

Blue Economy and Poverty Alleviation Nexus: Reflection on the Role of Blue Economy on Poverty Alleviation in Nigeria

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Abstract: Blue Economy is a recently coined concept in resource planning. The concept encompasses all economic activities that depend on the sea, such as tourism, maritime transport, energy and fishing. Blue economy facilitates the sustainable growth of a nation's economy; as the oceans and seas are engines of the global economy with great potential for livelihoods enhancement, and a catalyst for economic growth and development. The study unravels appropriate mechanism for poverty alleviation in Nigeria by unlocking the opportunities offered by the blue economy. The study conceptually reviewed existing literature as a basis for obtaining an in-depth understanding of how blue economy potentials can provide alternative livelihoods besides generating employment opportunities in fisheries, tourism, and other ocean based industries that could boost the wellbeing of households and their income generating capability in Nigeria. It is revealed that blue economy has far-reaching potential for expanding economic activities and poverty reduction if the economic, social, technological, cultural and environmental challenges fettering the development of the sector are properly addressed. Consequently, the study recommends strong political will and robust institutions for effective development and implementation of blue economy policies in order to bolster livelihood activities in Nigeria. The need to establish thorough policy coordination and stakeholder engagement to provide formidable structure for the development of blue economy in Nigeria is suggested.

Keywords: Blue Economy, Poverty Alleviation, Reflection, Role, and Nigeria

I. Introduction

The axiom "blue economy" signifies the economics of utilizing, guarding, and re-generating the marine environment. The phrase is differently viewed by Organizations contingent on its context. Nevertheless, Farmery et al., (2021) observed that when referring to a sustainable development strategy for coastal resources, the phrase is characteristically used in the context of international development, which can embrace wide-ranging economic activities, stemming from well-established ones like coastal, marine, and maritime tourism, fisheries, aquaculture, maritime transportation, and other traditional uses to more topical ones like bio-prospecting, seabed mining, marine ecosystem services, and renewable energy for the coast (Choudhary et al., 2021).

While the World Bank (2022) postulated that Blue economy is "the sustainable use of ocean resources for economic growth, improved lives, and jobs while protecting the health of the ocean environment", the European Commission take accounts of "every economic activity involving all the oceans, seas, and coastlines". It embraces several interrelated existing and growing sectors (Heidkamp, Morrissey, Germond-Duret, and Rourke, 2022). Hazra and Bhukta, (2022) opined that Blue Economy "comprises a variety of economic sectors and related policies that collectively decide whether the use of ocean resources is sustainable". The ability to comprehend and efficiently manage the many dimensions of marine sustainability including fisheries, ecosystem health and pollution control has been identified by Ayilu, Fabinyi, and Barclay, (2022) as a major challenge for the blue economy.

Besides, the blue economy compels us to recognize that international cooperation across sectors and boundaries and new collaborations are obligatory for the ecological sustainability of marine resources, which is conceived by Lyons, Mynott, and Melbourne-Thomas (2023) as constituting a daunting task, mostly for the Least Developed Countries (LDCs) and Small Island Developing States (SIDS), which have several constraints. The UN advanced that the Blue Economy will support the globe significantly in achieving its Sustainable Development Goals, one of which is to enhance "life below water." The World Wildlife Fund in its report entitled "Principles for a Sustainable blue economy" provides two definitions of the phrase 'Blue economy'. While some scholars define blue economy as utilizing the ocean and the assets for long-term fiscal growth, others (Setiyowati, Nugroho, and Halik, 2022) employ the concept to refer to any maritime-related economic activity, sustainable or not. In spite of the mounting use of the phrase, The WWF asserted that there is presently no widely accepted definition of the "blue economy" as a concept and as a goal of policy-making and investment (van de Water, Tignat-Perrier, Allemand, and Ferrier-Pagès, 2022).

The Blue Economy concept, introduced by Gunter Pauli in 2010, focuses on leveraging ocean resources to drive economic growth, improve livelihoods, and alleviate poverty. Poverty has remained a severe threat and challenge to humanity in all ramifications. It is complex, multidimensional and multifaceted with expressions in the economic, social, political, environmental and all aspect of human existence. Poverty embraces inadequate income and denial of the basic necessities such as education, health services, clean water and sanitation (Esin, 2014). It is evident by the lack of purchasing power, exposure to risk,

malnutrition, high mortality rate, low life expectancy, and inadequate access to social and economic services and limited opportunities for income generation. Finding ways to reduce poverty has become a herculean task for local, national and international decision makers.

