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## The Role of Human Capital Development on Sustainable Agricultural Productivity in Nigeria

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### ARTICLE INFO

### ABSTRACT

*This paper evaluates the role of human capital development on sustainable agricultural productivity in Nigeria. Precisely, it aims to: (i) highlight the importance of human capital development in the agricultural activities in Nigeria; and (ii) identify the effects of human capital development on agricultural productivity in Nigeria. The paper adopted a desk research approach, using empirical studies to achieve the objective of the study. From the reviewed literature, it was established that human capital development significantly affects agricultural productivity in Nigeria. Therefore, to achieve a sustainable agricultural productivity in Nigeria, the paper recommends amongst others that government should carry out a critical assessment of the Nigerian educational sector aimed at revitalizing the sector since it plays a key role in human capital development of any country*

### INTRODUCTION:

Agriculture plays an important role in the economy of most sub-Saharan African countries, with one third of total Gross Domestic Product (GDP) being contributed by the sector (Nyamkye, Fiankor & Ntomi, 2016). It remains the most practiced economic activity being that the sector employs over 65% of workforce in most sub-Saharan Africa (SSA) with over 80% of the African population depending on it as a source of livelihood (IFPRI, 2013; WB, 2013; Muguna, 2015, Ndour, 2017). According to the study by IFPRI in 2012, agriculture would remain the dominant potential-source of employment for the rising rural population in SSA (IFPRI, 2013); and the productivity growth in agriculture is critical for food security, economic growth, development and poverty reduction (Nyamkye, Fiankor & Ntomi, 2016). For poor households in Africa, agriculture is a mechanism to provide the means to cover food expenditure and improve nutritional status. In addition, agriculture occupies a foremost place among the Sustainable Development Goals (SDGs) that lead to the economic prosperity of the poorest nations (Ndour, 2017). This notwithstanding, current productivity in the agricultural sector falls below the prospects of Africa;

while its contribution to the GDP remains very low at 36% (World Bank, 2014; Ndour, 2017).

In the 1960s, Nigeria was an agricultural economy and among the world's leading producers of cocoa, palm oil, groundnuts, cotton, rubber, and hide & skin (Penda, 2012). At that time, the sector contributed over 60% to the GDP, but today, agriculture contributed only 22.35% of the total GDP in the first quarter of 2021 and this is even seen to be an increase from the last quarter of year 2020 (NBS, 2021). Nigeria's agricultural sector faces many challenges which impact on its productivity, including: poor land tenure system, low level of irrigation farming, climate change, land degradation, low technology, high production cost, poor distribution of inputs, limited financing, high post-harvest losses and poor access to market. Although, the government has embarked on numerous initiative and programmes -- the Agriculture Promotion Policy (APP), Nigeria-Africa Trade and Investment Promotion Programme, Presidential Economic Diversification Initiative, Economic and Export Promotion Incentives, among others -- aimed at increasing agricultural productivity



for both domestic demand and export ([www.fao.org](http://www.fao.org)), the result is still below expectation.

Globally, the number of people working in agriculture worldwide reduced by 17% between 2000 and 2020; and in Asia, agricultural employment declined from approximately 800 million people to roughly 590 million, showing that more than one out of every four agricultural workers left the sector for another job outside agriculture in the region. Similarly, Europe witnessed the biggest drop with a 50% drop from 35 million. However, in Africa the number of people working in agriculture continued to grow within the period, with a total number of 161 million in 2000 to 224 million in 2019. In the same vein, Nigeria recorded an increase in the agricultural workforce within the period from 19 million to 20 million in 2019; although with a decrease between 2015 and 2017 (FAO, 2021). Regrettably, increase in the agricultural workforce has not yielded the expected increase in productivity.

