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The Effect of Clima-Tech on Sustainable Power Supply in Nigeria

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Abstract

The study “Effect of Clima-tech on sustainable power supply in Nigeria” tends to proffer solution on the challenges limiting sustainable power supply in Nigeria. To achieve this aim, the work classifies the types of power supply available in Nigeria, observes the challenges facing the sector. Of the various power supplies available in Nigeria, this work examines climate supported power supply. Among other things the work observes that climate, Technology and Managerial ability are the major challenges facing sustainable power supply in Nigeria. Climate play a major role in the production of some power supply, therefore such power supply in this work is regarded as climate supported power supply. The effectiveness of such power supply depended on the prevailing climatic condition of the area. Among other things suggested is the transporting of freshwater from the South to the North where hydroelectric powers are situated. This kind of technology will definitely address the issue of low volume of water in the dam for adequate power production. Other suggested solutions include tapping underground water to recharge the dam and to seed cloud for rainfall to occur in the hydroelectric power region. It is also observed that Nigeria lies within the tropics, which is a favourable climatic condition for solar power production and supply because the sunshine duration is always long. It is therefore suggested that cheap but powerful solar boxes should be used in providing power for the people. Geographically, speaking location of Nigeria favours the harvesting of wind energy. The Northern part of the country with few and scanty vegetation, to the roughed middle belt of Nigeria, with hills and mountains, which is breeding ground of wind current between the foot of the mountain and the top of the mountain (Katabatic wind) harness of wind energy will add to the available power in store for distribution. In the South, the land and sea breeze, the open Atlantic Ocean can always provide windy condition for wind farm. This paper opines that if this natural source energy are properly harnessed and properly managed, the issue of inadequate power supply will be a thing of pass.

Keywords: Climat-tech, climate supported power supply, management, technology, Nigeria, power supply and rainfall

1. Introduction

God injunction to Adam as related to humans in Genesis 1:28 is. Further, God blessed them, and God said to them; “Be fruitful and become many, fill the earth and subdue it, and have in subjection the fish of the sea and the flying creature of the heavens and every living creation that is moving on earth”. Having in subjection every living thing on earth implies that man can also influence the habitat and the environment of all living things to his benefit. Man shows this God given authority through the application of his power, experience and knowledge to solve problems facing human and to harness the free gift of nature bestowed to human.

The entire continent of Africa is regarded and truly is made up of developing nations. This is because some basic

amenities are lacking and are still seen as luxury in Nigeria.

Nigeria, like many other countries, faces significant challenges in maintaining a sustainable power supply due to various factors, including climate change impacts. The concept of Clima-Tech, which involves harnessing climatic resources to mitigate the adverse effects of climate change, offers potential solutions to address these challenges. This study aims to investigate the impact of Clima-Tech interventions on enhancing sustainable power supply in Nigeria, particularly focusing on innovative approaches that utilize climatic resources for power generation and distribution.

Nigeria is a nation rich in diverse climatic resources; however, she is grappled with the interplay between climate change impacts and sustainable power supply (Urban & Mitchell, 2011). The pursuit of innovative solutions becomes imperative amid the escalating challenges posed by erratic weather patterns, dwindling conventional energy sources, and the urgent global need for emission reduction (ESMAP, 2011). The concept of Clima-tech, harnessing climatic resources to address climate change impacts, emerges as a promising avenue for mitigating these challenges and fostering sustainable power supply in Nigeria.

Despite its immense potential, Nigeria is faced with huge challenges in its quest for sustainable power supply. Climate change induced factors, such as irregular rainfall affects hydroelectric power supply, and extreme weather events disrupt energy infrastructure, thereby, exacerbating the nation's energy deficit (UNFCCC, 2010).

Climate Change and Power Supply in Nigeria: Nigeria's power sector is highly vulnerable to the impacts of climate change, experiencing disruptions in energy generation due to factors such as irregular rainfall patterns affecting hydroelectric power, temperature variations impacting thermal power generation, and extreme weather events damaging power infrastructure. These challenges have contributed to a persistent energy deficit, hindering economic growth and societal development.

Clima-Tech Interventions in Sustainable Power Supply: Clima-Tech offers a range of interventions that can positively influence Nigeria's power supply sustainability. For instance, innovative methods such as utilizing water transfer from different basins to replenish shrinking rivers can enhance hydroelectric power generation. Furthermore, leveraging solar power technologies tailored to Nigeria's climatic conditions can provide decentralized and reliable energy sources, reducing dependence on conventional fossil fuel-based power generation.

Impact Assessment and Case Studies: This study will conduct a comprehensive impact assessment of Clima-Tech interventions on sustainable power supply in Nigeria. It will include case studies analyzing successful projects where climatic resources were effectively utilized for enhancing power generation and distribution. Examples may encompass initiatives involving water resource management, solar power integration, wind energy harnessing, and other innovative Clima-Tech approaches implemented within Nigeria's context.

Power supply which is a catalyst for development is not adequate in Nigeria. It is so bad that some states in Nigeria have never experience uninterrupted power for a day in this twenty first century. As at 2023 July Nigeria cannot afford 72 hours of uninterrupted electricity or power supply. The effect of this is overwhelming, starting from high cost in Nigeria to unproductivity in the industries and high cost of living. Lack of electricity and the continuous surge in the price of cooking gas has driven Nigerians to rely on wood and charcoal as a cheap source of fuel for cooking. This practice is not only harmful to health and the environment but also encourages deforestation which is the major cause of global warming; in addition, aside climate and environmental concerns, the peace and overall well-being of Nigerian residents have been grossly compromised due to lack of power (Vanguard, 2022).