The depth and severity of poverty also showed a despondent condition. Several studies (Orokpo et al., 2018; Esin, 2014, and Mercy, 2020) stated that the rising profile of poverty in Nigeria is assuming a disturbing and irritating dimension. Study by Iheonu and Urama (2019) using data from the Global Consumption and Income Project, GCIP (2019) reported that within Nigeria, the rate of poverty overtime has been considerably high. Poverty head count for Nigeria between 1960 and 2015 on the average was 61.8% of the country's population. Recent statistics based on the poverty line of \$1.90 per day, revealed that 46.5% of Nigerians are extremely poor, with the World Poverty Clock citing Nigeria as 'the poverty capital of the world'. Based on the World Data Lab (2019) report, extreme poverty in Nigeria is mounting by almost six persons per minute. In 2018, the National Bureau of Statistics (NBS) asserted that Nigeria overtook India as the country with the largest population living in extreme poverty and reported that 40.1% of the population in Nigeria lived in poverty, which is about 83 million people (NBS, 2020). Esin (2014) opined that the menace of poverty in Nigeria is an undeniable fact which manifests in hunger, ignorance, malnutrition, disease, unemployment, poor access to credit facilities and low life expectancy as well as a general level of human hopelessness. This is confirmed by Nwaobi (2003) which avowed that Nigeria presents a paradox because the country is rich but the people are poor.

The growing importance of the ocean and its resources are increasingly recognized extensively as a viable alternative resource to meet the needs of the rising global population amidst Earth's dwindling land resources (Ralph, Claire and Carl, 2019). It is estimated that with a considerable development of many of the current ocean-based economic activities, food, jobs, energy and raw materials to cater for the needs of the projected population level of 9-10 billion people would become readily available by the year 2030 (European Commission, 2020). Dealing with these problems, therefore, requires the need to develop innovative strategies to address the negative externalities associated with the exploitation of the ocean based resources.

With the growing recognition of the importance of the ocean and its resources to global economic growth in particular and Nigeria in general, there is the need to shift attention to other emerging opportunities derivable by substantially expand the scope to which ocean resources are put to use in the country. Realizing the full potentials of these resources demands sustainable action on numerous fronts to achieve a durable balance between ocean use and marine ecosystem conservation

Nigeria's Blue Economy

A report by the OECD in 2016 shows that the ocean economy contributed around USD 1.5 trillion to the global economy, equivalent to 2.5% of the worldwide GDP. The report further projected that the ocean economy could double its contribution by 2030 if the right policies and investments are made. The report specifically underscored the potential of emerging sectors such as offshore wind energy, aquaculture, and marine biotechnology to drive economic growth and create jobs (Rigaud et al., 2018). Recent report by the World Wildlife Fund (WWF) in 2019 estimated that the blue economy could generate up to USD 3 trillion in value and create up to 40 million jobs by 2030. World Bank report (2019) for Blue economy resilient for Africa, reported that Blue economy generated over \$300billion for African continent in the year 2018 and generated about 49million jobs with other benefits like food security, livelihoods and tourism. According to The Guardian (2021), Blue economy has the wherewithal of generating revenue, providing jobs for unemployed youths and enhances Foreign Direct Investments which could significantly ameliorate poverty levels.

Maritime transport makes up a large portion of Nigeria's blue economy. Due to its closeness to the Atlantic Ocean (one of the busiest maritime channels in the world), an extremely active maritime channel—Nigeria has the potential to serve as a center for transshipment, ship repair, and shipbuilding. Nigeria is lucky to have a coastline with deep natural indentations and an Exclusive Economic Zone (EEZ) extending up to 216,789 sq kms, which UNCLOS expanded by an additional 50,000 square kilometers in 2015 (Samad and Abbasi, 2022).