Empirical studies found evidence that human capital level is positively related with agricultural productivity (Iglori, 2006); implying that human capital is important to agricultural production, particularly because it increases its productivity and central in economic activities, growth and development (de Castro, de Barros & Menezes-Filho, n.d). Its key role in economic growth and development is based on the central position it occupies in production, distribution and consumption chain. Penda (2012) asserts that “the accumulation of human capital productivity facilitates technological innovations, increases returns to capital and makes growth in agriculture more sustainable” p.90; and investing in the human capital base is regarded as one of the most effective ways to improve agricultural productivity (Nyamkye, Fiankor & Ntomi, 2016). Building on this premise, this paper aims to: i) investigate the role of human capital development on agricultural productivity in Nigeria; and ii) identify the effect of human capital development on agricultural growth.

## REVIEW OF RELATED LITERATURE

### Conceptual Review

#### *Human Capital Development*

Most of the early economic theories refer human capital simply as workforce; one of the factors of production, which is considered to be a fungible resource that can easily be replaced with another (Djomo & Sikod, 2012). Economically, “capital is referred to as a factor of production used for the creation of goods and services, but significantly not consumed in the production process; while the human

element takes charge of all the economic activities such as production, consumption and transactions necessary to move the products to consumers” (James, 2021, p. 92). In the article: “The Economic Organization of Agriculture”, T.W. Schultz in 1954 was the pioneer in the studies showing that the human capital associated with formal schooling enabled farmers to be more productive. Also, the term was first used in the modern economic literature by Schultz in 1961 (Fleischhauer, 2007; Djomo & sikod, 2012; Evenson, 1988), where he classified expenditures on human capital as investment rather than consumption. Subsequently, its first application as human capital theory in economics was by Becker and Mencer of the Chicago School. According to Becker (1964) cited in Fleischhauer (2007), “human capital is similar to “physical means of production, and investing in human capital means “all activities that influence future real income through the embedding of resources in people”” (Fleischhauer, 2007, p.4).

Human capital is defined as the stock of competencies, knowledge and personality attributes embodied in the ability to perform labour so as to produce economic value. Human capital is vitally important for an organization’s success; and it increases through education and experience (Djomo & Sikod, 2012; Crook et al., 2011). It is a means of production, into which additional investment yields additional output. Human capital is substitutable, but not transferable like land, labor, or fixed capital; and in modern growth theory, it is seen as an important growth factor (Djomo & Sikod, 2012). Apart from stock of physical capital, human capital (knowledge and technical know-how) has been identified as one of the components that can contribute positively to productivity growth. It has been identified as aggregate economic view of human beings acting within economies; and it includes traits such as knowledge, talents, skills, abilities, experience, health, intelligence, training, judgment and wisdom (James, 2021). Furthermore, human capital development is classified into six ways: i) health facilities and services: this involves all expenditure that affects the life expectancy, strength and stamina, vigor and vitality of the people; ii) on-the job training which includes old type apprenticeship organized by firms; iii) formally organized education at elementary, secondary and tertiary level; iv) study programmes for adults that are not in agriculture; v) migration of individuals and families to adjust changing job opportunity (factor mobility); and vi) transfer or importation of technical assistance, expertise and consultants (Ogunniyi, 2018).



Thus, human capital development is associated with investment in man and his development as a creative and productive resource (James, 2021; Jhingan, 2012). Human capital investments include expenditures on education, training, health, information, and labour mobility (Weisbrod, 1966). Accumulation of human capital happens in three different ways, namely: formal schooling (where individual devotes his whole time to learning), on-the-job training (being a post-school training provided by the current employer), and off-the-job training (post-school training provided by “for-profit” proprietary institutions). These investments involve initial costs in order to gain a return on the investments in the future. The return on investment is based on two interrelated channels: increased earnings for the worker and higher productivity for the firm (Fleischhauer, 2007).

