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TVET PROGRAMS AND ASSISTIVE TECHNOLOGIES IN AGRICULTURE: A TOOL FOR ENHANCING THE PRODUCTIVITY OF DISABLED RURAL FARMERS IN NIGERIA

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ABSTRACT

Rural farmers in Nigeria over the years have made significant contributions to the rural economy. It is however pertinent to note that some of them are incapacitated to engage in agricultural activities as a result of disability, and this has impacted negatively on their livelihood. The aim of this paper is to unveil the numerous prospects and opportunities of TVET programs in enhancing the training and acquisition of practical skills, in the design and fabrication of assistive technologies for rural disabled farmers. More than thirty articles were downloaded from peer- reviewed journals, web search engines, and databases, using keywords related to the research topic. Findings show that physical, visual, auditory and locomotor disabilities are common among rural farmers and such disabilities are mostly caused by motor vehicle accidents, ill-health, insecurity etc. Even though these conditions can be alleviated through the use of assistive technologies, there are however barriers in capacity gaps of assistive technology workforce, lack of biomedical and rehabilitation engineers involved in the design, development, and production of assistive technologies among others. TVET formal, non-formal and informal programs provide opportunities for the training of professional biomedical and rehabilitation engineers, acquisition of practical skills to design and fabricate assistive technologies in form of tools, devices and modifications. This paper therefore, recommends that key actors of TVET programs at all levels should create the enabling environment for the design and production of assistive technologies for rural disabled farmers.

Keywords: *Assistive technologies, Disability, Nigeria, Rural farmers, TVET programs*

1. INTRODUCTION

The majority of households in Nigeria depend on agriculture as their primary source of income, it is an important sector in the country's overall economy, providing a considerable source of employment for the country's huge and rising population (Akinde & Vitung, 2020). Over 40% of the country's GDP is derived from the agricultural sector, which employs between 60 and 70 percent of the workforce (Akinsanmi, 2005). The agricultural sector, which includes crop production, animal production, forestry, and fisheries, is the backbone of the rural economy (Olukunle, 2013). As a result, agriculture has become an increasingly important weapon in Nigeria for alleviating poverty and hunger (Asogwa et al., 2020). From this activity, farmers can feed themselves as well as their families. This in turn leads to increased income generation at the household level and directly helps them sustain their livelihoods. A rise in rural income gives families the means to obtain medical services and pay for their children's education (Asogwa et

al., 2020). For the agro-processing industries, it is a major supplier of raw materials, and among the non-oil sectors, it generates the largest foreign exchange revenue (Akinde & Vitung, 2020).

Though, rural farmers in Nigeria over the years have made significant contributions to the rural economy. It is however pertinent to note that they are sometimes incapacitated and unable to engage in agricultural activities as a result of disability. In the last decade, several insecurity threats and attacks have rendered many farmers in rural areas maimed and disabled, this has impacted negatively on their livelihood. Elijah (2020) opined that the menace of killings, death, destruction and displacement has become a recurring problem in the country's rural communities, leading to food insecurity, population growth in IDP camps, disability, death, rural-urban migration, and widespread hunger and malnutrition. In Nigeria, around 25 million individuals are disabled, with 3.5 million experiencing considerable difficulty in social and physical functioning (World Health Organization & World Bank, 2011).

However, it has been noted that individuals with disabilities experience more difficulties in rural locations than they do in urban settings, when compared to non-disabled persons in developing countries, their households are less likely to always have food to eat, less likely to have attended school, and less likely to be employed (Jonckheere, 2020). They are also denied access to education, skill training, and treatment, resulting in a loss of physical ability to work and a reduction in human capital (Eide et al., 2011). People with disabilities frequently live a challenging life, which further inhibits their involvement in social and economic activities (Hästbacka et al., 2016; Akyurek & Bumin, 2017; Carroll et al., 2018). Disability also affects the farm business. According to the findings of a study conducted by Lakshmi and Paul (2018) disability had a negative influence on the agricultural business in the majority of the cases interviewed. Disabled farmers are often restricted from participating in agricultural activities, these constraints in turn, reduce their earning capacity and prevent people from being empowered, primarily in economic matters. There is a strong connection between poverty and disability, as both conditions can contribute to one another (ILO, 2011 in Soetan et al., 2019). Furthermore, particularly in rural areas, most families with disabled members are known to have a higher level of poverty than other poor households (UN, 2011 in Soetan et al., 2019).