The potential for fishing and farming offered by the Blue Economy in this region is considerable. Despite this, Nigerian may be able to adapt to climate change and global warming with the aid of blue carbon. The country can act as a gateway for maritime goods because of its crucial strategic relevance. Fisheries and aquaculture are the foundations of the blue economy since they not only support individuals who live by the coast but also promote economic development (Esin, 2024; Esin and Nse, 2024 and Esin and Zelibe, 2024). There are many different fish species in Nigeria; over 500Nigeria has a diverse range of fish species, of which 310 species are freshwater fish, and the other 296 are marine fish (Muhammad et al., 2021). Unfortunately, there has not been any significant government attempt to use the fisheries potential of the blue economy to evolve policies of eradicating the growing poverty incidence in the country. The importance of fish could be directly and indirectly felt among rural and urban dwellers in Nigeria. In Nigeria, fisheries, constitutes a vital subsector as it contributes about 3.00–5.00% to the agriculture share of the Gross Domestic Product (GDP) and generation of foreign exchange through exports. Fish are important sources of protein in the food intake of Nigerians asides being a major source of employment generation to many coastal households. FAO (2020) reported that employment in the primary capture fisheries and aquaculture sector production in Nigeria has remained relatively stable since 1995 and was estimated at 59.5 million in 2018. This is so because over 820 million people throughout the world are valued to

depend on fish for all or part of their income (FAO, 2022), while WorldFish (2020) report on Nigeria, attested that 1,477,651 people were engaged in the fisheries and aquaculture sector of the country.

Energy consumption, which is presently very low globally and significantly lowers in developing countries like Nigeria resulting from increased prices and limited supply governed by dollar value and geopolitical difficulties, is closely related to eradicating poverty and meeting a person's basic requirements (Cooray, Premarathna, Atapaththu, and Priyadarshana, 2022).

Nigeria's maritime potential is massive but has yet to be completely realized. The nation should switch from a orthodox old economy to a new blue economy to accommodate its growing population demand and global trends. The blue economy can be used as a catalyst to induce growth in the country's maritime industry which could significantly generate jobs for the teeming unemployed youths thereby reducing poverty rates in the country. Economic analysts think this industry may generate more than a million employment opportunities in Nigeria if the blue resources are fully and efficiently utilized. Since over 90% of Nigeria's trade occurs on the sea, the maritime sector is one of the major drivers of the national economy and military might. The open sea provides the potential for unobstructed, unrestricted trade and access to all nations (Khan, 2021) which when fully harnessed could generate revenue for the government and improve employment potentials of the country. Nigeria, a developing nation, must give the marine industry more attention to reap appropriate economic rewards. Ports, harbors, commercial ships, and their infrastructure are all part of maritime power, including maritime defense (Aijaz and Butt, 2021). The ocean or maritime economy, otherwise known as blue economy, denotes the sustainable use of ocean resources for economic growth, improved livelihoods, and ocean health. The blue economy incorporates a variety of sectors, such as fisheries, aquaculture, shipping, energy, tourism, and marine biotechnology. Its' prospect to contribute to sustainable development, and poverty decline has gained prominence amongst policymakers, scholars, and stakeholders (Smith-Godfrey, 2016).

Among the major economic activities envisaged in Nigeria's blue economy includes fisheries, coastal leisure and tourism, ship and boat building, offshore oil and gas and shipping (marine transportation), blue carbon sequestration, offshore renewable energy, deep sea mining, and biotechnology, while fisheries stand out prominently as the most promising in terms of contribution to the growth of Nigeria's economy in terms of revenue and job creation. The recently appointed Minister of Marine and Blue Economy in Nigeria, Mr. Adegboyega Oyetola, projected that the blue economy could yield up to N7 trillion per annum while fisheries alone could contribute up to 20% if properly managed. The National Bureau of Statistics (NBS) (2022) reported that the fisheries sector contributed 1.16 per cent to the national GDP in 2021 and 0.47 per cent in 2022 while the country's aquatic food systems' contribution to the gross domestic product rose from 0.5 per cent in 2013 to 4.5 per cent in 2021. Over 1.48 million individuals are reportedly engaged in the fisheries sector in Nigeria. In 2016, 653,000 individuals were engaged in inland fisheries, with an estimated 21 per cent of them being women. Nigeria's blue economy therefore remains one of the country's anchor sub-sectors, with maritime trade contributing 1.6 per cent and fisheries contributing 3-5 per cent to the GDP.

Blue economy sub-sector such as fisheries, aquaculture, marine and coastal tourism have been embraced to alleviate poverty prevalence by stimulating food security, decent livelihoods and economic growth in a number of coastal developing countries, with the aim of progressively incorporating it with other vital economic sectors (Ababouch, 2015). UNECA (2016) noted that in spite of the overwhelming contributions of blue economy to the development of national economies in Africa, its potential is yet to be fully realized. Corroborating this position, Odongkara, Abila, and Luomba (2009) noted that aquatic resources are not adequately monitored, understood and valued in the context of national development agendas in Sub-Saharan Africa (SSA).