### ***Sustainable Agricultural Productivity***

Agricultural productivity is the measurement of the quantity of agricultural output produced for a given quantity of input or a set of inputs (Mozumdar, 2012). Generally, productivity is defined as a ratio of a volume measure of output to a volume measure of input use; and at the primary level, it measures the amount produced by a target group given a set of resources and inputs (FAO, 2017; OECD, 2001b). In other words, it measures how efficiently production inputs (i.e. labour and capital) are being used in an economy to produce a given level of output (Krugman, 1994). According to the report of the Food and Agriculture Organizations of the United Nation, agricultural productivity and efficiency is at the centre of many of the debates, policies and measures concerning the agricultural sector. This is because of the emphasis placed on it by the Sustainable Development Goals (SDGs) as a pillar for enhancing economic development of developing countries. Enhancing agricultural productivity is imperative because of its effective contribution to poverty reduction through better food security and increased incomes for farmers, especially in the developing countries where agriculture remains the major economic sector (FAO, 2017).

Productivity can be measured for a single entity (farm, commodity) or a group of farms, at any geographical scale. However, “the quantities of output relative to the quantity of inputs are the conventional measures of productivity. If output increases at the same rate as inputs, then productivity is unchanged. On the other hand, if the output growth rate exceeds the growth rate in the use of inputs, then productivity is positive” (Mozumdar, 2012, p.56). In productivity measurement, the key point is that the measure should reflect the ultimate purpose. For instance, if the

objective is to compare productivity between farms, it then means that measures that are micro-based will be required; whereas, evaluating national agricultural policy at the country level will require macro measures. Although the desired purpose may vary, the measurement issues associated with deriving the different indicators are the same (FAO, 2017).

There are two ways of measuring productivity commonly used: (i) the partial factor productivity measure, and (ii) the total factor productivity measure. The first measure states the amount of output per unit of a particular input, such as land or labour; while the second takes into account all the factors of production for its measurement. Although, the most commonly used is the partial factor productivity measure, but sometimes it does not clearly show why production is changing; hence it is better to use the multifactor or total factor productivity, in order to account for the accurate agricultural productivity. However, it is important to state that the different productivity measures are used for different purposes (Mozumdar, 2012; Wiebe, 2003).

Measuring productivity is important for resource reallocation and optimization, geared towards food security, economic growth and sustainable development (O'Donnell, 2010). Sustainability represents a process of using resources in a way that does not lead to depletion or permanent damage, rather remains from generation to generation (Ndibe & Ojiula, 2019). Alluding to that, Mozumdar (2012) asserts that sustainability is an important facet for food security. In his words, “it means that food productions have to carry on upholding with the demand for future generations”, p.54. In a situation where agricultural growth is accounted for mostly by land expansion, which is not sustainable in the long run, agricultural productivity can be employed to enhance longer-term sustainability (Osinowo, Tolorunju & Osinowo, 2021). According to Frisvold and Lomax (1991), enhancing and accelerating sustainable agricultural productivity is a central component of a comprehensive strategy to meet the rising demands of food, even as the gap in agricultural productivity between the richest and poorest nations continues to grow, and many poorer nations facing higher food prices and insecure supplies of goods.

### ***Human Capital Development and Agricultural Productivity***

Efficient resource use by a farmer can be attributed to socio-economic drivers amongst which are the farmer's knowledge base and the capacity to function (Awoyemi, Odozi, Atekunrin & Ehirim, 2015). Improving efficient resource use requires investment on the farmers (human capital); which is commonly





measured in two dimensions: schooling and health. Schooling can increase productivity by imparting specific knowledge and/or by enhancing skill in acquiring new knowledge. On the other hand, health status relates with productivity through the channel of capability and functioning (Awoyemi, Odozi, Atekunrin & Ehirim, 2015; Rosenzweig, 2010; Strauss & Thomas, 1998).