It has been observed in the tropical Sub-Sahara that power supply is key to development, but its unreliability in supply especially in Nigeria is a hiccup to development. No country in modern world can develop without robust electricity supply.

Many scholars, government agencies and stakeholders have tried to revamp power sector in Nigeria to no avail. Untold amount of fund has been invested to the power sector with the aim of improving the sector, however the result was little or nothing to celebrate about. Mukhtaar stated that a high degree of sophisticated automation and analytics is needed to manage a system powered by an increasing variety of energy sources (businessday.ng, 2023).

Provision of affordable and clean power is one of the seventeen sustainable development goals, which many countries in Africa tend to achieve same as Nigeria. Oyedepo (2012) observed that the achievement of this goal has become a mirage in Nigeria; he listed the challenges to the achievability of the goals as level of poverty, decline in economic growth, poor health services, low quality research and uncoordinated socio-economic pattern.

This paper tends to proffer workable solution for efficient power supply in Nigeria. The key to effective power supply depends on “Clima-technology” (Clima-tech). Clima-tech is the application of scientific knowledge to harness climatic resource available within a locality for the benefit of the people and the environment. In the face of climate change, clima-tech seeks to minimize the adverse effect of climate change in one hand and maximize its benefit on the other hand.

Climate is beyond just average weather condition of an area over a long period of time say 30 to 35 years (Iwena, 2020) or just a summary of mean weather conditions over a time period, usually based on 30 years of records (Mayhew, 2009; Chinago, 2020), but it is natural atmospheric condition experience over a place at each point of the year.

Climate change is the long-term change in weather pattern which causes several events such as melting of ice cap or polar ice, rising of sea level, and increasing intensity of natural disaster and a shift from the mean rainfall (Australian Academy of Science, 2018).

Technology is the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of human environment. (https//www.britannica.com) Technology has also being defined as the product of transferring scientific knowledge to practical use. In this work, technology is defined as the application of human knowledge in solving problems, creating enabling environment and providing satisfying life for human and better condition for the environment.

The aim of this work is basically to proffer solution for the poor power supply (Production and distribution of electricity) in Nigeria base on affordable technology. To achieve this aim, the objectives pursued include to

(1) To observe climate support power supply sources in Nigeria and its effect to environment

(2) To observe challenges of climate support power supply in Nigeria

(3) Check the effect of non-climate support power supply on the efficiency of climate support power supply.

2. Material and Methods

The major method use for this work is classification and selection. Power supply sources are classified in relation to impact of climate on their efficiency. The challenges facing climate support power supply, using hydroelectric power as example. Questionnaires were administered to respondents as to obtain first-hand information from individuals that had experienced the effect of climate on power supply. 600 persons were selected from among informed people, workers and residence of hydroelectric power station for interview. 500 respondents turn in their questionnaire (83.33%).

3. Result and Discussions

Climate supported power supply use in Nigeria are

(1) Hydroelectric power

(2) Solar power

(3) Wind energy

3.1 Hydroelectric Power Supply

Hydroelectric power is source of energy derived from running water. It occurs when water falls from when a bar of resistant rock lies across a river valley. It may also result when a fault line scarp lies across a river valley or develop from a rapid, or when water plunges down a plateau edge. The water undercuts the softer rock leading to the receding of waterfall upstream and formation of plunge pool (Iwena, 2020).

The favourable conditions for hydroelectric power are, the presence of a river, rough terrain waterfall or slope that enhances the velocity of the river, adequate water supply and impermeable rock (Daminabo et al, 2018).

3.1.1 Solar Energy Supply

Solar energy is a renewable source of energy that comes from the sun. The amount of sunshine duration and the intensity are important for the efficiency of solar energy. The sun energy is trapped and stored in the solar panels, which transmit and convert the solar energy to electric energy. This type of energy is very much available in the tropics due to its relative location on the glove. It is important to note that the tropic zone lies between latitude $23^1/_2{}^0$ N and $23^1/_2{}^0$ S of the equator. This implies that sun is always available (Alexander, 2021).

Togo and Burkina Faso all in West Africa, same as Nigeria, has embarked on solar energy supply. Togo started with a 50MW solar plant called Sheikh Mohammed Bin Zayed solar power plant, it is one of the largest solar plants in West Africa. Bukina Faso in the other hand embarked on the manufacturing of solar panels. These are pointer to minimize dependency crude oil (https;//www.ecowrex.org).

3.1.2 Wind Energy Supply

Wind energy is a source of energy that is derived from the moving air or air in motion. It is environment friendly and very effective in areas with little or no vegetation, such as a desert, ocean, and other barren landmass like Polar Regions. Wind is an element of climate and also a factor affecting climate. Wind energy performs better where there is no vegetation or any wind breaker, and there must be regular sources that encourages or stimulates air current.

3.2 Challenges of Efficient Climate Supported Energy in Nigeria

The problems of climate supported power supply in Nigeria include (a) Climate, (b) Management, (c) Technology and (d) Corruption.

