

**GREENING TECHNICAL VOCATIONAL EDUCATION AND TRAINING (TVET) FOR  
COMBATING CLIMATE CHANGE AND PROMOTING SUSTAINABLE DEVELOPMENT IN  
NIGERIA**

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**ABSTRACT**

*The aim of this paper was to present the global situation of rising climate change phenomenon and it's the socio-economic impact to the world and Nigeria in. It specifically identified human activities such as uncontrolled use of fossil oil promote carbon emission and mass deforestation as major cause of climate change. The devastating consequences of climate change was also discussed and the justification for mitigating it. The paper identified Technical Vocational Education and Training (TVET) as an agent of change in combating climate change through greening TVET, which is a potential source of meeting Sustainable Development Goals (SDG). The objectives of SDG are aimed at preventing poverty and protecting the planet. Greening TVET would involve training students on skills and knowledge that can reduce carbon emissions*

***Keywords: Carbon emission, Climate change, TVET, Greening TVET, Sustainable Development Goals***

**INTRODUCTION**

A casual observation of the weather pattern in Nigeria shows how abnormal the weather has been lately. This is evidenced by higher temperatures, variable rainfall, rising sea level and flooding, draught and desertification Haifa, (2019). This is mostly attributed to atmospheric change linked with the interactive effect of the earth system, such as the oceans, ice masses in the northern and southern hemisphere, which together forms a balanced the earth's system (World Bank 2021). The effects of global warming are increased heat, reduced agricultural yields, poor health and poor water quality. Any disruption in the system influences the ecosystem in such a way that causes atmospheric changes. The effects of climate change leads to global warming are increased heat, reduced agricultural yields, poor health and poor water quality.

Climate change is a global concern, and a great threat to the survival of the world as a whole. Climate change according to Badaru, (2020) is the resultant effect of pollution of the atmosphere when there is excessive emission of Green-House Gases (GHG). This is observed by a significant variation of average weather conditions becoming warmer wetter, of drier. Climate change is therefore an outcome of the burning of fossil fuels such as coal, oil and natural gas which are the major source of energy for many countries. Primarily industrialization, power plants, plus combination of oil drilling, farming and deforestation are the major source of the environment. The environment can be defined as the natural features of a place like weather, land or plants. Environment pollution and climate change have negative affect on the sustainable economic activities across the world, with Nigeria being one of them. The biggest pollutants in the world according to an African Development Bank Report (ADB, 2017) are:

China - - - - -10,065 million tons  
USA - - - - - 5.416     ".     "

India - - - - -	2.67	“	“
Japan - - - - -	1.16	“	“
Germany - - - - -	759.	“	“

The driving force behind the activities of these countries is manufacturing, especially energy to power the industries. Energy is one of the essential requirements for survival and the demand for energy keeps going up and accompanied by environmental issues of pollution and gas emissions which cause climate change. Climate change in turn leads to global warming. Equally responsibility for climate change, is the indiscriminate cutting down of forest for farming or for energy in most developing countries. The effect of climate change is depletion of the ozone layer which causes higher temperature, draught, rising sea levels, flooding and health related issues (Jackson, 2024). The Secretary General of the United Nation on the 5<sup>th</sup> of April 2022 presented a gloomy picture of global warming and warned that it has reached a tipping point which could be catastrophic to the world.

### **Climate Change Phenomenon in Nigeria**

Climate change in Nigeria could be noticed especially by the erratic weather patterns. Recent weather pattern is dominated by high temperature, inconsistent rainfall, falling water levels in rivers and lakes and draught in the north, flooding and rise in sea level in its southern region. This phenomenon of climate change has created many problems in agriculture, health, economy and security among many other social problems. Climate change has forced migration to greener environments, with attendant conflict on land. Many people have also lost their source of livelihood due to draught around the Lake Chad Basin. This has created severe food insecurity in the region on fisheries and livestock rearing and other wetland economic activities (FGN, 2021). The problem of kidnapping and banditry in the northern region could therefore be traced to climate change. Of great consequence of the problem of insecurity is the threat to the unity and survival of the nation. There is no doubt that the devastating effect of climate change could have significant effect on the socio-economic and environmental development of Nigeria and the need to mitigate it becomes imperative.

The drivers of environmental pollution in Nigeria which in turn promote climate include bush burning, indiscriminate logging, oil spillage and gas flaring in the delta region, inappropriate disposal of oil are among others. Bush burning is an age old tradition that is very hard control. Inspire of several advocacy, bush burning still persist. Logging for timber is also very rampant, and the outcome of such logging is deforestation which promotes climate change. With rising cost of energy in Nigeria, many families have resorted to the use of charcoal as a source of energy, which is further causing more deforestation than ever witnessed before. Oil spillage and gas flaring in Nigeria has gained worldwide attention because the devastation of the oil rich Niger Delta region of the country. Not only has oil spillage destroyed the eco system of the region, agricultural activities are further disrupted as a result of the problem.