In the opinion of Lakshmi & Paul (2018) addressing the challenges faced by people with disabilities necessitates interventions to reduce environmental and social barriers, and one of such interventions is the use of assistive technologies (ATs). Also, removing such barriers can be accomplished through enhancing accessibility and providing accommodations, but more crucially, via customized and focused disability-inclusive strategies that are led by people with disabilities themselves (Jonckheere, 2020). To a larger extent in Nigeria, rural farmers with disabilities have limited capacity to initiate such inclusive approaches, hence, it remains the responsibility of the government to design and implement appropriate programs that will help rural farmers living with disabilities. Therefore, the role of inclusivity and assistive technologies in TVET programming in Nigeria cannot be overemphasized. The productivity of rural farmers can only be enhanced when TVET programs at all levels are designed to incorporate disabled farmers, alongside special assistive technologies that will enable these rural farmers with various types of disabilities to function effectively. The aim of this paper is to unveil the numerous prospects and opportunities of TVET programs in enhancing the training and acquisition of practical skills, in the design and fabrication of assistive technologies for rural disabled farmers. This will be achieved through the review of relevant literature to understand the concept of

disability, the causes of disability, assistive technologies in agriculture and the barriers to assistive technologies, and providing an overview of TVET programs in Nigeria and the prospect and opportunities of TVET programs in the development of assistive technologies in agriculture.

2. MATERIALS AND METHODS

This paper is a narrative review that provides the current knowledge in relation to the scope of the study. Using keywords related to the research topic, more than thirty articles were downloaded from peer- reviewed journals indexed in databases such as Scopus, ResearchGate, and Google Scholar among others. The study is focused on how the productivity of rural disabled farmers can be enhanced through TVET in Nigeria. Nigeria is a West African nation with a total land area of around 923,768 square kilometers, situated between latitudes 4°N and 14°N and longitudes 2°E and 15°E (see figure 1). It is bordered by Niger to the North, Chad to the Northeast, Cameroon to the East, and Benin to the West, with the Atlantic Ocean along the Gulf of Guinea forming its southern boundary (Falola & Heaton, 2008). The topography of Nigeria consists of lowlands, plateaus, hills, and mountains. The Sokoto Plains and Chad Basin dominate the Northern region, while the Jos Plateau rises in the central part of the country, the Adamawa and Obudu plateaus are found in the east, and the coastal plains of Niger Delta respectively (Udo, 1970). The country has a tropical climate, which varies by region. The north has a semi-arid climate with lower rainfall and higher temperatures; the central region has a savanna climate with moderate rainfall; and the south has a tropical rainforest climate with high humidity and heavy rainfall throughout the year (Ojo, 1977). Nigeria has a variety of vegetation zones, such as the sparsely vegetated Sahel savanna in the far north, the grassland and scattered trees Sudan savanna, the densely woodland Guinea savanna, and the biodiversity-rich southern rainforest zones (Areola, 1982).