The importance of the human factor and characteristics such as having adequate knowledge resources is extremely important in the management process of agriculture. This is due to the development of engineering and technology, information technology, the necessity for innovative management and globalization of the economy (Kijek, 2012; Kołodziejczyk, 2002; Narski, 2001). The link from human capital to productivity gains was well acknowledged by the early classical economists. For instance, Adam Smith noted that the more that people are instructed, the less likely that they are to produce disorder and illiterate nations (Awoyemi, Odozi, Atekunrin & Ehirim, 2015). Similarly, in the economy of the 21st century, education and continuing improvement of skills have become important drivers of the development of countries and respective sectors of the economy (Nowak & Kijek, 2016; Berezka, 2012). And in the case of agriculture, human capital has become important in terms of improving the results of management, particularly, in the aspect of adequate management and organisation of other production factors, i.e. land and capital (Górecki, 2004). Still in agriculture, a relationship can be observed between the quality of human capital (defined by the characteristics of a farm manager) and the implementation of scientific and technological progress. For instance, a better educated farmer is more prone to introduce changes and innovation on the farm, which will enhance productivity (Nowak & Kijek, 2016; Sikorska, 2011).

Besides, the close relationship between the level of education and the inclination towards entrepreneurship, diffusion of innovation, changes in the nature of the farm or the intention to make use of information was also noted by Wawrzyniak (2001) in Nowak and Kijek (2016). Also from the macroeconomic point of view (Penda, 2012; Kijek & Kasztelan, 2013) alluded to the fact that better quality of human resources facilitates development and implementation of technological innovations, increases capital earnings and promotes sustainable development of agriculture. Likewise, Klynhans (2006) noted that improvement in the quality of human capital leads to lower unit costs of production and decreases marginal cost of production, thereby

enabling firms to trade higher quality commodities at lower prices. Hence, Nowak and Kijek (2016) suggested that more attention should be paid to both quantity and quality objectives in evaluating human capital in agriculture because of the growing complexity of the environment in which agricultural producers operate.

### **Theoretical Review**

This paper is anchored around the following theories:

#### ***Human Capital Theory***

Human capital theory suggests that individuals and society derive economic benefits from investments in people. The theory further suggests that education and training are investments that make individuals genuinely more productive. According to the theory, individuals who are more productive are expected to have higher earnings and be more employable. Hence, the investment feature of this theory significantly differentiates human capital expenditures from consumptive expenditures (those providing few benefits beyond immediate satisfaction) (Wuttaphan, 2017; Carneiro & Vignoles, 2010; Sweetland, 1996). Also, this theory shows how education leads to increase in productivity and efficiency of workers by increasing the level of their cognitive skills. According to James (2021), Theodore Schults, Gary Becker and Jacob Mincer introduced the notion that people invest in education so as to increase their stock of human capabilities which can be formed by combining inherent abilities with investment in human beings. Investment in education is seen as a productive investment in human capital -- an investment which proponents of human capital theory considers to be equally or even more equally worthwhile than that in physical capital. Education is a key to creating, adapting and spreading knowledge. It can add to the value of production in the economy and also to the income of the person who has been educated (James, 2021). Although investment in human capital occurs in two ways: i) health and nutrition, and ii) education; education consistently emerges as the prime human capital investment for empirical analysis. This is because education is perceived to contribute to health and nutritional improvements; a second and more empirically important reason is that education may be measured in quantitative monetary costs and years of tenure (Sweetland, 1996).

#### ***Modernization theory***

This theory puts development as a uniform evolutionary route that all societies follow, from agricultural, rural, and tradition societies to postindustrial, urban, and modern forms (Ynalvez &



Shrum, 2015). The theory centers on how education transforms an individual's value, belief and behaviour. It emphasizes internal forces and sources of socioeconomic development, such as formal education. Even though, the theory does not rule out external forces and sources of social change and economic development, it focuses less on foreign influences (James, 2021; Ynalvez & Shrum, 2015).

Exposure to modernization institutions such as schools, factories and mass media inculcate modern values and attitudes, which include: openness to new ideas, independences from traditional authorities, willingness to plan and calculate further exigencies and growing sense of personal and social efficacy. The greater the number of people exposed to modernization institutions, the greater the level of individual modernity attained by the society. The assumption is that educational expansion through its effects on individual values and benefits sets in motion the necessary building blocks for a more productive workforce and a more sustained economic growth (James, 2021, Chikwudiebube, 2015).