To mitigate the effect of climate change, the Nigerian government developed a comprehensive strategy policy called the Nigeria Climate Change Policy Response and Strategy (NCCPRS). The main objective of the policy is to promote low-carbon, high-growth economic development and build a climate-resilient society (FGN, 2012). As a leading nation in Africa, and the West African sub region the NCCPRS states its commitment to the achievement of effective agreement on climate change. The plan of the policy covers Agricultural, Forestry and other Land Use, Energy, Health, Industry, Oil and Gas, Transport, Waste, Water and Security. While the policy identified several strategies and priorities, the review of the policy in 2021 still do not is mention of education as a one of them. Education is important because in a knowledge-based society we now live, Nigeria must educate its young population on the importance of maintaining a balanced

ecological environment. Modern technology and innovations can therefore be deployed to help in addressing the issues of climate change. This could be achieved through moving towards a low carbon climate resilient technologies such as solar, wind power energy generation, energy-efficient light bulbs, draught-resistant crops, water harvesting technologies. The main thrust of technology should therefore be to move the country's economic activities from natural resources economy to a knowledge based method of development that is low-carbon and innovative technologies. This calls for engaging TVET in mitigating climate change

### **The Role of TVET in Combating Climate Change**

Particular interest in this paper is the role of TVET in controlling the tide of climate change in Nigeria. The major drivers of any economy is a skilled workforce, of which TVET is the main provider of such workforce. The existing economic production system must therefore shift to a greener economic model that can create green jobs and green occupations. Green jobs and occupations are dependent on sourcing raw materials and processing them to the final stage. The demand for raw materials for industrial production has led to massive depletion of natural resources. Furthermore, climate change has contributed to the problem economic growth in and unemployment (Minh, Huy, Minh, Cong, Erkelens, & Marteneit, 2018). This reinforces the fact that jobs are dependent on the environment as the world data below indicates (ILO, 2014).

- 40% of world employment depends on ecosystem services i.e. agriculture and tourism
  - 33% increase in greenhouse emissions worldwide that caused climate change
  - 62% increase in material extraction
  - 72 million fulltime jobs will be lost by 2030 as a result of lost hours due to heat stress
  - 23 million would be lost each year due to natural disasters resulting from human activities
- TVET plays an important role in making transition to a low carbon economy and climate resistant society. It holds its traditional role of preparing learners for occupational fields. However, these traditional roles are facing new expectations which hitherto were non-existent. There are therefore suggestions for adjusting TVET curriculum to the level of climate change policy (Setaiwan, 2017). The policy recommends for TVET to cover a wide range of sectors and skill sets that goes beyond industrial manufacturing, but also includes the provision of ecological oriented courses on sustainable and wider environmental courses. It further suggest for emphasis on renewable energy generation. These skills are needed to operate and maintain new technologies like electric cars, ecodesign and low energy solutions, energy saving building designs. create a more sustainable society, where there is need to develop and promote new technologies that can lead to avoiding as far as possible they are of irreplaceable raw materials, recycling of waste, minimizing energy and avoiding pollutions of the environment. Investing in green TVET helps production to advance to more environmentally friendly practices. Furthermore, a green worker is a more employable worker. As such, a green worker enhance the profitability of the organization. There is a great potential for job creators by creating skills needed in the new green sector. There are many skills and environmental consideration for growing TVET in various specialties such as:
- Energy Sector: Training should focus on the application of energy effectively and renewable energy.
  - Manufacturing Sector: Keep away harmful pollutants, and waste management
  - Construction Sector: Land use and waste production and pollution
  - Food Sector: Solid waste and waste water are major issues in the food industry

Majumdar, (2014) suggested some strategies that can facilitate transition to a green economy, some of which are:

- Adapt to the evolution of employment sector
- Prepare teachers and trainees who can effectively transfer their knowledge and skill
- Expand the current scope of TVET and delivery mechanism
- Allow the workforce to adjust to the technological shift

How the workforce adapts to the methods of protecting climate change would depend on the development of green skills in TVET institutions. From all indications, the existing TVET framework in Nigeria does not seem to address these issues. TVET has a great role to play in protecting the environment, as it provides the bulk of skilled workers who must meet up with the requirements of new skills for sustainable development. TVET is also a vital tool for a sustainable transition to climate resistant economy and greater resource efficiency. It is therefore expected to play a key role in preparing learners for emerging green jobs and providing them with green skills and competencies. However, while the demand for green skills is growing globally, TVET system in many countries like Nigeria are still struggling to reform and cater for their needs.

Greening TVET is therefore a key element in sustainable development, and should a priority of educational planners.