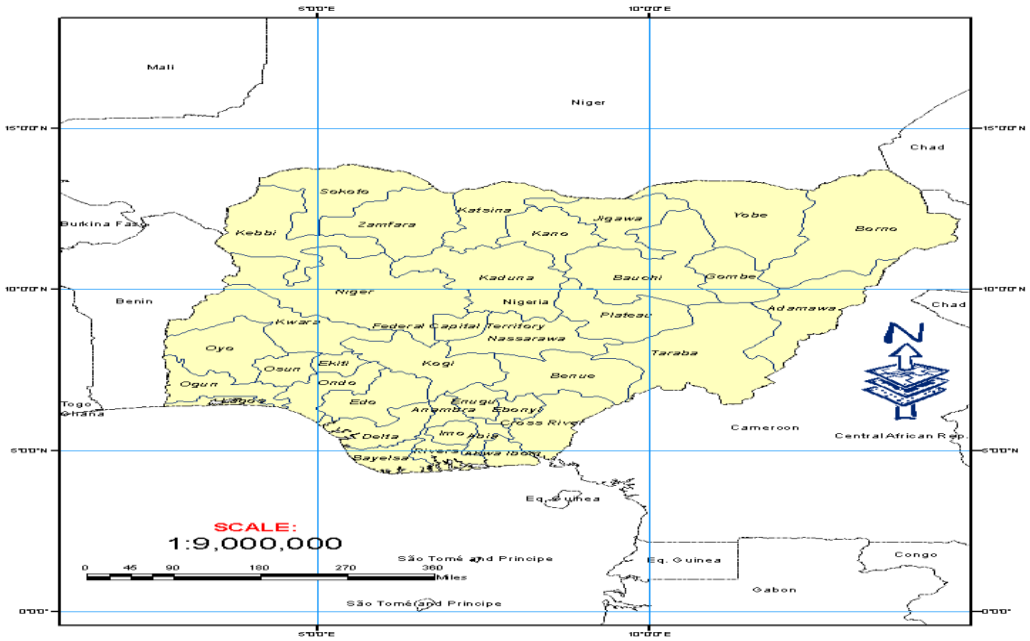

Figure 1: Map of Nigeria

3. CONCEPT OF DISABILITY

Any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being is the definition of disability (WHO, 2010). A person who is disabled is hindered due to illness, a hereditary condition, or a traumatic event that results in an exceptional and excessive dependence on other people and/or mechanical devices, either completely or partially, to carry out their daily tasks (Lakshmi & Paul, 2018). Expanding on the concept, the United Nations Convention on the Rights of Persons with Disabilities states that disability is defined as physical, intellectual, or sensory limitations that prevent full and effective participation in society (United Nations, 2006). Disability is more than just a health issue; it also refers to a range of experiences that have an impact on a person's physical well-being and capacity to participate fully in the society to which they belong (Mohammed, 2017 cited in Ogunjimi et al., 2020). People who have been recognized as having one or more disabilities such as total blindness, partial blindness, emotional disorder, deafness, partial hearing, physical handicap, speech defects, learning disability, social maladjustment, exceptional giftedness and mental retardation by an expert in any therapy discipline are also referred to as people with disabilities (Deloitte Access Economics, 2011 cited in Ogunjimi et al., 2020). Due to a partial or whole impairment of one or more organs or senses, a person with a disability is dependent on other people or mechanical equipment, and loses or reduces their functional capacity to walk, see, hear, move, lift, bend, push, or pull(Lakshmi & Paul, 2018).

3.1 CAUSES OF DISABILITY IN AGRICULTURE

Regarding fatal workplace accidents and permanently disabling injuries, farming has historically been and continues to be among the riskiest professions (Field, 2002). In agriculture, there are a variety of physical tasks that call for the use of the hands, eyes, and feet, this makes farming physically demanding and creates major challenges for people with even minor disabilities (Field, 2002). Farm work injuries range from minor bruising to traumatic limb amputations, head and spinal cord injuries, and noise-induced hearing loss. Non-farm or non-work-related injuries also harm farmers and agricultural employees. Motor vehicle and recreational accidents each account for a percentage of the disabilities that affect farm-related activity performance (Australian Centre for Agricultural Health and Safety, 2008). Farmers, ranchers, herders, and other agricultural workers in developed countries have historically demonstrated a high level of personal risk-taking behaviour as a result of mechanized farming, each year, hundreds of farm families are impacted by extreme injuries caused by entanglement in agricultural equipment (Field, 2002).

In Nigeria, the case is quite different because the practice of mechanized farming is not common. However, rural farmers suffer from various forms of disabilities that are mostly associated with poverty resulting in various types of ill health-related disabilities, insecurity and accidents. According to a survey conducted by Sango et al. (2022) in five Northern Nigerian states, the most common types of disability among agricultural workers were physical, visual, and auditory. Accidents (23.1%), inborn (21.4%), old age (4.9%), religious and traditional beliefs (4.3%), and conflict/insecurity (3.4%) were cited as the causes of the participants' disability. While more than 40.0% of participants stated additional conditions as illness-related causes of impairment, such as polio, glaucoma, leprosy, infections from snake bites, childhood diseases, meningitis and fever. Another study conducted by Mbada et al. (2020) demonstrates that among rural people in Nigeria, the male gender with low socio-economic position has a high prevalence of impairment,

with the most prevalent types being visual disability and locomotor disability. In terms of statistics on rural farmers with disabilities, it was noted that there is very little data on the experience of rural farmers with disabilities, particularly in low- and middle-income countries (Ahlenbäck et al., (2020). Additionally, farmers with disabilities were not mentioned and examined in any of the research on agriculture in Nigeria (Sango et al., 2022). However, it is believed that people with disabilities are innovators who possess essential knowledge that can help their societies. Nonetheless, institutional impediments frequently prevent them from contributing to household income (Jonckheere, 2021).