Climate affects power supply in various ways. Nigeria is located between latitude 04^0 N to Latitude 14^0 N. The entire country (Nigeria) is located within the tropic. The hydroelectric power in Nigeria is located in the Northern part of the country with unequal and rough mountains and undulating river beds.

The annual rainfall from the dam rivers is low; even where it is not, the parts through which the river flows to the dammed point are dry with very high temperature. The dammed point of the river's annual rainfall distribution is low. High evaporation and low annual rainfall mean low volume of water in the dam. This implies low productivity for the hydroelectric power.

Similarly, short sunshine duration and intensity will translate to low solar energy output from the station. Anything that affects the speed of wind can also affect the output of the wind energy supply.

Low volume of water in the dam is a crucial factor in efficient power supply. The turbine is turned by the force of water; it implies that low water in the dam translate to low power output. A severe drop in the volume of the water in the dam means that some of the turbine may not function at all. This will result to drastic short supply of power in the country. The reverse case is a situation where the water supply in the dam is in excess. This may lead to collapse of the dam or causes flood in the downstream when water is discharged from the dam to save it from collapse.

The dam in the northern part of Nigeria generates electricity for most of the cities in the north (Encyclopaedia Britannica, 2017). Climate change and its effect is a threat to power supply in Nigeria, especially the northern part was drought and high temperature can affect volume of water in the dam and the efficiency of power supply (IIPC, 2007).

Management is saddled with the responsibility to run power supply system be it hydroelectric power, solar power or wind power. The inability to maintain, replace or repair damaged or obsolete materials shows the best the management could do. Most of the power stations are under performing and for the last 30 years the power sector has become national sink of the country revenue and nothing positive to show for the huge investment so far.

Untold amount of money is been owed the sector, yet the management could not fathom out ways to recoup the said owed amount of money. Inferior parts are bought to replace spoilt parts. Under the nose of management the staff collect bribe from costumers, to the extent that they reconnect those that refused to pay their monthly bills for cheaper amount, there by discouraging them to pay the actual bill that are higher than the negotiated ones collected by the fieldworker.

Most of those in the management know nothing about power production or distribution. They are just bunch of political compensators, political representatives of political juggernauts and friends of political powerful, clergymen depots and traditional ruler good boys and girls. The interest of such class of administrators is to share the money and share it now, to the detriment of the corporation. The few technocrats among them can hardly achieve anything, since the strategic positions are held by the moneybags.

Another great challenge to efficient power supply in Nigeria is the influence of the political cum businessmen in the country. They kill the power sector using their rubber-stamped board members and management. For instance, those whose business is sales of generators, and its accessories will do everything possible using those they appointed to position in the power industry to pull the industry down as to keep their pay master's in business.

Technology has been defined as the application of scientific knowledge to practical use of human. Technology is a key to adequate power supply in Nigeria. The level of technology determines the level of efficiency under normal circumstance.

Affordable technology can help the sector to recoup the great debt owed the by customers. For instance, instead of the old faction of carrying lather to disconnect customers, pre-paid meter should be made available to all, you pay as you go. Seen that a neighbour has power, and one does not have will force the individual to recharge or

pay up the bill, technology will actually improve efficiency and even monitor the vandalization of electric power equipment in Nigeria.

Electric power equipment can be monitored, checked and enhance using the latest technology, however, the power sector in Nigeria is still relaying on analogue or obsolete method. A command can switch on or off a line, load can be determined using a machine, but the sector is still using manual switching on and off, high voltage cannot automatically be identified and auto device switched off the line. In Nigeria such power outage will destroy entire home, compound and unless individual reported the issue to the sub-station if not there is no way notice the problem. The implication is that power theft cannot be monitored, which is waste of resources. The use of technology can brand electric power equipment, such that if stole cannot be sold anywhere in the market, but such is not the case because of the level of technology at our disposal.

Table 1. Effect of Climate on climate Support Power Supply

S/N		**SA**	**A**	**DA**	**SDA**	**UD**
a	Does climate affect HEP output and efficiency?	200	200	60	38	2
b	Does efficiency of HEP depend on season?	150	180	100	55	15
c	Does excessive rainfall translate to Efficient HEP output?	100	110	150	130	10
d	Does low rainfall result to reduce HEP power output?	190	250	40	20	0
		640	**740**	**350**	**243**	**27**

(Researcher Fieldwork, 2022).

The response of respondents on serial number (a) question is shown in the Table 1. 200 of the respondents strongly agreed or agreed that climate affects HEP output and efficiency, while 60 and 38 respondents disagreed and strongly disagreed that climate affect HEP output and efficiency respectively. This implies that 400 respondents (80%) were of the view that climate affects HEP output and efficiency; while 98 (19.6%) claimed that climate does not affect HEP production.