### **Sustainable Development**

Sustainable Development is the universal call to end poverty and protect the planet (WHO, 2015). It is a call to action to end poverty and inequality protect the climate and ensure that all people enjoy health, justice and prosperity. It encourages the gradual change in the way we develop and use technologies. The six principles for sustainability are:

- Energy saving
- Improve resource efficiency
- Sustainable material choice
- Environmental product declaration
- Constant research and innovation
- Corporate social responsibility

Sustainable economic growth as outlined in the 2050 Agenda for Sustainable Development can be achieved when the world of works shifts effectively to significantly impact of global markets. According to ILO, 18 million of the projected new jobs are related towards renewable energy efficiency and other low carbon industries. Green jobs are needed across several sectors of the economy like manufacturing, energy, iron and steel, food and construction sectors. Rapid environmental changes are creating fundamental transformation that has dramatic input on the management and organization of TVET. There is therefore the need for TVET institutions to strategize with regards to planning, specifically the need to address the issues on jobs that will soon become obsolete because the jobs that most industries will require green jobs.

### **Greening TVET for Sustainable Development In Nigeria**

Greening TVET is described as the strategies of sustainable practice in TVET that facilitates the transition to climate resistant societies, and greater resource efficiency. TVET is expected to play a key role in preparing learners for emerging green jobs and providing them with green skills. However, TVET systems in many countries like Nigeria are still struggling to respond to these needs. Greening is the process of pursuing knowledge and practices with the intention of becoming more environmentally friendly, by enhancing decisions and lifestyles in a more responsible manner. Greening leads to the protection of the environment and sustainability of natural resources for current and future generations (Manjubar, 2014) Green skills are knowledge, abilities, values needed to live and support sustainable and resource-efficient society. Green jobs on the other hand are jobs that contribute to restoring environmental quality, while also meeting

longstanding demands and goals of the labor movement, such as labor, wages, safe working conditions and workers' rights (UNESCO, 2017). The main concern for practitioners in TVET is the transition to a green economy and the anticipated changes. There are projections that half of the world's workforce would be affected by transition to a greener economy. These changes would be in the new markets to be created around new technologies, new jobs will be created to meet the needs for environmentally friendly goods and services and new occupations will be created to meet the expertise required by the green economy i.e. Wind energy mechatronics. The implications here is that certain jobs will be greener, substituted or eliminated.

The International Labor Organization provides a list of core skills necessary for green jobs:

- Adaptability and transferability skills to learn and apply the new technologies
- Strategic leadership skills to help policy makers and business development cleaner production
- Environmental awareness and willingness to learn about sustainable development
- Coordination, management and business skills to access, interpret and understand both the need for change, and the measures required
- Entrepreneurial skills to seize the opportunity of low carbon technologies
- Innovation skills to identify opportunities and create new strategies to respond to green challenges
- Communication and negotiation skills to discuss conflicting in complex contexts
- Marketing skills to promote greener products and services
- Consulting skills to advise consumers about green solutions
- Networking IT and language skills to perform global markets

The implications for green skills suggest for curriculum change. There is the need to integrate green skills into existing TVET curriculum. This would involve adding skills that are cross-occupational at the same time add green skill requirements for specific occupations, and then develop training programs for new green occupations (UNESCO, 2017). The methodology for implementing a green curriculum would need the use of practice based, to find out practical ways to make products and provide greener services. This would also involve project based activities and cross disciplinary learning and learning by doing.

### **Transforming TVET to meet the needs of a green economy**

The greening of economies is creating unprecedented shifts in skills requirements and these changes include shifts in the way jobs are performed. This calls for retraining and upskilling workers so that they can be employed in other sectors. Some skill shortages may occur because there are few people trained for the jobs, thus leading small number of trained and qualified personnel. TVET comprises training and skill development relating to a wide range of occupational fields in production and services. Indeed, TVET as part of lifelong learning can take place at all levels of education. It includes work-based learning and continuing training and professional development. TVET can therefore contribute to sustainable development by empowering individuals and organizations and fostering employment and lifelong learning. It can also promote inclusive and sustainable economic growth and social equity and environmental sustainability.

### **SUMMARY**

Many studies have shown that the world is at the tipping edge of climate change. The effect of climate change is real. In order to address this problem, the sustainable development plan must be implemented. This would require the development of green skills and green jobs. TVET being the main supplier of technical manpower must align with these objectives. This requires lifelong learning to train and upskill the workforce to meet the job requirements of a digital age, by

applying digital competence. At present, there appears to be no evidence of greening in the Nigerian TVET curriculum, hence the need for policy, planning and implementation of greening TVET.

## **RECOMMENDATIONS**

The following recommendations are hereby made:

1. Government must promote skills that can promote transition to a greener society, manpower is an essential instrument for the change towards a green society.
2. There must be a deliberate effort to train TVET teachers and trainees in fast growing green sectors of the economy.
3. Current TVET curricula does not meet the requirements of combating climate change so there is need for curricula review by government to offer courses in energy-saving and cleaner technologies
4. There is need to match classroom learning and work place experience through internship.

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