment and control groups were well matched (Caliendo and Kopeinig 2008).

Figure 5. Common support graph for NNM algorithm.

KEY: Horizontal axis-propensity score; Vertical axis-frequency of propensity score.
Source: survey data (2019) plotted using psgraph

Results of balancing test for covariates

The covariate balancing test showed that there was no significant difference between the means of the treatment and control groups following matching as opposed to the case before matching for all the 12 covariates (Table 4.5). For instance, before matching, the mean age of
participants (treatment) was 27.33 years while that of nonparticipants was 24.33 years. However, after matching, the mean age of the treatment and control, respectively, were 26.89 and 27.13 and the initial significant difference was eliminated ($p = 0.440$). This was similar for all the other covariates as those that were significantly different before matching all became insignificant after matching. This implies that the disparities between the covariates of the participants and nonparticipants were successfully eliminated resulting in the conclusion that the comparison group is a good counterfactual. According to Caliendo and Kopeinig (2008), the main essence of matching is to ensure that the covariates are comparable in terms of observable characteristics, hence, the two groups must not be statistically and significantly different.

**Table 7.** Covariate balancing test for selection bias after matching.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Matched/ Unmatched</th>
<th>Treated</th>
<th>Control</th>
<th>%Bias</th>
<th>Bias</th>
<th>t</th>
<th>p&gt;t</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>Unmatched</td>
<td>27.33</td>
<td>24.33</td>
<td>69.90</td>
<td>10.92</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>26.89</td>
<td>27.13</td>
<td>-5.60</td>
<td>91.90</td>
<td>-0.77</td>
<td>0.440</td>
</tr>
<tr>
<td>EDUC(Years)</td>
<td>Unmatched</td>
<td>14.48</td>
<td>13.77</td>
<td>24.10</td>
<td>3.78</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>14.34</td>
<td>14.49</td>
<td>-5.10</td>
<td>79.00</td>
<td>-0.76</td>
<td>0.445</td>
</tr>
<tr>
<td>SEX</td>
<td>Unmatched</td>
<td>0.65</td>
<td>0.68</td>
<td>-6.20</td>
<td>-0.96</td>
<td>0.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>0.67</td>
<td>0.69</td>
<td>-3.30</td>
<td>46.40</td>
<td>-0.48</td>
<td>0.631</td>
</tr>
<tr>
<td>HHSIZE</td>
<td>Unmatched</td>
<td>5.63</td>
<td>6.49</td>
<td>-26.10</td>
<td>-4.03</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>5.79</td>
<td>5.99</td>
<td>-6.00</td>
<td>77.10</td>
<td>-1.04</td>
<td>0.297</td>
</tr>
<tr>
<td>AGRIC_ENT</td>
<td>Unmatched</td>
<td>0.43</td>
<td>0.10</td>
<td>82.00</td>
<td>13.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>0.39</td>
<td>0.39</td>
<td>1.20</td>
<td>98.60</td>
<td>0.14</td>
<td>0.888</td>
</tr>
<tr>
<td>RES</td>
<td>Unmatched</td>
<td>0.65</td>
<td>0.63</td>
<td>4.40</td>
<td>0.68</td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>0.65</td>
<td>0.68</td>
<td>-5.40</td>
<td>-23.10</td>
<td>-0.79</td>
<td>0.432</td>
</tr>
<tr>
<td>AGRIB_INT</td>
<td>Unmatched</td>
<td>3.67</td>
<td>2.55</td>
<td>95.80</td>
<td>14.90</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>3.59</td>
<td>3.56</td>
<td>2.70</td>
<td>97.20</td>
<td>0.41</td>
<td>0.678</td>
</tr>
<tr>
<td>ASTINDEX</td>
<td>Unmatched</td>
<td>4.68</td>
<td>4.35</td>
<td>12.90</td>
<td>1.99</td>
<td>0.046</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>4.62</td>
<td>4.47</td>
<td>6.00</td>
<td>53.00</td>
<td>0.89</td>
<td>0.372</td>
</tr>
<tr>
<td>SKILL_PERC</td>
<td>Unmatched</td>
<td>0.92</td>
<td>0.84</td>
<td>25.60</td>
<td>3.95</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>0.92</td>
<td>0.92</td>
<td>-2.40</td>
<td>90.60</td>
<td>-0.41</td>
<td>0.679</td>
</tr>
<tr>
<td>BUS_PERC</td>
<td>Unmatched</td>
<td>0.90</td>
<td>0.80</td>
<td>30.60</td>
<td>4.72</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>0.89</td>
<td>0.88</td>
<td>5.60</td>
<td>81.80</td>
<td>0.89</td>
<td>0.372</td>
</tr>
<tr>
<td>MARITAL_STAT</td>
<td>Unmatched</td>
<td>0.40</td>
<td>0.14</td>
<td>59.10</td>
<td>9.32</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>0.35</td>
<td>0.34</td>
<td>2.20</td>
<td>96.20</td>
<td>0.29</td>
<td>0.772</td>
</tr>
<tr>
<td>HoHEDUC(Years)</td>
<td>Unmatched</td>
<td>14.76</td>
<td>14.02</td>
<td>21.10</td>
<td>3.30</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Matched</td>
<td>14.54</td>
<td>14.65</td>
<td>-3.40</td>
<td>83.90</td>
<td>-0.55</td>
<td>0.584</td>
</tr>
</tbody>
</table>