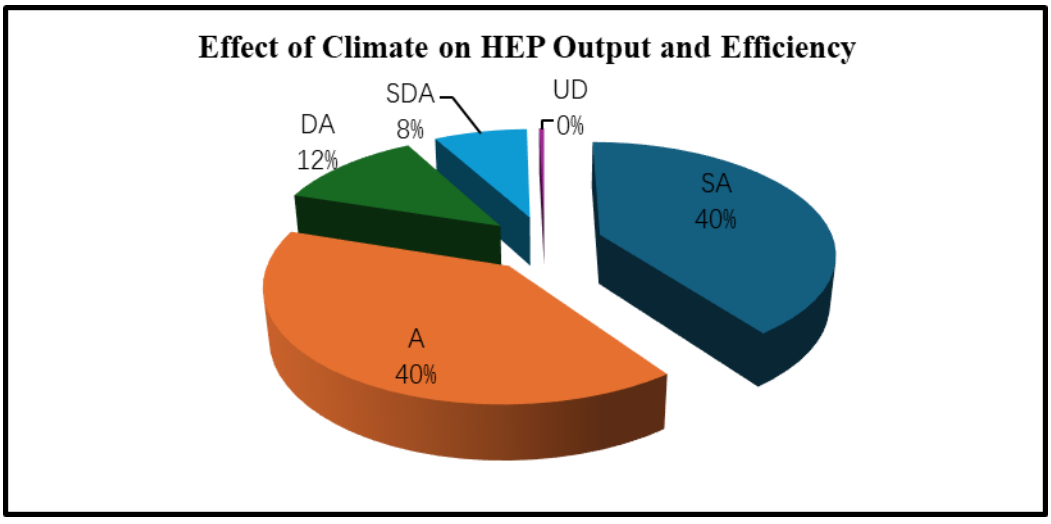

Figure 1. Response on Effect of climate on HEP Output and Efficiency

In analysing question on serial number (b) 150 respondents strongly agreed that HEP efficiency was seasonal. Similarly, 180 of those interviewed agreed that efficiency of HEP is seasonal. This implies that 330 respondents (66%) either strongly agree or agree that the efficiency of HEP occurs seasonally. 100 and 55 persons interviewed either disagree or strongly disagreed that the efficiency of HEP was seasonal. The opinion of 31% of the respondents was that HEP efficiency was not seasonal. Just 15 respondents were undecided, this represents 3%.

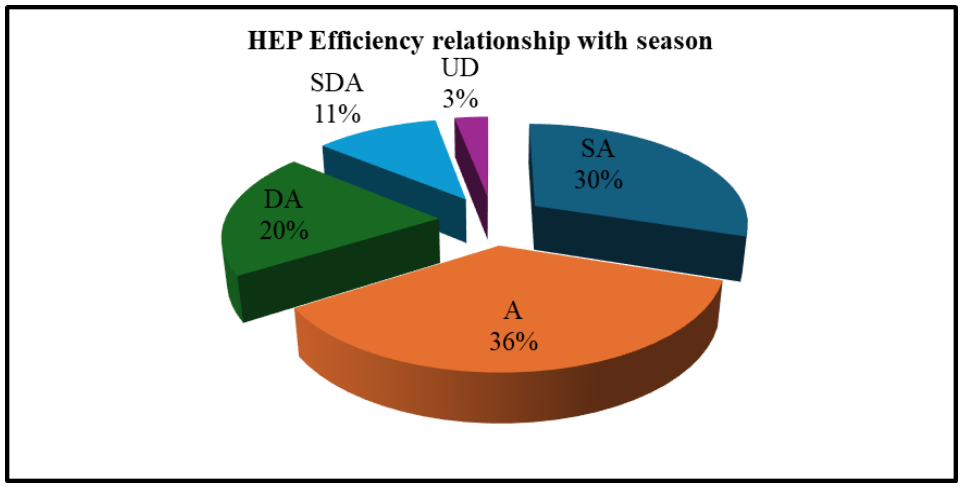

Figure 2. Response to HEP Efficiency relationship with Season

(Source: Researcher Fieldwork, 2022).

Does heavy rainfall or excessive rainfall translate to high HEP output? This occurred in serial number (c) question. 100 respondents (20%) strongly agreed that high rainfall translate to high HEP output. Another 110 respondents (22%) agreed that excessive rainfall will translate to higher HEP output. This implies that 42% of the entire interviewed group was sure that rainfall is proportional to HEP efficiency and output. 150 respondents (30%) disagreed that rainfall is proportional to HEP high output; another 130 respondents (26%) strongly disagree that excessive rainfall will mean higher HEP output.

56% of the respondents either disagreed or strongly disagree that high rainfall translates to higher HEP output. In a simple term this implies that a year with high rainfall does not mean a year with high HEP output'. An insignificant 2% of the respondents were undecided. Figure 3 shows the analysis.

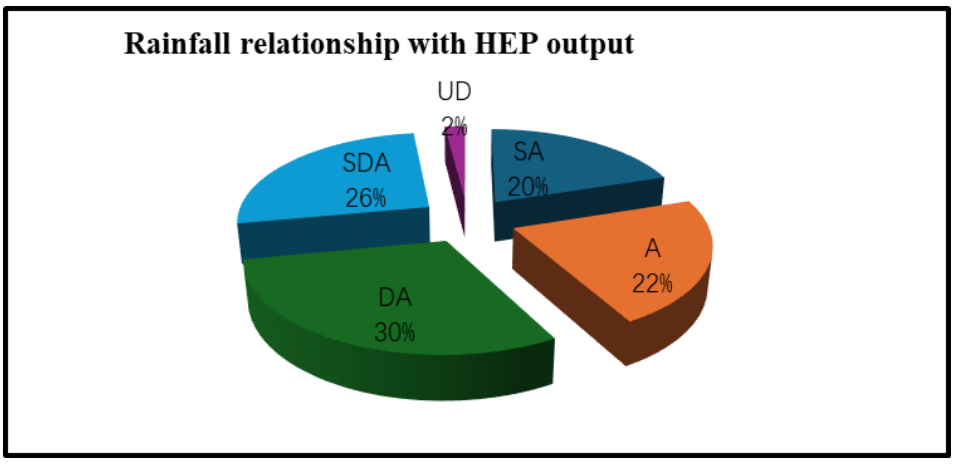

Figure 3. Response to relationship between heavy rainfall and HEP output

(Source: Researcher Fieldwork, 2022).