Elements of Nigeria's Blue Economy

The components of Blue economy in Nigeria include:

i) Fishing and aquaculture are essential components of the blue economy, and Nigeria has a long tradition of fishing and seafood consumption. The Nation's access to the Rivers Niger and Benue, the Atlantic Ocean, the Chad Basin and several other inland waterways provides diverse opportunities in boosting her revenue. Fisheries production particularly from marine is vital for the socio-economic growth of Nigerians and its input to the nation's economic growth through the Gross Domestic Product (GDP). Nigeria is blessed with enough marine fisheries resources that could enhance increased fish production and increase her revenue generating capacity. Yet, fish supply from domestic production is far below the fish demand for export and for intake by her citizens. As reported by the FAO (2019; 2020) the global export value of fish and fishery products has increased remarkably in recent decades, from US\$15 billion in 1980 to US\$ 164 billion in 2018, about 50 per cent of that total comes from the developing world, where the net export revenue that these countries receive from fish trade is larger than their exports of tea, rice, cocoa and coffee combined. The increasing demand for seafood has led to a complex global system of trade in fisheries products. In the year 2020, the European Union was the largest importer of fish and fishery products worldwide with an import value of about 56.5 billion U.S. dollars (2021). In 2018, exported 480,000 Tons of fish were valued at US\$671.3 million, the majority of which was exported to the Ivory Coast (AU-IBAR, 2018). It is sad to note that while Ivory Coast keeps earning more revenue from fish exportation; Nigeria on the other hand keeps expending considerable part of her revenue on fish importation.

The first challenge to the seafood business in Nigeria emanates from reckless and unsafe fishing methods, which might lower the resource bases and, in turn, the production. However, the other is from inadequate quality control, which results in much wastage and underutilization of the catch (Syed and Safdar, 2021). The biggest problems impeding quality control are post-harvest

handling and waste fish. Fish reproduction suffers a terrible loss due to using proscribed nets and fishing during the off-season (Gill and Iqbal, 2021).

Furthermore, unethical fishing methods' involving the use of harmful fishing technique is a severe problem that jeopardizes the environment and the existence of threatened species. These unethical fishing methods result from the lack of knowledge among the fishing community, an inadequate regulatory system, and a weak enforcement apparatus (Esin, 2024). Additionally, illegal fishing and the smuggling of catch are seriously depleting the country's marine resources. Valuable fish species are smuggled out of Nigeria on daily basis amounting to over 210 tons. All these problems can only be resolved by enforcing strict regulations with formidable architecture and oversight (Esin, 2024).

Maritime Shipping/Transportation

Nigeria is blessed with an abundant ocean for foreign and territorial transportation of goods with enormous maritime resources available for the well-being of its over 200 million population. Atakpa (2021) reported that Nigeria has about 852 km of coastline water with a maritime space of about 315,240 km² and stated that the maritime space represents 34.1% of Nigeria's landmass. Also, Okoye (2021a) stated that Nigeria has access to 12 Nautical miles of territorial waters, 24 Nautical miles of the contiguous zone and 200 Nautical miles of international coastal waters. The country presently has nine (9) seaports with massive shipping operations.

The prominence of the Nigerian maritime industry was noticeable by the United Nations Conference on Trade and Development (UNCTAD) which ranks Nigeria highest out of the top 35 flags of registration fitting to the increase in the shares of the world merchant fleet value in 2021 (Dentons, 2022). Also, the International Maritime Organisation (IMO), referring to the maritime industry, stated that Nigeria is important to Africa and the global maritime economy (Egole, 2022). Onyenucheya (2022) reported that approximately 80% of shipping business on the West African coast occurs in Nigeria.