Source: Field survey data (2019) using pstest
The quality of matching

Table 4.6 shows that using the NNM algorithm, the value of the Pseudo R2 was 0.257 before matching. However, after matching, the value reduced to 0.005 which is within the range obtained by Ahmed and Haji (2014) and Haji and Legesse (2017). Also, the LR chi2 reduced to 5.71 after matching compared to 347.15 before matching. The likelihood ratio test after matching implies that since all the regressors in the treatment group were statistically insignificant (p > chi2 = 0.930), the assumption of joint significance of the regressors could not be sustained (Caliendo and Kopeinig 2008). Furthermore, the mean standardized bias after matching reduced to 4.1% from 38.1% before matching, indicating an 89% reduction (Table 4.7). This value (4.1%) is in line with the acceptable percentage of 3–5% recommended by Caliendo and Kopeinig (2008). Also, only 36 cases were lost to common support restriction, representing only 4% of the entire sample. Thus, it can be concluded that good matching quality was obtained.

**Table 8. Chi-square test for joint significance.**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Ps R2</th>
<th>LR chi2</th>
<th>P &gt; chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmatched</td>
<td>0.257</td>
<td>347.15</td>
<td>0.000</td>
</tr>
<tr>
<td>Matched</td>
<td>0.005</td>
<td>5.71</td>
<td>0.930</td>
</tr>
</tbody>
</table>

Source: Field survey data (2019) using pstest

**Table 9. Indicators of matching quality and robustness of result.**

<table>
<thead>
<tr>
<th>Entrepreneurship performance</th>
<th>SBBefore (%)</th>
<th>SBAfter (%)</th>
<th>Percentage reduction in SB</th>
<th>Cases lost to CS</th>
<th>Percentage of cases lost to CS</th>
<th>Critical value of gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>38.1</td>
<td>4.1</td>
<td>89</td>
<td>36</td>
<td>4</td>
<td>2.8–2.85</td>
</tr>
</tbody>
</table>

Source: Field survey data (2019) using pstest

Result of the sensitivity analysis

The gamma level obtained from the R-bounds test conducted to check for the hidden bias was reported at the point where 5% level of significance was exceeded since the tolerance level was fixed at 5%. The critical value of gamma for the impact estimate varied between 2.8 and 2.85 (Table 4.7), which implies that the unobserved variable would have to increase the odds ratio of participating by up to 185% before the estimated result can be negated. Following this, it was concluded that the estimated ATT is robust against hidden bias and can be attributed to the training program.
Impact results

The impact of the Fadama GUYS programs on youth agripreneurship performance was obtained by taking the difference between the mean outcome values of the treatment and control groups. Table 4.8 shows that the difference between the mean outcome values of both groups was positive and significant at 1%. The ATT shows that participants’ performance score improved by up to 27 percentage points implying that participation in the program had a significant impact on the performance of the participants (t = 5.05). The earlier diagnostic tests carried out further validates this result. Based on this result, it was concluded that training had a positive and significant impact on youth agripreneurship performance.