If excessive rainfall does not enhance HEP output efficiency, does low rainfall reduces HEP output (d)? 190 respondents stated that low rainfall led to low HEP output; 250 of respondents are sure that low rainfall will lead to low HEP output. By implication 440 respondents are sure that low rainfall will signal low HEP power distribution. 440 respondents represent 88% of the number interviewed for this work. 40 respondents disagreed that low rainfall would result to low HEP output. 20 respondents, similarly, strongly disagree that low rainfall is proportional to low HEP low output.

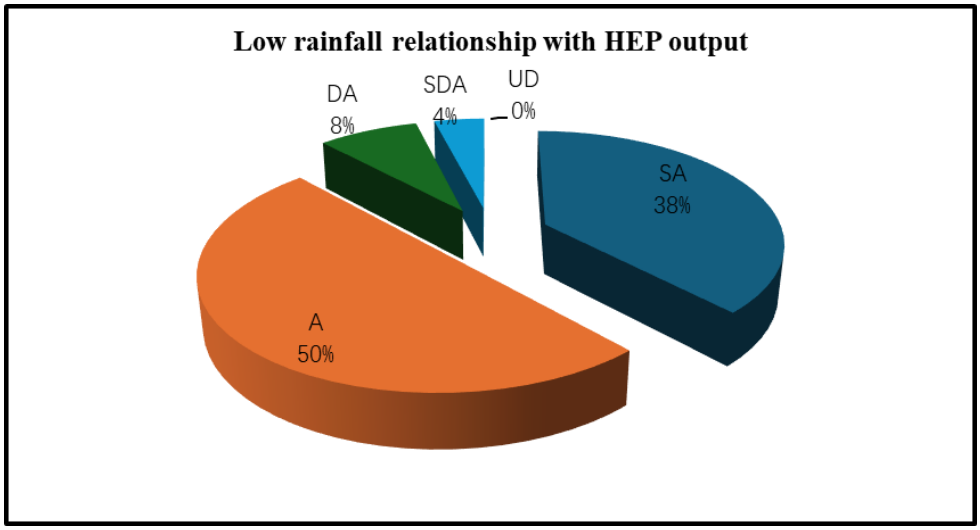

Figure 4. Response to Effect of low rainfall of HEP output

Table 2. What are Challenges facing Climate Supported Power Supply

S/N		SA	A	DA	SDA	UD
e	Is the volume of water in dam a challenge to HEP output?	150	150	100	86	14
f	Does lack of alternative water source a challenge to HEP?	300	200	0	0	0
g	Does lack of manpower a cause to low HEP output?	97	58	150	180	15
h	Does corruption affect HEP output and efficiency?	120	200	100	60	20

In analysing common challenges faced by HEP as a representation of climate supported power supply, the following question was administered to respondents, (e) Does volume of water in dam possess challenge to HEP? In response, 150 respondents strongly agreed that the volume of water in the dam can be a challenge to the HEP station. Another 150 respondents just agree that volume of water in the dam can be a challenge, especially if it is extreme. This shows that 300 respondents (60%) understand that volume of water in the dam is a key to efficient delivery of power. I00 and 86 respondents strongly disagree and disagreed that the volume of water in the dam is a challenge to HEP effective output. So, 186 respondents (37.2%) do not see volume of water available in the dam as a challenge to HEP output. 4 of the respondents (0.8%) of do not understand if the volume of water in the dam is a challenge for effect output or not.