3.2 ASSISTIVE TECHNOLOGIES AND AGRICULTURE

Assistive technology is an umbrella term for assistive products and their related systems and services. Assistive technology is broadly described as any technology that enables a person with a disability to carry out a functional activity, its main purpose is to enhance the functional outcomes of people with impairments (Grisso et al., 2010). There is also a description of assistive technology for individuals with impairments in terms of the environment. For example, people gain from the use of assistive technology in the workplace, enhancing people's functional abilities through the use of tools and other devices. It qualifies individuals for various job opportunities as well as allows them to pursue occupations following accident or disease (ACAHS, 2008). Assistive technologies in agriculture are techniques, devices, instruments, modifications (farmers with disabilities also attempt to modify their farm machinery or create a self-designed device to get beyond the limitations imposed by their conditions (Mathew 2011), procedures, and specialized scientific knowledge and engineering expertise that enable a person to do vital duties in an agricultural setting (ACAHS,2008). Such assistive technologies may be created to enable a person with a disability to perform a job; they may also be created for the general public, but they are especially important for people with disabilities since they can change how a task is performed (Elango et al., 2020).

There are several new assistive technologies in the market that enable farmers with disabilities to perform fieldwork in a manner similar to that of an able-bodied person. (Lakshmi & Paul, 2018) . To achieve the overall goal of assistive technology, a wide range of devices, services, strategies, and practices are designed. An assistive technology system involves the use of low- or high-tech devices, commercially available or custom-made (Grisso et al., 2010). The following are some examples of assistive technologies: Aids for vision and hearing (sensory devices for the blind, visually impaired, deaf etc.), personal mobility devices (canes, wheelchairs, walkers, mobility scooters, and so on), equipment for livestock handling, seating and positioning, vehicle or equipment modification (extra or modified stairs for farm vehicles and equipment, motorized lifts, hand or foot controls, hydraulic or electronic controls, hitching assist devices, and so on)(Lakshmi & Paul, 2018). ATs serve as a bridge, allowing farmers with impairments or primary injuries to remain productive while lowering the risk of additional injuries (Anuradha& Reddy, 2013). Farmers can make necessary adjustments to their work to resume their primary employment of farming even after suffering from a disability through Ats (Friesen et al., 2010; Mathew, 2011). As a result, access to assistive technologies that will assist farmers in regaining the greatest level of freedom possible, earning money and becoming economically empowered is critical (Field & Jetta, 2007). Assistive technology in a nutshell, makes it possible and encourages the inclusion, involvement, and engagement of people with disabilities, older people, and those who have chronic illnesses in families, communities, and all facets of society, including the political, economic, and social spheres (WHO/UNICEF, 2022). People with

disabilities can participate in agricultural activities, but they require access to agricultural training and assistive technologies to enhance their engagement (Soetan et al., 2019).

3.3 BARRIERS TO ASSISTIVE TECHNOLOGIES

Access to assistive technology is hindered by several factors, including lack of knowledge and affordability, a lack of services, poor product quality, variety, and quantity, and difficulties with supply chain and procurement, additionally, the workforce for assistive technology has capacity gaps and the industry has a low policy profile (WHO/UNICEF, 2022). Aside from direct service providers, there is a shortage of professionals who play critical roles in the assistive technology system. Biomedical and rehabilitation engineers, for example, are involved in the design, development, and manufacturing of assistive products (WHO/UNICEF, 2022). Boughton &Fragar (1997) identified a few potential impediments to providing effective rehabilitation services to rural residents. These are some examples: educational opportunities are limited (rural educational institutions frequently lack suitable facilities, trained personnel, and specialized educational programs and services), and Inadequate data (limitations in understanding the needs restrict the creation of appropriate action plans). There are other limitations connected with a limited modification of assistive devices, appropriate for use by farmers and agricultural workers (ACAHS, 2008).