Table 10. Impact of training program on youth agripreneurship performance.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample</th>
<th>Treated</th>
<th>Control</th>
<th>Difference</th>
<th>S.E</th>
<th>T-Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youth entrepreneurship performance</td>
<td>ATT</td>
<td>55.90</td>
<td>43.95</td>
<td>11.95</td>
<td>2.36</td>
<td>5.05***</td>
</tr>
</tbody>
</table>

Source: Author’s Computation, 2019. Note: p > 0.1 = *, p > 0.05 = **, p > 0.01 = ***

Impact of program training on youth empowerment

Results of the endogenous treatment effect regression model

This fourth objective was analyzed using a three-stage estimation procedure. In this estimation, the average treatment effect (ATE) is the same as the average treatment effect on treated youth (ATET). By implication, the average estimated outcome for the entire sample is the same as the average estimated outcome for the treatment units.

The estimated correlation coefficient between the error terms of the participation equation and the youth agripreneurship performance equations was –0.76 (Table 4.9). The negative sign implies that the unobservable affecting agripreneurship performance is negatively correlated with those that affect the likelihood of participating in the program. Also, the likelihood ratio test result was statistically significant (p < 0.01).
Hence, it was concluded that the error term of the selection (participation) and the first outcome variable (agripreneurship performance) were correlated.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Selection Equation (Probit)</th>
<th>Agripreneurship Outcome Equation (OLS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef</td>
<td>S.E.</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.180**</td>
<td>0.092</td>
</tr>
<tr>
<td>Household Size</td>
<td>-0.039***</td>
<td>0.013</td>
</tr>
<tr>
<td>Agribusiness Ownership</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productive Asset Index Score</td>
<td>0.515**</td>
<td>0.234</td>
</tr>
<tr>
<td>Mental Health Index Score</td>
<td>0.355***</td>
<td>0.060</td>
</tr>
<tr>
<td>Type of Employment (Formal = 1)</td>
<td>-0.204</td>
<td>0.145</td>
</tr>
<tr>
<td>Access to Credit (Yes = 1)</td>
<td>-0.292***</td>
<td>0.101</td>
</tr>
<tr>
<td>Migration Status (Yes = 1)</td>
<td>0.148*</td>
<td>0.089</td>
</tr>
<tr>
<td>Agribusiness Intention</td>
<td>0.751***</td>
<td>0.080</td>
</tr>
<tr>
<td>Perception about Training (Positive = 1)</td>
<td>0.393***</td>
<td>0.104</td>
</tr>
<tr>
<td>Participation in Training (Yes = 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-1.602</td>
<td>0.260</td>
</tr>
</tbody>
</table>

Rho = -0.7634; LR test of indep. eqns. (rho = 0): chi2(1) = 53.07  Prob > chi2 = 0.0000

Source: Author’s Computation, 2019. Note: p > 0.1 = *, p > 0.05 = **, p > 0.01 = ***