Nigeria Container Port Throughput was reported at 1,566,109.000 TEU in December 2022. This stayed constant from the previous statistics of 1,566,109.000 TEU for December 2021 averaging 1,548,622.000 TEU from December 2008 to 2022 reaching a peak of 1,867,409.000 TEU with lowest ebb of 72, 5000.000 TEU in 2008. This implies significant growth in the port productivity of Nigeria. Data from the National Bureau of Statistic (NBS) shows that total transport revenue from maritime activities in the last 3 years has been roughly equivalent to the average size of the Nigerian annual budget. Import and Export values of maritime shipping transactions have been around N8trn in 2018 and 2019, which were increases from around N6trn in Q4 2017 and 7trn in Q1 2018. In Q1 and Q2 2019, the value of shipping transportation for both import and export was N8.5trn, while export alone was N4.5trn. Thus, eradicating the impediments that hinder efficient and effective maritime transportation and investing in the sector would significantly improve the revenue earnings of the country with considerable effect on poverty reduction.

Maritime Tourism

The most significant market grouping worldwide is tourism, which also expands quickly. The tourist industry generates five percent of the global GDP and six to seven percent of jobs worldwide. In approximately 150 countries worldwide, tourism ranks among the top five revenue-generating industries (Faran and Ejaz, 2022). For half of the developing countries like Nigeria, maritime tourism serves as their primary source of foreign exchange. Worldwide trends over the next 20 years indicate a substantial expansion in tourism business.

Coastal tourism is a very important sector to the Nigerian economy and many developing countries. Nigeria's rich marine biodiversity and natural beauty offer opportunities for recreational activities such as diving tourism, marine archaeology, surfing, cruises, eco-tourism and recreational fishing operations which when fully harnessed could meaningfully expand her revenue base and significantly contribute to the economy (Esin and Nse, 2024). Nigeria's coastal areas account for 80 percent of tourism, with beaches being the most popular destinations. Prominent among the coastal and marine tourism destinations in Nigeria include Lekki and Badagry Beaches (Lagos State), Aghenebode Sand Beach (Edo State), Asaba and Otuogo Beaches (Delta State), Okpoama Beach (Bayelsa State), Ikofo and Port Harcourt Beaches (Rivers State), Ibeno Beach (Akwa Ibom State), and Calabar, Lagos, and Coconut Beaches (Cross River State).

Proceeds generated from tourists' visits to coastal and marine tourism centers remain the most obvious economic benefit of coastal and marine tourism. Revenue generation can either be from domestic sources or earnings of foreign exchange, in which case it involves visits by nationals of other countries. In several emerging countries, importance is given to international tourists often at the expense of domestic tourists due to the foreign exchange earnings that complement international visits. Majority of African countries depend on revenue from foreign nationals, particularly from Europe, North and South America, Asia, and Australia. Amongst the African countries that have benefited massively from tourism as a source of foreign earning are Kenya, Seychelles, Botswana, Namibia, Ethiopia, Egypt, and South Africa, amongst others (United Nations World Tourism Organization (UNWTO), 2015). The development of coastal tourism can help the local economy and lessen poverty. The sea cruise business and sustainable coastal tourism both require the backing of the private sector (Tagar et al., 2021).

In addition to the potential and obstacles described in each area of Nigeria's marine economic sector, several emerging challenges tend to affect maritime expansion and countries' commercial policies. As observed by Syed and Safdar, 2021, "Unless the seas

and oceans constitute a crucial component of these urgently required reforms, a worldwide transition to a low-carbon, resource-efficient Green Economy would not be conceivable". Unrestrained pollution, climate change, ocean acidification, frequent and severe natural catastrophes, sea level rise, etc., are all increasing the environmental challenges to the Nigerian coastal ecology which might affect the country's marine and coastal infrastructure. Furthermore, ocean waste disposal depletes marine resources and jeopardizes Nigeria's capability to produce seafood.

Nigeria is still evolving her tourism products. Hence, foreign exchange earnings from tourism are still low compared to other African countries aforementioned. Travel and tourism contributed about 1.7% directly to the nation's gross domestic product in 2014, which was NGN1,560.2bn (World Travel and Tourism Council (WTTC), 2015). The rapid growth of tourism sector and investment will lead to increased domestic and foreign earnings. Such earnings will provide Nigerian government with means to provide and maintain infrastructural facilities, remunerate her employees, pay foreign debts, and allow for naira appreciation in the international currency market and developed effective poverty alleviation programs.

Offshore Renewable Energy

The term "offshore renewable energy" refers to the production of electricity from resources found in the ocean. These include Great Lakes, ocean-based wind farms, and marine-based energy sources such as waves, tides, saltiness, and thermal properties (Fjellstedt et al., 2022). Global trends indicate that the marine sector's contribution will rise along with population growth, land-based economic activity, and new business prospects like renewable energy (Trifonova, Scott, Griffin, Pennock, and Jeffrey, 2022). Nigeria has huge potential to tap into the blue economy by fostering renewable energy, marine transportation, and tourism because of its locational advantage to the sea.