4. AN OVERVIEW OF TVET PROGRAMS IN NIGERIA

Nigerian National Policy on Education defines technical and vocational education as “a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and allied sciences as well as the acquisition of skills, attitudes, knowledge, and understanding about diverse jobs concerning different spheres of economic and social life” (NPE, 2014 cited in Akinde & Vitung, 2020). In Nigeria, TVET programs are run by the federal, and state governments, as well as private organizations (Osidipe, 2017) . TVET programs are classified as formal, non-formal and informal In Nigeria, the formal Technical and Vocational Education and Training (TVET) system is managed by institutions such as private and public technical colleges, mono and polytechnics, Vocational Enterprise Institutions (VEIs), and Innovative Enterprise Institutions (IEIs), all of which are overseen by the National Board for Technical Education (Osidipe, 2017;Akinde & Vitung, 2020). After completing basic education at the Junior Secondary School level, the formal TVET system begins, based on their results in the Junior Secondary School final exams, students have the following options: Senior Secondary School, Technical College, Out-of-School Vocational Training, Apprenticeship Scheme, Vocational Enterprise Institutions (VEIs), and Innovation Enterprise Institutions (IEIs) (UNESCO-UNEVOC, 2012).

In Nigeria, the National Board for Technical Education, in partnership with the National Commission for Mass Literacy, Adult and Non-Formal Education (NMEC), and the National Directorate of Employment (NDE), provides non-formal Technical and Vocational Education and Training (Akinde & Vitung, 2020). The non-formal system, which began operations in 2007/2008, consists of out-of-school vocational training, apprenticeship schemes, Vocational Enterprise Institutions (VEIs), and Innovation Enterprise Institutions (IEIs) that are supported by the private sector and are occupation-specific vocational institutions, whereas the informal system is primarily based on apprenticeships(UNESCO-UNEVOC, 2012) **.** Traditional apprenticeships provide the opportunity to learn skills that can be applied in the informal sector(Osidipe, 2017). TVET is known as ATVET in agriculture, and it is defined as "the

educational process involving, in addition to general education, the study of technologies and related sciences, as well as the acquisition of practical skills, attitudes, understanding, and knowledge relating to occupations" in agriculture (Jones, 2016). Currently, formal agricultural training is offered in Nigeria through Federal and State Colleges of Agriculture, universities, mono or polytechnics and other specialized training providers. Agricultural and rural training is offered through private organizations, which might be either innovative enterprise institutions or vocational enterprise institutions. In addition to these institutions, there are numerous other organizations involved in informal agricultural and rural training, such includes, national and international non-governmental organizations, international donor organizations, university institutes, and various programs and initiatives (Akinde & Vitung, 2020).

4.1 PROSPECTS OF OPPORTUNITIES OF TVET PROGRAMS IN THE DEVELOPMENT OF ASSISTIVE TECHNOLOGIES IN AGRICULTURE

TVET is described as an essential platform for acquiring the skills and knowledge necessary for employment and a sustainable way of life (Maclean & Wilson, 2009). Vocational/technical education is intended to give people the chance to become more proficient in general, particularly regarding their current or prospective employment (Okoye & Arimonu, 2016). To increase productivity, working conditions, and the promotion of decent employment in the informal economy, the ILO's Decent Employment Agenda recognized the development of relevant skills as being essential (Adams, 2008; AFDB & OECD, 2008) . There is a widespread perception that TVET gives the necessary employability skills and attitudes for effective workplace performance (Osidipe, 2017). Quality TVET can help to improve skill acquisition and lifelong learning to promote inclusive economic growth, employment and decent work, poverty alleviation, social well-being, gender equality, and lasting learning (AFDB et al., 2017). The World Bank policy of 1991 emphasized the development of a skilled labour force as an important aspect of every nation's development, the most successful and efficient strategy to develop workforce skill levels is to involve employers of labour, the private sector, and training facilities (Okoye & Arimonu, 2016).