Thus, controlling for endogeneity by using the ETER model, Table 4.9 shows that the coefficient of the treatment variable (participation in training) was positive and significant at 1%. This implies that participation in the program had a significant and positive (p < 0.01) impact on youth agripreneurship performance. This is consistent with the PSM result. A few studies have followed a similar approach in validating PSM results instead of conducting a sensitivity analysis (Feleke et al. 2016; Adebayo et al. 2018) there have been successes in cassava research in terms of the development of production technologies, particularly improved varieties with high yield potential. The study addresses the question of whether and to what extent adoption of improved cassava varieties has led to rural poverty reduction in four African countries, namely Tanzania, Democratic Republic of Congo, Sierra Leone and Zambia. Data for the study come from a household survey conducted in the above-mentioned countries through a multinational-CGIAR support to agricultural research for development of strategic crops (SARD-SC. This is also consistent with existing studies which have argued that training
is required for capacity building, skill acquisition, and better performance (Ahmed et al., 2016; Alice Kasau 2014; Ngugi, 2014; Ng’ang’a et al. 2013)“type”: “paper-conference”, “volume”: “1” ], “uris”: [ “http://www.mendeley.com/documents/?uuid=6c145823-7f51-460a-ab1c-747fffc89d0d2” ] }, “id”: “ITEM-2”, “itemData”: { “abstract”: “This study intended to investigate the relationship between training and performance in the MFIs narrowing down to attitude, service delivery and job satisfaction. The specific objectives were to investigate whether attitude, job satisfaction and service delivery affects the performance of the employees. Questionnaires were used by the researcher in data collection. Qualitative data was analyzed by editing, coding and grouping the information into relevant themes. The study made use of descriptive statistics to analyze the data. The study found out that the three variables of training investigated were key in determining employee performance especially in service firms under which MFIs fall. The research has confirmed that training has a big influence on performance with attitude, job satisfaction and service delivery equally getting the same weight. The result is consistent with modern scholars who recommend for training to develop positive attitudes at work place, to increase efficiency and effectiveness in service delivery and improve job satisfaction of the employees. Key”, “author”: [ { “dropping-particle”: “”, “family”: “Alice Kasau”, “given”: “Sila”, “non-dropping-particle”: “”, “parse-names”: false, “suffix”: “” } ], “container-title”: “European Journal of Business and Social Scince”, “id”: “ITEM-2”, “issue”: “1”, “issued”: { “date-parts”: [ [ “2014” ] ] }, “page”: “95-117”, “title”: “Relationship Between Training and Performance : A Case Study of Kenya Women Finance Trust Eastern Nyanza Region, Kenya”, “type”: “article-journal”, “volume”: “3” ], “uris”: [ “http://www.mendeley.com/documents/?uuid=cbaa0b8d-f58a-43eb-975a-23fc74e87a9e” ] }, “id”: “ITEM-3”, “itemData”: { “DOI”: “10.6007/ijarbs/v3-i9/190”, “abstract”: “Well-preserved floras from the Alpine Early\u2013Middle Triassic are rare, and thus our understanding of the vegetation in this area during this period of time con- tinues to be incomplete. As a result, every new find repres- ents a significant piece of information that deserves thoughtful consideration. Anisian (Middle Triassic).

Impact results
Table 4.10 shows that the predicted value of agripreneurship performance from the second stage was positive and statistically significant at 1%. This implies that youth agripreneurship performance as a result of training had a positive and significant impact
on youth empowerment. Thus, as performance score increases by one percentage point, youth empowerment score will increase by up to 73 percentage points. The implication is that training led to better agripreneurship performance which invariably led to an increase in youth empowerment score. Based on this result, it was concluded that the program had a significant and positive impact on youth empowerment. This result is consistent with prior expectation and corroborates the findings of Bairwa et al. (2014) that better agripreneurship performance translates into increased productivity and profitability as well as contributes to better livelihood and better individual economic status which are all indicators of economic empowerment. Also, Bairwa and Kushwaha (2012) argued that one of the important roles played by agripreneurship in the growth and development of national economy is that it increases employment opportunities among rural and urban dwellers.

Table 12. Impact of agricultural training on youth empowerment.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Empowerment Outcome Equation (Tobit)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
</tr>
<tr>
<td>Gender (Male = 1)</td>
<td>0.015</td>
</tr>
<tr>
<td>Household Size</td>
<td>0.020</td>
</tr>
<tr>
<td>Agribusiness Ownership</td>
<td>0.097***</td>
</tr>
<tr>
<td>Productive Asset Index Score</td>
<td>0.083***</td>
</tr>
<tr>
<td>Mental Health Index Score</td>
<td>0.150***</td>
</tr>
<tr>
<td>Type of Employment (Formal = 1)</td>
<td>–0.014</td>
</tr>
<tr>
<td>Access to Credit</td>
<td>0.142***</td>
</tr>
<tr>
<td>Migration Status (Migrated = 1)</td>
<td>0.060</td>
</tr>
<tr>
<td>Average Monthly Income</td>
<td>0.150***</td>
</tr>
<tr>
<td>Consistent Income Source</td>
<td>0.195***</td>
</tr>
<tr>
<td>Predicted Value of Agripreneurship Performance</td>
<td>0.727***</td>
</tr>
<tr>
<td>State Dummies</td>
<td></td>
</tr>
<tr>
<td>Abia State</td>
<td>–0.039</td>
</tr>
<tr>
<td>Ekiti State</td>
<td>–0.012</td>
</tr>
<tr>
<td>Kebbi State</td>
<td>0.123***</td>
</tr>
<tr>
<td>Constant</td>
<td>–3.903***</td>
</tr>
</tbody>
</table>