#### ***Endogenous Growth Theory***

The endogenous growth theory was developed by Paul Romer in the 1980s. The theory holds that investment in human capital, innovation, and knowledge makes a substantial contribution to economic growth (Gruzina, Firsova & Strielkowski,

2021). According to (Jones, 2019), endogenous growth theory emphasizes that technological change is the result of efforts by researchers and entrepreneurs who respond to economic incentives. In other words, human capital acts as a growth engine of economic activities (Mastromarco & Simar, 2021). Thus, anything that affects their efforts, such as tax policy, basic research funding, and education, for example, can potentially influence the long-run prospects of the economy (Jones, 2019). Furthermore, the proponents of endogenous growth models opined that growth rate of output is endogenously determined within the economic environment; implying that human capital is the driving force in the growth process of an economy (Anyanwu, Adam, Obi & Yelwa, 2015).

#### **Methodology**

The overall objective of the paper is to bring to fore the role of human capital development on sustainable agricultural development in Nigeria. Our assumption is that human capital development is positively related to agricultural growth. To achieve the objective, the author reviewed empirical studies related to the topic.

#### **Empirical Literature on Human Capital Development and Agricultural Productivity**

In order to find out the link between human capital development and agricultural productivity the author reviewed the following empirical studies as shown in table 1:

**Table 1: Empirical Studies on Human Capital Development and Agricultural Productivity**

Study	Methodology and Findings	Authors
<b>Drivers of Agricultural Productivity: Evidence from transforming economies</b>	This study employed panel data covering a thirty five (35) year period of 1980 to 2014. The result showed evidence of increased agricultural productivity with investment in human capital. Hence, capacity building of the farmers at farm level was recommended, as that will improve crop, soil and water management; as well as enhance the demand for and use of better and more efficient production inputs in order to increase agricultural productivity.	Osinowo, Tolorunju and Osinowo (2021)
<b>Effect of human capital on agricultural productivity and farmers' income in Cameroon</b>	The study adopted a Cobb-Douglas production function to evaluate agricultural productivity, establish stochastic frontier model and specify returns to human capital. Using data from household survey, the result shows that an additional year of experience and levels of education increases agricultural productivity.	Djomo and Sikod (2012)
<b>Impact of education on agricultural productivity of small scale female maize farmers in Potiskum, Yobe State, Nigeria</b>	The study used a regression analysis to show that education significantly related to output and concluded that education positively impacted on agricultural productivity.	Okpachu, Okpachu and Obijesi (2014)



Study	Methodology and Findings	Authors
<b>Effect of Human Capital on Maize Productivity in Ghana: A Quantile Regression Approach</b>	The study investigated the effects of human capital on maize production in Ghana and examine whether it differs across ecological zones and quantiles of the conditional distribution of maize output. Adopting a Cobb-Douglas production function in a quantile regression framework, findings show that human capital does not significantly affect maize productivity in Ghana, but human capital has different effects on farmers in the different quantiles. The study attributed the insignificant effect of human capital on productivity primarily due to the fact that the youth and people with higher education are mostly disengaged from agriculture, leaving it to the elderly and the uneducated.	Nyamekye, Fiankor and Ntoni (2016)
<b>Human Capital Development, National Security and Agricultural Sector Growth in Nigeria</b>	The study examined the impact of human capital development and national security on agricultural sector growth in Nigeria, using a time series data from 1981-2017 which were sourced from the Central Bank of Nigeria statistical bulletin for 2018 and from World Bank indicators. Adopting the Autoregressive Distributed Lag (ARDL) model to estimate the relationship among the variables, the findings from the study indicate that life expectancy is a key factor affecting agricultural sector growth in Nigeria.	James (2021)
<b>The effect of human capital on labour productivity of farms in Poland</b>	The objective of the study was to evaluate the effect of human capital on the production results of commodity farms using the Cobb-Douglas function. The results indicated that the output elasticity of the labour factor was significantly higher in the group of farms managed by farmers with higher-level education in two out of four analysed macro-regions and on a national scale. Further finding showed that human capital approximated by the level of education had a positive effect on the average and marginal productivity of the analysed farms.	Nowak and Kijek (2016)
<b>The human capital effect on productivity and the agricultural frontier expansion: evidence from Brazil</b>	The aim of the study was to investigate human capital effect on the agricultural productivity increase and on the agricultural frontier expansion. The results indicate that human capital has a positive effect on agricultural productivity and on the frontier expansion. In addition, the empirical evidences suggest significant heterogeneities with human capital affecting more the productivity in frontier regions, which is characterized by a shortage of skilled labor. However, it does not affect the agricultural area expansion in consolidated agriculture regions.	de Castro, de Barros and Menezes-Filho (n.d)
<b>Effects of human capital on agricultural productivity in Senegal</b>	The paper examined the impact of human capital on the agricultural productivity of 183 farmers in the Senegal River Valley. Using a stochastic boundary model and a simple Tobit model, and a Cobb Douglass production function, the findings showed	Ndour (2017)