Globally, important changes are being implemented in several nations due to a growing realization of the critical role that higher technical skills play in promoting competitiveness, social inclusion, decent employment, and poverty reduction (Osidipe, 2017). Until recently, technical and vocational education was viewed as the last resort for those who failed in the more academic streams, technical and vocational education, however, has taken on a significant educational function in light of the changing role of work and its effects on both national and global economies (Hughes, 2005). In the opinion of Okoye & Arimonu (2016) many of the so-called "expatriate engineers" working on Nigeria's roads and collecting large sums of money in dollars are graduates of vocational colleges, however, technical and vocational education in Nigeria is rarely taken seriously, and no country can wage war without an army. Therefore, the desired development in Nigeria can only be achieved when TVET programs at all levels are effective and efficient. Considering the prospects of TVET, it is obvious that TVET programs at all levels in Nigeria offer numerous opportunities that will provide assistive technologies in agriculture especially for the disabled rural farmers.

4.2 OPPORTUNITIES OF TVET FORMAL PROGRAMS IN NIGERIA

The goal of junior secondary education is to give students the practical abilities and capacities for critical and creative thought that will help them make good decisions, solve difficulties, and

carry out practical tasks (Federal Ministry of Education Nigeria, 2012). The curriculum at the junior secondary level is designed to combine academics and pre-vocational learning to give students general education and career choices as well as to spark early student interest in pre-vocational abilities (Osidipe, 2017). Vocational courses are available at the junior level in areas such as carpentry, dressmaking, computer science, welding and fabrication, etc. (Akinde & Vitung, 2020). The TVET program in the secondary school curriculum, particularly at the lower secondary school level, provides a framework for developing foundation skills that subsequently grow into transferable abilities and, finally, technical and vocational skills (UNESCO, 2012).

At higher levels, TVET programs such as; engineering courses (mechanical, agricultural, electrical electronics, foundry, metallurgy and computer engineering) and other related technical and vocational courses such as; building and woodwork technology, mechanical technology and electrical electronics technology. In addition, agricultural related courses are equally taught in Federal and State Colleges of Agriculture, universities and other specialised training providers. Therefore, about assistive technologies, formal TVET programs provide the opportunity for students at all levels to be educated, trained and acquire skills in different aspects of the technical and engineering profession. According to (ACAHS, 2008) agricultural engineers have a thorough understanding of agricultural work sites, equipment, and procedures, and because agriculture is so diverse, these engineers have experience building one-of-a-kind solutions that are specific to agriculture. In the same manner, knowledge and skills acquired in biomedical and rehabilitation engineering will provide a platform for the design, development and production of assistive technologies in agriculture. With respect to VEIs and IEIs, students can be trained to acquire skills and become entrepreneurs in all vocational and craftsmanship to produce assistive technologies in indigenous fabric making through welding, sheet metal works and agriculture among others.

4.3 OPPORTUNITIES OF TVET NON-FORMAL PROGRAMS

The majority of the programs implemented in Nigeria's non-formal TVET programs target adults, adolescents, and early school leavers and typically lack any entry-level prerequisites. 'Recognition of Prior Learning' (RPL) serves as the foundation for non-formal training in the many programs that are being pursued, participants gain skills that enable them to go forward in life while continuing to learn throughout their lives (Akinde & Vitung, 2020). A few of the programs available are livestock management, welding, and fabrication. However, it is important to highlight that in Nigeria, persons between the ages of 15 and 34 experience the highest rates of underemployment and unemployment (Osidipe, 2017). The national unemployment rate of 14.2% is significantly higher than the 7.2% global unemployment rate for the same period reported by the International Labour Organization (National Bureau of Statistics, 2017). Nigeria's high unemployment rate has been related to a lack of relevant practical skills, which can only be addressed through skill acquisition (Dike, 2009).

Additionally, Nigeria has a large non-formal TVET sector that offers all types of training that are provided outside of formal TVET institutions, as well as several unrealized potentials and prospects (Bello & Muhammad, 2021). Since TVET non-formal programs target adults, adolescents and early school leavers for training and skill acquisition in areas such as welding, art and craft and fabrication. This means that TVET non-formal programs can empower the youth for creative problem-solving ability, through specialized skills acquisition programs, the key actors in the non-formal TVET programs can train people living with disabilities in rural

area to acquire skills for the development of assistive technologies, this will enhance social inclusion, poverty reduction, and decent employment. Given that the majority of technical and vocational training participants live in rural and agrarian areas, these programs will teach skills for specific needs in the participants' immediate environment (Osidipe, 2017).