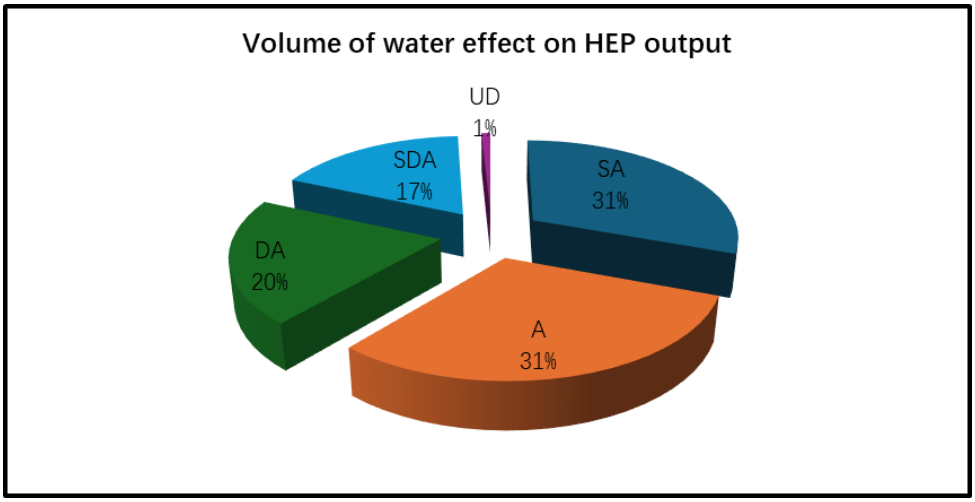

Figure 5. Response to Water Volume as a Challenge to HEP Output

Are there alternatives for Water/Rainfall supply for the dam? (f). Response to this question show that 210 respondents strongly agreed that there was no alternative to rainfall and running water as source of recharge for the dams, similarly, 290 respondents agreed that there were no alternatives for the rainfall/running water for dam recharge. This implies that a year with very low rainfall will translate to low power production.

The finding shows that everybody conversant with HEP agrees that running water and rainfall are the only source of HEP dam recharge in the tropic countries of the world, especially in Africa.

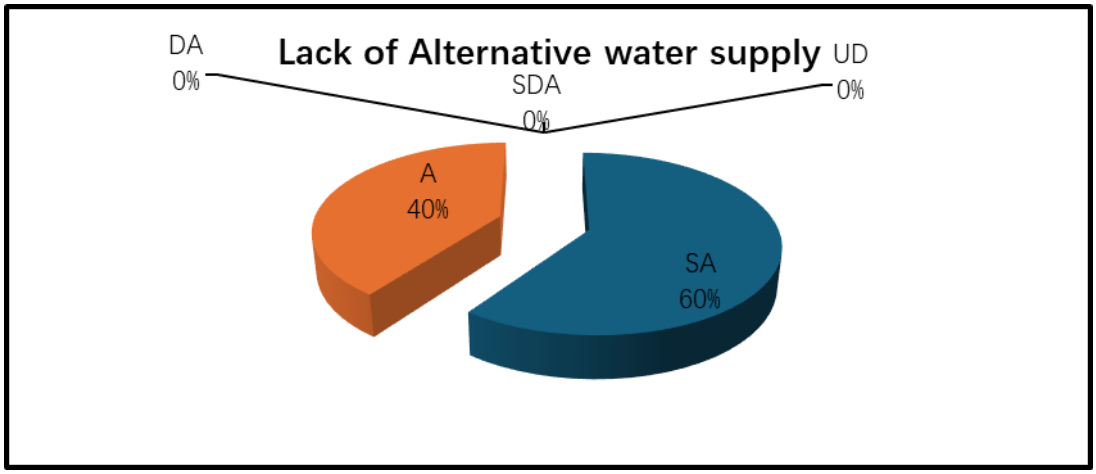

Figure 6. Response to alternative to water/rainfall supply to HEP dams

The response of respondents for question (g) relating to manpower shows 97 respondents strongly agree that lack of manpower is a cause of low HEP productivity. 58 respondents agreed that lack of manpower is responsible to low HEP output. That implies that 155 respondents, representing 31% of those interviewed either agreed or strongly agreed that lack of manpower is responsible to low HEP output.

150 respondents disagreed that lack of manpower is the cause of low HEP output. 180 of those interviewed strongly disagreed that lack of manpower is responsible to low HEP output. By implication 330 (66%) of the respondents were of the view that lack of manpower does not affect the HEP output or efficiency. 15 of the respondents (3%) are undecided, they are not sure of the effect of manpower to the productivity of HEP.

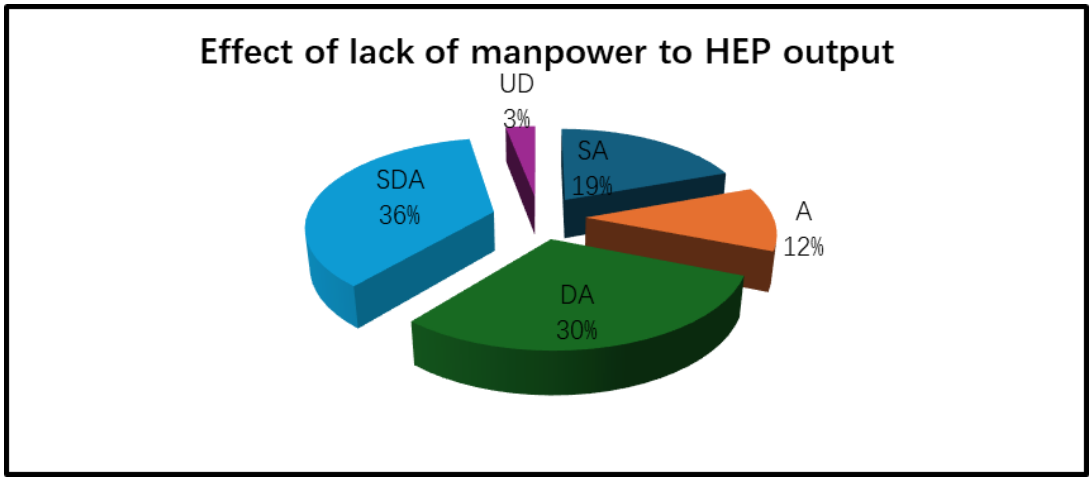

Figure 7. Response to effect of lack of manpower on HEP output

The analysis of question (h) that have to do with the effect of corruption on HEP efficiency, shows that 120 respondents (24%) strongly agree that corruption affect output and efficiency of HEP. 200 of the respondents agreed that corruption is a factor to low HEP productivity in Nigeria.