Pseudo R² = 0.5394; LR Chi² (prob) = 942.12(0.000); Log likelihood = –402.17
Drivers of youth empowerment

The model of youth empowerment includes the predicted value of youth agripreneurship performance and other relevant explanatory variables that influence empowerment. The results presented in Table 4.10 shows that out of the 11 variables hypothesized to influence empowerment, seven were positive and significant at less than 1%.

Productive asset index score was positive and significant at 1%. The coefficient (0.083) implies that as the score increases by one percentage point, empowerment score increases by close to eight percentage points. This is not surprising as possession of asset is expected to contribute to the economic outcome of young people. Thus, possession of relevant assets will improve youth-owned enterprises which will contribute to empowerment.

Having a consistent source of income was positive and significant at 1%. This implies that having a consistent source of income increases youth empowerment score by close to 20%. This is because a consistent income source implies less financial dependence on other people and financial buoyancy. Thus, they are able to make their personal and economic decisions with less dependence on people, which is an important indicator of empowerment. This agrees with the findings of Mburu (2015) who found that high dependency ratio reduced women empowerment in Kenya. Furthermore, a consistent income source may translate into a better livelihood. In the modern world, a consistent income source is comparable to job security. The implication is that regardless of economic stress and strains, all things being equal, income will be earned at a specified and expected period. This may give some sort of peace of mind and also contribute to mental health.

Access to credit was positive and significant at 1%. This implies that having access to credit facilities will increase the empowerment score by 14 percentage points. This is because access to credit will lead to increased investment which will further translate to increased income, more profit, and better livelihood. This corroborates the findings of Kurgat (2017) and United Nations (2014).

Ownership of agribusiness enterprise was another factor which was positive and significantly related to youth empowerment. The result implies that having an agribusiness enterprise will increase youth empowerment score by up 10 percentage points. Having
an agribusiness enterprise implies that the youth has an income source (employed) and makes decisions relating to investment. Thus, this increase in empowerment may be attributed to the ability to make production, economic, and welfare decisions, and earn consistent income from the enterprise.

The average monthly income was positive and significant at 1%. This implies that an increase in average monthly income by one naira will lead to an increase in youth empowerment score by 15 percentage points. This is because a higher income may lead to higher and better investment, thereby contributing to youth economic empowerment. Also, Haneef et al. (2014) found that having an independent income source has a greater influence on investment decision which is an important indicator of empowerment. Thus, a higher income motivates people to make investment decisions that foster income diversification and contribute to economic empowerment. In addition, a higher income can translate into financial stability, increased social status, and increased level of confidence which are all indicators of empowerment.
5. Summary, Conclusions, and Recommendations

Summary

This study assessed the impact of agricultural training programs on youth agripreneurship performance and empowerment taking the case of the Fadama GUYS program in Nigeria. The specific objectives were to determine the factors which influenced youth participation in the program; determine the factors influencing youth engagement in agribusiness; assess the impact of the Program on youth agripreneurship performance, and assess the impact of the Program on youth empowerment. Data were collected following a multistage sampling procedure from a total of 977 youths, comprising 455 participants and 522 nonparticipants. Data were analyzed using descriptive and inferential analysis.

Based on the comparison of the socioeconomic and farm characteristic of the respondents, participants were significantly different from the nonparticipants in terms of years of formal education, household size, and productive asset score. Also, participants had higher average monthly income and more years of agricultural experience compared to the nonparticipants. However, both groups were not significantly different in terms of gender.

On factors impeding youth engagement in agribusiness, three barriers ranked high among those identified by the respondents. lack of access to finance (56%), lack of mentorship (11%), and lack of access to information (10%). Of these three, lack of mentorship is the only one which is not so common in literature.