4.4 OPPORTUNITIES OF TVET IN-FORMAL PROGRAMS

Apprenticeship schemes are typically used to implement informal TVET programs (Bello & Muhammad, 2021). In Nigeria, many primary school graduates don't continue to lower secondary school, only 3.27 million students attended junior secondary school in 2009, despite a projected 9.27 million students enrolling (Osidipe, 2017). According to existing data, only slightly more than half of the pupils who complete primary school in Nigeria continue to the junior secondary level (Federal Government of Nigeria, 2009). Nearly one in four primary school-age students drop out and are unable to continue their education in a formal system (Akinde & Vitung, 2020). Furthermore, the bulk of Nigeria's out-of-school children and adolescents reside in impoverished rural communities (Osidipe, 2017) . Because of this, they can only pursue an informal training path, and apprenticeships continue to be the most crucial approach to building skills (Akinde & Vitung, 2020). As a self-financed system, apprenticeships typically exhibit considerable flexibility, mix learning and work, are available to young people with little or no prior training, and are related to the labor market in ways that the formal training systems find challenging to handle (Akinde & Vitung, 2020). Apprenticeship is a contractual agreement between a master-craftsman (the trainer) and the apprentice (the learner) in which the apprentice is trained for a set period on a specific work procedure through practical experience, it is a type of workplace learning that allows the apprentice to gain on-the-job experience through training (Akinde & Vitung, 2020).

Additionally, Bello & Muhammad (2021) stated that a large number of Nigerian adolescents who are not able to enrol in secondary or higher education institutions work for others or work for themselves in the informal sector. Attesting to this view, Osidipe (2017) argued that the formal sector has failed to provide job prospects for a growing number of workers entering the labour market, which has led to the majority of young people working in the informal sector of the economy. Traditional apprenticeships offer the major kind of training to employees in the informal sector and are likely to outnumber other suppliers of vocational training by a very substantial margin, although there are very few official statistics on them (Akinde & Vitung, 2020). The informal sector is characterized by low productivity, low skill requirements, unsafe working conditions, poor quality products, lack of access to social protection, and lack of technical and vocational skills. It also has (Osidipe, 2017). Harnessing the potentials of out- of-school children through informal apprenticeship training in areas of carpentry, welding, fabrication and related areas will be of great advantage to the informal sector in terms of manpower development.

5. CONCLUSION

Despite the notion stated in the United Nations Charter that all members of the human family have inherent dignity and the equal and absolute rights that form the cornerstone of freedom, justice, and peace in the world, It is unfortunate that some Nigerians still experience extreme poverty as a result of their disability (Ogunjimi et al., 2020). Due to their impediment, people with disabilities are sometimes seen as being unproductive. For equitable rural economies to flourish, the barriers to the productivity of rural farmers must be eliminated, and this can be

achieved through the use of assistive technologies. All technical and vocational education and training programs' main objective is to equip students with the knowledge, skills, and attitudes they need to work in a particular trade or occupational field (ILO, 2005). The formal, non-formal and informal programs are saddled with this responsibility and can utilize the numerous unemployed and underemployed youth population and out- of-school children to acquire skills related to assistive technologies; this will help in reducing unemployment, inequality and poverty, and promotion of growth. The TVET system in Nigeria has to be repositioned to better serve the needs of rural farmers with disabilities by utilizing assistive technologies. Therefore, vocational training and skill acquisition to produce assistive technologies especially for rural disabled farmers is paramount.

6. RECOMMENDATIONS

Having unveiled the barriers limiting rural disabled farmers from being productive, and the prospects and opportunities TVET programs in solving these challenges. This paper therefore recommends that key actors of TVET formal programs should create the enabling environment for the training of biomedical and rehabilitation engineers, for the design and production of assistive technologies for rural disabled farmers. In addition, non-formal and informal TVET programs should be sensitized about assistive technologies and the need to establish skill acquisition programs related to the design and fabrication of assistive technologies for disabled rural farmers in Nigeria.

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