Study	Methodology and Findings	Authors
	that human capital (represented by education and level of experience) has a positive impact on the agricultural productivity of farmers in the Senegal River Valley. In addition, the human capital variables also had positive effects on technical efficiency.	
<b>Schooling and Human Capital Development in Agro-Based Rural Economy in Southern Benue, Nigeria</b>	The study examined the concepts and consequences of schooling, human capital development and their implications for economic development in the agro-based rural communities of Southern Benue, Nigeria. The result shows that schooling and human capital development improves productivity and production. However, in its case, the result was paradoxical in the sense that, in spite of stimulate growth and development of the rural communities, there still exist under employment, loss of workforce, low capacity for effective production and a general disorientation of attitude from their basic means of life sustenance, which is agriculture. These have created economic and social problems instead of development in the agro-based rural community of Southern Benue.	Amali (2012)
<b>Impact of Agricultural Training on Farmers' Technological Knowledge and Crop Production in Bandarawela Agricultural Zone</b>	The objective of the study was to examine the impact of the training on technological knowledge of farmers imparted by In-service Training in Sri Lanka. About 82 farmer trainees were randomly selected for the study. Using nonparametric tests to check the differences in technological knowledge before and after the trainings (Chi-square and Wilcoxon sign rank tests), the result shows that training programs increased the usage of high yielding varieties. Further, finding reveals a significant difference on individual's gross income, meaning that with the right instructions and guidance of the agriculture instructors, farmers achieved higher yields and thereby higher income.	Rasanjali, Wimalachandra, Sivashankar, and Malkanthi (2021)
<b>Human capital development and economic growth: the Nigerian experience</b>	The study employed the augmented Solow human-capital growth model to investigate the impact of human capital development on national output, using quarterly time-series data from 1999-2012. The result shows that human capital development exerts significant positive impact on output level.	Anaduaka and Eigbiremolen (2014)
<b>An analysis of human capital development and productivity growth-case study in Nigeria</b>	The study sought to address the direction of causality between human capital and productivity growth in Nigeria. The study used data from 1970-2010 and followed the endogenous growth model which argued that technical progress through an effective labour force could lead to long-run growth within an economy. The finding shows that while productivity growth caused human capital, human capital development did cause productivity growth.	Adejumo and Adejumo (2017)





Study	Methodology and Findings	Authors
<b>Revisiting the Role of Education for Agricultural Productivity</b>	The aim of the study was to resolve the discrepancies in results of some of the earlier studies which showed that education had a strong positive effect on agricultural productivity at micro level, but insignificant or negative effect at macro-level (cross-country). Using a panel of 95 developing and middle-income countries from 1961 to 2002 that includes data on educational attainment, the finding shows that education indeed has a highly significant positive effect on agricultural productivity. Thus, the study affirms that the failure to find a positive impact of education in the international context appears to be a data problem related to the inappropriate use of enrolment and literacy indicators. The findings further revealed high returns to education for developed countries implying that education will have larger impacts on agricultural productivity in the presence of rapid technical change since it helps farmers to adjust more readily to the new opportunities provided by technological innovations.	Reimersa and Klasena (2011)