Offshore wind farms are positioned underwater. The principles of offshore wind are the same as those of terrestrial wind technologies, but because of the more robust and reliable winds at sea, large-scale wind turbines must be installed by ships. Placing a structure in a fluid ocean environment is challenging (da Silva, Sergiienko, Cazzolato, and Ding, 2022). Offshore wind turbines offer comparable advantages to onshore wind turbines in that they produce no carbon emissions during their lifespan and are thus free of charge compared to other energy-generating technologies like conventional power sources (Nezhad et al., 2021). Blue Economy can be developed to generate energy thereby solving the power generation, transmission and distribution challenges that bedeviled the country over the years, which could act as a catalyst for the economic development of the country. A step-wise analysis of 24 poverty indicator variables by Esin (2014) reveals that improving households' access particularly in the rural areas to electricity supply has considerable potential welfare benefits in reducing poverty by 19%. This is because such power provision could enhance the thriving of small and medium scale industry which in turn induces the growth of the local economy. Consequently, their absence deprives households' of the much needed growth which may result in increased poverty.

Offshore Oil and Gas:

Nigeria is a significant oil and gas producer, and offshore exploration and production are essential components of the country's economy. Nigeria has an estimated 37.2 billion barrels of proven oil reserves as of the end of 2011. The majority of reserves are located along the country's Niger River Delta and offshore in the Bight of Benin, the Gulf of Guinea, and the Bight of Bonny. Recent exploration activities are mostly concentrated in the deep and ultra-deep offshore with some activities in the Chad basin, located in the northeast of the country. The government expectation is to increase established oil reserves to 40 billion barrels in the next few years. Nigeria has four refineries with a total installed capacity of 445,000 barrels per day. However, capacity utilization is low. Accordingly, annual intake of petroleum products, which according to government is estimated at 34 million liters per day, is not fully met by internal production and has to be supplemented by imports. Developing new offshore oil and gas fields and expanding existing areas could benefit the region economically through increase GDP and revenue generation.

Nigeria's established natural gas reserves, projected at about 187 trillion standard cubic feet, are recognized to be substantially larger than its oil resources in energy terms. Gas discoveries in Nigeria are attendant to oil exploration and production activities. As of 2001, over 50% of the gas produced (mainly associated gas) was flared. Arising from the growing domestic oil consumption, a carefully optimal strategy to replace oil with gas and gas derivatives will boost the availability of more oil for export. This will also promote the conservation of the oil reserves. Besides the economic advantage, fuel substitution from oil to gas is more ecologically friendly because gas is a cleaner fuel than oil. In view of the current reserves and rate of exploitation, the estimated life-span of Nigerian crude oil is about 44 years, based on about 2mb/d production, while that for natural gas is about 88 years, based on the 2001 production rate of 1850 bscf. It is, thus, advantageously important to start major investments in the gas sector in order to sufficiently prepared for gas as a substitute for oil both for domestic needs and foreign exchange earnings.

Energy and Submarine Mining:

Energy and Submarine mining is also another area where the blue economy generates revenue which could be employed in developing effective poverty alleviation policies besides contributing to national development. Deep sea oil drilling is as old as the earth's history and has been in existence for long, but market forces are making the exploration and tapping of even the most isolated areas with remote reserves cost effective. It is certain that oil will remain the leading energy source for many decades to come but the Ocean offers huge prospect for the generation of renewable energy – wind, wave, tidal, biomass, and thermal

conversion and salinity gradients with the offshore wind energy industry being the most developed of the ocean-based energy sources.