The factors which positively and significantly influenced youth participation in the training program were age, years of formal education, gender, agribusiness ownership, perception about training and agribusiness, and intention to engage in agribusiness. Again, household size negatively but, significantly influenced participation.

The decision of the youth to engage in agribusiness was positively and significantly influenced by gender, productive asset index score, access to land, and access to
credit. However, years of formal education was negatively but significantly related to engagement decision. The insignificant variables included in the model were age, household size, migration status, and type of employment. Interestingly, some of the factors which influenced youth decision to participate in training such as education and gender also influenced their decision to engage in agribusiness.

The PSM result indicated a positive impact of the program on youth agripreneurship performance. A significant difference was found between the average performance score of participants and nonparticipants, which was attributed to the training program. Specifically, the performance of participants improved by up to 27 percentage points. The result of the sensitivity analysis further showed that the impact estimate was insensitive to unobserved selection bias, thereby confirming the validity of the result.

The three-stage estimation results showed that the program had a positive and significant impact on youth empowerment. Specifically, agripreneurship performance which was predicted to measure the impact of training on empowerment had a positive and significant coefficient (0.727) implying that as youth agripreneurship performance score increases by one percentage point, empowerment score also increases by up to 73 percentage points. Other drivers of empowerment identified in the study include productive asset, access to credit, consistent income source, ownership of agribusiness, and average monthly income.

**Conclusion**

The significant difference between the participants and nonparticipants in terms of their agribusiness attributes indicates that participants benefitted from the training program.

Changing the perception of youth about agribusiness could facilitate their decision to engage in agribusiness as perception is one of the important variables which drives action.

While years of formal education positively influenced youth decision to participate in training, it had a negative influence on their decision to engage in agribusiness. These opposing results indicate that participation in training may not necessarily lead to engagement in agribusiness.

The positive coefficient and significance of the impact estimate from the PSM analysis assessing the impact of the program on youth agripreneurship performance coupled
with the insensitivity of the estimate to selection bias led to the conclusion that training had a positive and significant impact on youth agripreneurship performance.

Also, the significance and positive sign of the coefficient which measures the ATT of training impact on empowerment led to the conclusion that training had a significant and positive impact on youth empowerment. By implication, there is a strong link between training, performance, and youth empowerment.

**Recommendations**

Based on the identification of lack of mentorship as an impediment to engagement in agribusiness, it is recommended that training programs incorporate mentorship into their program designs. An effective way to ensure that mentorship translates into positive outcome is to adopt the peer-to-peer mentorship approach whereby successful young farmers mentor new ones. This way, they will be able to share their challenges and success stories with them.

The positive influence of the perception variables (perception about training and perception about agribusiness) calls for relevant strategies which could further help to change the outlook of agriculture as a career-option with low economic returns. One way of achieving this is by formulating policies and organizing programs which will change the general outlook of agriculture in the country.

Access to credit was found to positively and significantly influence youth agripreneurship performance as well as empowerment. On this note, government and development partners should provide financial and institutional support for young people who intend to go into agribusiness. This institutional support could be in the form of reducing the high-interest rate on loan or by providing loans without collateral. An approach that could be adopted is the group borrowing which has worked in the United States.

Also, access to land was positive and significantly related to youth engagement in agribusiness. Thus, access to land should be improved by providing small plots to the youth willing to engage in agribusiness. Idle government land can be used for this purpose and the youth can pay rent based on specified agreed-upon conditions.

Training had a positive and significant impact on both agripreneurship performance and youth empowerment. The youth should be allowed access to training without restrictive administrative limitations such as purchase of forms. Also, government agencies and
development partners providing these trainings should improve the quality and image of agricultural training by investing in training facilities and qualified trainers. In addition, since training had so much impact, it is expedient to establish training centers as opposed to seasonal (once-in-a-while) training programs.

Suggestions for Further Research

1. The study focused on general agricultural training programs without disaggregating into different subsectors such as crop and livestock. It is therefore recommended that further study should be carried out to evaluate the impact of each subsector on youth performance and empowerment.

2. Further studies should be carried out to improve on the application of the agripreneurship performance model.
References


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