### Challenges facing Human Capital Development in the Agricultural Sector of Nigeria

Okezie (2020) and Azu (2021) enumerated the following as the challenges facing human capital development in the Nigerian agricultural sector:

1. Lack of enlightenment in mechanized farming: Mechanized farming is the use of machinery and equipment to make farm work easier and faster in order to increase farm productivity. Most of the local farmers in Nigeria are not enlightened in the mechanized way of carrying out farming which leads to poor output and in turn negatively affects productivity. According to Onwualu and Pawa (2004) in Okezie (2020), 90% of Nigeria's agricultural work is done with hand tools, 7% with animal-drawn tools and only 3% with engine powered technology. This goes to support the need for aggressive enlightenment campaign on the adoption of mechanized farming as the best option to achieve increased and sustainable agricultural productivity in Nigeria.
2. Poor infrastructural facilities: One thing is to enlighten people on mechanized farming; another is to ensure that adequate infrastructural facilities that will enhance productivity and access to products are provided. This is because creation of awareness and provision of infrastructure are concomitant forces that drive agricultural productivity. Presently, poor infrastructural facilities, especially in the rural areas remain a major challenge facing agriculture

in Nigeria. A major case of poor infrastructure in the agricultural sector is poor road network. Poor road infrastructure in rural communities does not only affect production and distribution of food, but negatively affects the development of rural areas and food security. In addition, the poor road conditions in rural communities makes it difficult for farmers to have access to interventions and amenities such as training and education, clean and affordable drinking water, health services and other forms of support.

3. Absence of information communication technology: Information technology is the use of computer or any other electronic device to create, process, store, retrieve and exchange makes the access, storage and retrieve all sorts of electronic information or data. In Nigeria and the agricultural sector in particular, unavailability of information and communication Technology (ICT) is a big challenge to human capital development. Access and application of telecommunication would lead to a healthy communication cycle between all critical stakeholders in the agricultural sector. However, the problem with ICT development in the agricultural sector in Nigeria is linked to poor power supply and lack of computer knowledge.
4. Poor Educational System: The problem of human capital development has been accredited to the deplorable state of education in Nigeria. This sector has suffered impediments ranging



from policy inconsistency, infrastructural decay, poor funding, unethical behaviour and corrupt practices. Presently, Nigerian educational system is not functional or responsive to entrepreneurship development in agriculture. The sector lacks basic infrastructure, and have left much to be desired in raising qualitative, competitive and innovative human capital. This is notwithstanding the huge amount of money being generated by the government from crude oil. Similarly, the executive capacity is low, as most of the employees have inadequate professional and requisite technical skills. It is expected that Nigeria should provide the best educational institution in Africa. Unfortunately, the reverse has been the case; hence, Nigerians are rather compelled by political uncertainties and poor quality of learning environment, to send their children to overseas countries for higher education. A situation that only the ruling class can afford, leaving the low income class (who coincidentally are those working in the agricultural sector) to their fate.

5. **Indiscipline:** Indiscipline is another impediment to manpower development caused by value re-orientation. According to Azu (2021), “in the 1960s and seventies, the target of education was to train efficient manpower to man the civil service of the newly independent state. This goal was pursued with vigor and discipline was the watchword of stakeholders of Nigerian universities. Then admission to tertiary institutions was not a matter of number, but a matter of quality of graduates to be trained” p. 152. However, the change in our value from quality education to raising fund for the universities in the late 1990 and beyond necessitated a massive increase in the number of admissions into the tertiary institutions. This outcome was more pressure on the already inadequate infrastructure which could no longer accommodate the large number of students. Incidentally, focus shifted from emphasis on quality which then weakened the disciplinary structure of the universities; thereby creating a porous system raising all kinds of unethical conducts, such as cultism, absenteeism, exam mal-practice, money for grade, sex for grade etc. Again, this has affected the quality of our university graduates and also the human capital development in Nigeria.