Deep-sea mining has always been appealing and attractive to many countries of which Nigeria is not an exception as a means of economic development and revenue generation. A Canadian company (Nautilus Minerals), and the Independent State of Papua New Guinea in April 2014 signed an agreement to begin the world's first deep sea mining for ores of copper, gold, and other valuable metals (Nautilus Minerals, 2014). Mining companies, and national governments, have leases to explore margin sediments for phosphates off Namibia, New Zealand, and Mexico (Mengerink et al., 2014)

Between 2000 and 2010, the price of many non-energy raw materials increased annually by about 15%, mainly as a result of consumer demand in emerging economies (WTO, 2010). Advances in technology, as well as anxieties and unease over security of supply have encouraged mining companies to consider what the seabed can provide. By 2020, 5% of the world's minerals, including cobalt, copper and zinc could come from the ocean floors which could rise to 10% by 2030. Global annual turnover of marine mineral mining can be projected to grow from virtually nothing to €5 billion in the next 10 years and up to €10 billion by 2030 (EC, 2012). The government of Nigeria needs to take adequate advantage of all its coastal areas to accumulate substantial benefits from the coastal resources in its own exclusive economic zones, which will go a long way in increasing her revenue capability and contributes to national economic development.

Marine Biotechnology and Bio-prospecting

Marine biotechnology refers to the application of biotechnology, molecular and cell biology, and bioinformatics in producing products and processes from marine organisms. Ocean exploration is a field of study that focuses on developing new chemicals, enzymes, medicines, and other products and processes (Pereira, 2022). Ocean exploration addresses a variety of subjects, including the advancement of aquaculture, the safety of seafood, bioremediation, and biofuels. Marine biotechnology may discover new uses for biological molecules and new knowledge. Exploring and using marine resources as noted by Schneider et al., (2022 may result to discovering brand-new applications outside the maritime environment. Utilizing the potential of the marine environment for human advantage and essential biological advancement requires biotechnological solutions. Aquaculture's challenges could be solved with the help of biotechnology (Pramanik, Das, and Ghosh, 2022). Sadly, there are dearth of experts and professionals who could utilize this technology and develop a better understanding and application for the growth rate, disease resistance, and reproduction of marine species in Nigeria. Further research must be explored in order to uncover the potential of marine bio-resources in boosting economic growth in the country. These resources might be utilized to create novel goods and procedures and could contribute to resolving the nation's problems of acute poverty caused by food security challenges, energy, and health.

Poverty: Nigeria's Most Significant Challenge

Poverty is one of the critical issues confronting Nigeria as a nation. It thwarts the economic developments efforts of the government at various levels. One of the most critical glitches with economic growth is the disparity in living standards between nations. Poverty also makes people doubt the benefits of market- and development-oriented policies (Sharma, Gupta, Sharma, and Sharma, 2021). According to the United Nations Development Program (UNDEP), hunger and a lack of food are caused mainly by poverty while the Food and Agriculture Organization of the United Nations projected that globally, there are 963 million hungry people constituting about 15% of the total population (Saleem, Shabbir, Shah, and Shah, 2021). The United Nations Program identifies inequality to be on the rise both nationally and internationally. Poverty symptoms manifest in lack of food, illiteracy, poor health care, limited educational resources, low income and unemployment (Esin, 2014).

Poverty is often conceptualized in one of three fundamentally different ways: as a material condition where people are poor when they have an income or consumption level that is too limited to cover basic living conditions; as a multi-dimensional condition where the poverty of people is context specific, dynamic, and is social, political, as well as economic; and as a relationally shaped condition where people are poor because social relations (relations concerning gender, labour, land, etc.) prevent them from improving their condition. Given that Nigeria is still growing and one of its main problems is poverty, it is essential to concentrate to evolve policies towards alleviating its increasing poverty incidence. In whatever way poverty is being conceptualized, it is important to note that the manifestation of poverty has no respect for political boundary. Today at the global level, poverty has become a major development issue. The United Nations has responded strongly to the global poverty challenge by articulating 'poverty eradication' as one of the 17 goals that make up the 2030 Agenda for sustainable development (UNDP, 2015). Other allied institutions such as the World Bank, International Monetary Fund, World Poverty Clock, Brookings Institution and even the Water Life Foundation have collaborated with level agencies to help push back poverty in the world. In spite of their effort, global poverty statistics still remain alarming.

In Nigeria, Poverty has spatial dimensions in terms of regional differences and rural/urban variations. According to the National Bureau of Statistics (NBS)'s report (2016), poverty incidence is higher in the Northwest (51.8%) and lowest in the South-west (25.4%). The statistics further indicate that the North-East had a poverty incidence of 51.5%; North-Central-38.1%; South-East-41.0%; and South-South 35.5%. In terms of rural/urban differentials, the NBS, (2016) report shows that 65% of poor Nigerians live in rural areas. Other studies have also indicated that poverty is more pervasive in rural Nigeria compared to the urban, (Esin 2015; Effiong, 2017).