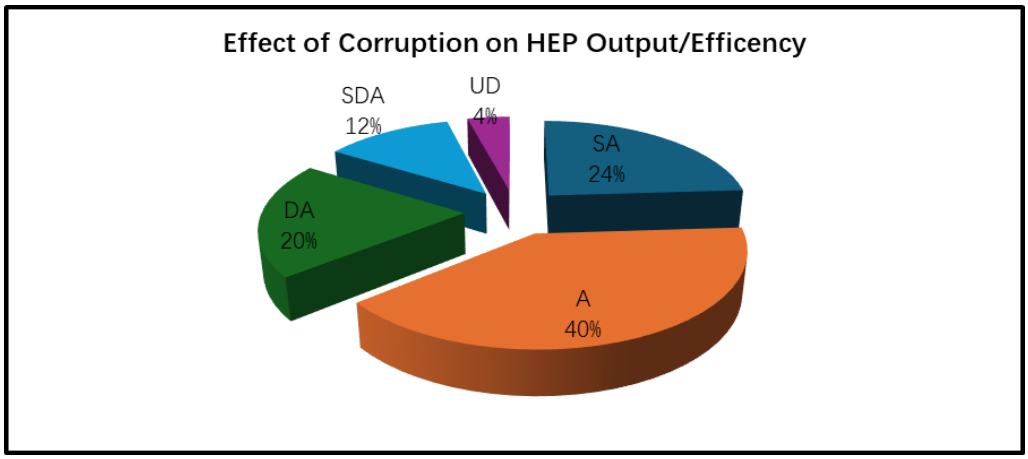

Figure 8. Response to effect of corruption on HEP output and efficiency

3.3 Non-Climate Supported Power Supply

The outstanding non climate supported power supply in Nigeria is the thermal power supply. This is a method of generating power by burning of hydrocarbons. This source of power supply is not renewable. Though it is versatile in usage, it can be used to generate power with giant generators; it can also be used to generate power in medium size generator. Also, it can power small size generator called locally “I pass my neighbour”.

The advantage of thermal power supply is that it is flexible. It can be used where it is mined, it can also be used elsewhere. Thermal power plant can be built anywhere in Nigeria and can be used in any locality, undermining whether crude oil is mined in the area or not.

The thermal power supply includes Petroleum, Coal and Gas, all the thermal power supply can easily be transferred from one place to another. The transfer under discussion is not just transport of electricity through cables to various destinations, the siting of power stations in places where the energy source is found. Examples are the location of Egbin Power Plc in Lagos, and Olorunsogo 11 Power Plant in Ogun State Nigeria, these are none oil producing States.

The demerit of thermal power is that it is not environment friendly.

It causes sound pollution.

Pollute the air

Harmful to health of man, animal and the environment

Prone to Accident (Fire disaster)

It is expensive in running.

4. Solutions To Challenges Facing Power Supply in Nigeria

Clima-technology (Clima-tech) as a Solution to Power Supply in Nigeria.

Clima-tech is climate compliant technology. It is technology that harness and utilises the element of climate or it product for the benefit of man and his environment. The major challenge of hydroelectric power is low volume of water. Rainfall an element of climate is the source of river recharge. It recharges the river and also recharges the underground water.

This technology seeks how to compliment the lost amount of water from the river through fall in rainfall distribution and on high evaporation around the areas with hydroelectric power stations. The lost water can ordinarily be replaced through cloud seeding or artesian well water supply. This technology can be embarked on, if the benefit exceeds the cost of production of the technology.

Transportation of fresh water from the source area (origin), to hydroelectric power station or plant sites (destination) will not just address the issue of low volume of water in the dam, but will enhance the velocity and force of water in the dam, thereby boosting power supply production in Nigeria. Water pipeline connected to the dam in from out, will only be open when there is need for more water in the dam. (Budnukaeku, 2024).

Having a similar pipeline connection out from in, of the station dam will also enhance the efficiency of the station especially during heavy rainfall years. The fact that excess water can lead to dam’s collapse and opening of it to let such water escape leads to flood downstream the hydroelectric power stations. The out from in pipeline will be opened when there is need for removal of unwanted water.

This technology is feasible in Nigeria, given the fact that a similar fluid (Crude oil) has been transported from the South to the North. Crude oil is transported from Delta State to Kaduna State through oil pipeline. Similarly, fresh water can be transported from the west or south to the hydroelectric power stations in the north. The cost of providing this can be weighed against other alternatives. Besides, the environmental cost should also be considered for sustainable power supply.

The second suggestion is the development of solar power in Nigeria. By its geographic location Nigeria is situated between latitude 04^0N to latitude 14^0N. This translates to adequate solar energy. The sunshine duration in about 12 hours, if solar energy is stored to about twelve hours it will go a long way to compliment the other source of energy, besides; the amount of solar energy to be stored will be transmitted or distributed for supply and use. Clima-tech should think about making solar energy available. Small energy boxes but powerful and cheap should be produced for portable usage.