### **How to improve Human Capital Development in the Agricultural Sector of Nigeria**

In order to improve human capital development in the agricultural sector, the following were proposed by Okezie (2020) and Azu (2021)

1. **Creating an enabling environment:** Creating an enabling environment will positively affect the productivity of the farmers and those working in the agricultural sector. Thus, the government should ensure the provision of long and lasting infrastructure especially in the agricultural-based areas. Fixing the appalling road conditions in rural areas will directly impact the productivity of farmers; and also ease the transportation of farm materials as well as quicker access of experts and extension workers to farms. Therefore, government should channel certain amounts of the budget to fixing of roads, provision of water and power in the rural areas. This would help create an enabling environment and prevent the scenario where farmers in the process of trying to transport their products especially perishable goods run into deficit due to the bad roads. Uninterrupted power supply will also help them in making storage facilities to perishable goods. Furthermore, the government should ensure the availability of water or renewable energy. This can be achieved by building reservoirs to support irrigation planting.
2. **Proper funding of the education sector:** The future workforce is captured by providing access to education for children, youths and adults alike; and basic education increases people’s capacity to learn and to interpret information. The farmer level of education will definitely impact their output and agricultural productivity. Beyond that, good quality education and standard of school depends largely on the provision, adequacy, utilization and management of educational facilities. The issue with education in Nigeria revolves around poor funding which stems from low budget allocation. In order to resolve this, government should prioritize education because of its importance on human capital development. This could be achieved by increasing the percentage of the country’s annual budget for educational sector. Moreover, the agency responsible for implementation should endeavour to tabulate critical areas that require more attention and ensure that funds are made available to them.
3. **Adopt Mechanized Farming System:** Since it has been established that mechanized farming increases agricultural productivity relative to manual system, there is need for emphasis to be



placed on the importance of mechanized farming system. To achieve this, government through relevant agencies, such as the Federal Ministry of Agriculture and partnering with international organization should frequently hold webinars, seminars and symposiums for the farmers. The essence would be to educate the farmers on the benefits of mechanized system of farming, its impact on the economy and how it improves productivity. These webinars and seminars would be strategized in such a way and manner that ensure that the farmers are educated and taught how to apply these machines in farming. In addition, native language of the farmers could be adopted in teaching them to ensure that the illiterate ones amongst them understand as well.

4. Provision of Funding/Credit Facilities: Aside from training, it is important to state the need for government to provide funding and credit facilities for those farmers that do not have funds to enable them procure the necessary equipment for mechanized farming. Through agricultural banks, Central Bank of Nigeria (CBN) and other financial institutions, government should create access to loans or funds or even help the farmers acquire the equipment at subsidized rate.
5. Farmers should be encouraged to have computers or smart phones: The farmers are encouraged to have computers or smart phones that would allow them access to the internet. On the other hand, government in collaboration with telecommunications agencies should ensure that access to internet services gets to rural areas. This will facilitate easily interaction between the farmers and those they do business with.

### Conclusion and Recommendation:

In this paper we examined the role of human capital development on sustainable agricultural productivity in Nigeria. We adopted a theoretical review approach and supported it with empirical review of extant literature in the area. Following evidences from all the reviewed literature, the role of human capital development on sustainable agricultural productivity was established. In addition, empirical studies found that human capital development has a significant positive relationship with agricultural productivity. Therefore, in order to achieve a sustainable agricultural productivity in Nigeria, the paper recommends amongst the ones already proposed by Azu (2021) and Okezie (2020) that government should carry out a critical assessment of the Nigerian educational sector aimed at revitalizing the sector since it plays a key role in human capital development of any country.

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