Technologist, Technicians and scientist should be ready to think out of the box to provide cheap and affordable solar energy, based on the availability of the resource. Environmental tailored technology (Clima-tech) should be able to proffer solution on how to make this natural resource almost free. Solar energy can be store and later be sold and the user can use it as at one's disposal. This renewable energy required indigenous or home breed tech base on tropic environment and climate.

Wind energy is another renewable source of energy that is supported by the climate of an area. Nigeria can also harvest great wind energy as a result of her geographical location and terrain. In the North lies short, scanty grassland with little or no wind breakers, this is a favourable condition for wind farm. The middle belt or central part of the country is the undulating hills and mountains, the rough terrain stimulates wind movement due to differential heating of the foot of the mountain and the mountain top, conventional current sets in which allow free flow of wind, especially in places like Kogi State and Kwara State. In the Southern part of the country, especially the coastal cities like Lagos, Port Harcourt and Warri, the effect of land and sea breeze is very much pronounced. The Atlantic Ocean stretches from Calabar to Lagos, an open vast surface that generates free wind movement. It is thus a breeding ground for wind energy.

Based on the terrain of Nigeria, pursuing wind power supply is very possible. Technologist and scientist need to fashion out environment compatible technology that can drive the potential energy resources to full viable and affordable resource. Wasiu et al (2020) and Masud et al, (2015) observed that "Every nation must wake up to stand up for their energy demand by boosting the existing supply of renewable energy. Moreover, nature has blessed Nigeria with various energy sources ranging from biomass, wind, wave, solar, hydroelectric power, geothermal, etc., and if utilized, could cater for the short fall in energy."

5. Conclusion

Having seen the abundant energy resources in Nigeria, and the sorry state of Nigerian power supply, this work states that the country should rely on climate supported power supply base on its environment friendliness and the fact that it is renewable and can be manipulated for efficiency.

The vastness of the country and its geographic location is an added advantage to what the country can achieve in power supply efficiency. Power supply that is climate driven should be given more priority in terms of production, distribution and conservation.

The danger of selfishness is inimical to sustainable power supply. The idea of placing and appointing individual to sensitive office as reward to loyalist is suicidal to the power sector. Satisfaction of the populace should be more important to service provider and not their personal gain to the suffering of the mass.

Clima-tech should be encouraged, so that we can utilize existing resources to meet our needs. Resource like water can be transfer from place of abundant to a needy area where it can be very useful and beneficial to the entire country.

6. Recommendations

Based on the research conducted on the effect of Clima-Tech on sustainable power supply in Nigeria, several recommendations can be proposed to enhance the implementation and effectiveness of Clima-Tech interventions in the country's energy sector:

1) **Investment in Research and Development:** Encourage and support research institutions, public-private partnerships, and governmental agencies to invest in research and development initiatives focused on innovative Clima-Tech solutions tailored to Nigeria's climatic conditions. This can involve the development of technologies for solar, wind, hydroelectric power, and energy storage systems.
2) **Policy Framework and Incentives:** Establish clear and supportive policies that incentivize the adoption of Clima-Tech solutions in the energy sector. These policies should include tax incentives, subsidies, and regulatory frameworks that promote renewable energy investments and encourage private sector

participation.

3) **Capacity Building and Training:** Conduct training programs and capacity-building initiatives for local communities, technicians, and engineers involved in the implementation and maintenance of Clima-Tech infrastructure. This will ensure the sustainability and effective operation of renewable energy projects across the country.
4) **Infrastructure Development:** Prioritize the development of resilient infrastructure to support Clima-Tech interventions. This includes building and upgrading transmission lines, grid systems, and storage facilities to accommodate decentralized renewable energy sources.
5) **Community Engagement and Awareness:** Promote community engagement and awareness programs to educate the public about the benefits of Clima-Tech interventions. Engaging communities in the planning and implementation stages of projects fosters local ownership and ensures the acceptance and sustainability of renewable energy initiatives.
6) **Partnerships and Collaboration:** Foster partnerships and collaborations between government agencies, private sector entities, non-governmental organizations, and international stakeholders. Collaborative efforts can leverage expertise, resources, and funding to scale up Clima-Tech projects effectively.
7) **Monitoring and Evaluation:** Establish robust monitoring and evaluation mechanisms to assess the performance and impact of Clima-Tech interventions. Regular assessment and data collection will provide insights into the effectiveness of implemented projects and help in making informed decisions for future initiatives.
8) **Incentivize Green Finance and Investments:** Encourage financial institutions to provide favorable terms for green finance, such as loans and investment options for renewable energy projects. Creating avenues for easy access to funding will spur investments in Clima-Tech solutions.
9) **Policy Integration and Long-Term Planning:** Integrate Clima-Tech considerations into national energy policies and long-term planning strategies. Aligning energy planning with climate goals ensures coherence and sustainability in achieving a low-carbon energy future.
10) **Continued Innovation and Adaptation:** Encourage continuous innovation and adaptation in Clima-Tech solutions to keep pace with evolving technological advancements and changing climatic conditions.
11) **Reliance on the West or East is over:** Home grown solution to home problem is need, therefore companies, institutions need to sponsor research on affordable energy supply in Nigeria, and as a matter of fact legislation should back research on sustainable power supply. State of emergency should be passed on power supply in Nigeria.

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