Causes and Reasons for Poverty in Nigeria

Poverty, it is often said is like a punishment for a crime one did not commit. The population of Nigeria has not yet entirely profited from the impressive economic growth rate of the country. Numerous factors contribute to the high poverty rate and unbalanced income distribution in the country. Even though global variables like the global financial crisis, the rise in oil prices, the global food crisis, the spillover of Covid-19 pandemic etc., have fueled the increase poverty levels in the country, other causative poverty factors are:

Population Growth

Nigeria has the world's most significant population growth rates of 2.4%. By 2050, the population will be close to 300 million. A large population has exacerbated poverty by increasing competition for resources, reduce per capital income, increased burden on infrastructure and services, reduced investment in human capital, increased dependence on natural resources, increased inequality, reduced social mobility and reduced economic growth among others.

Largely Illiterate Population

A UNICEF annual report (2022) shows that Nigeria has a significant number of out-of-school children, with approximately 10.5 million children aged 5-14 years not attending school. This translates to about 25.6% Of primary school-age children being out of schools, with limited progress made since 2016/2017 when the rate was 27.2%. A breakdown of the statistics indicate that 10.2 million children are out of school at the primary school level while 8.1 million children are out of school at the Junior Secondary School level. At the regional level, seven states have out-of-school rates of children above 50% while 15 states have rates below 10%. Thus, 58% of children from the poorest households are out of school in Nigeria. This statistics highlights the significant challenges Nigeria faces in ensuring all children have access to quality education. The high incidence of out-of-school children in Nigeria has severe implications for poverty alleviation. Such implication includes perpetuation of poverty cycle, reduced economic growth, increased inequality and limited human capital development. Thus, addressing the issue of out-of-school children is crucial for poverty alleviation and Nigeria's overall development because young people need to learn the skills necessary for employment with training and job cognitive domains. People who do not have enough education cannot get a job or get out of poverty.

Inequitable Taxes

The tax structure in Nigeria provides appalling evidence of governmental corruption. Instead of differentiating between different economic levels, the structure gives the underprivileged much attention. Over 80% of the taxes on items like energy, gas, and mobile communications are borne by the low-income class while the well-off pay less than 5% in taxes. Six of every 10 Nigerian lack adequate access to food, shelter, healthcare, and education. The poor require enough resources in Nigeria to lift them out of poverty. Without access to improved healthcare, educational opportunities, and fair taxes for the disadvantaged, there won't be significant improvement in Nigeria's economic development.

Stagnated Agriculture Production

The backwardness of Nigeria's agricultural sector's impacts approximately over 70% of the population, and the low wages and deficient infrastructural facilities in rural regions are the leading cause of poverty in Nigeria. The cultivated land in Nigeria is spread unevenly, according to data from the agriculture census. Poor people lack access to sufficient farm input such as affordable fertilizer, pesticides, quality seeds, water, cutting-edge technology, and extension services. Their income is lesser because they lack the resources to develop their property, resulting in prevalent large scale poverty in rural regions.

Inflation

Inflation, the most regressive tax on the fixed-income class, is the fourth cause of poverty. Evidence abound (Rehman, Cismas, and Milin, 2022) that the fixed-income group is more negatively impacted by inflation than the business class. Government salary is not adjusted to inflation, yet employees' expenditures are rising due to the high cost of living. One major cause of poverty is insufficient income and savings (Suleman, Javed, and Amjad, 2022). Also, the country's manufacturing sector is quite outdated. Less than 25% of the national income goes to this sector, which is relatively low compared to advanced nations. Because of industrial backwardness, Nigeria imports virtually all goods both consumer and manufactured goods. Considerable volume of the country's foreign currency set aside is spent on industrial imports. The low standard of living and poverty are directly or indirectly linked to the backwardness of industrial development in the country.

Poor Governance

Poor governance is one of the major causes of poverty in Nigeria. It is an undisputable fact that a necessary and significant prerequisite for growth and development is good governance. Nevertheless, the reverse is the case in Nigeria. Corruption has a devastating impact on poverty, exacerbating it and making it more challenging to eradicate. Corruption leads to the misallocation of resources, as funds intended for poverty reduction programs are diverted into the pockets of corrupt officials. Corruption also distorts the allocation of resources, leading to inefficient investments and projects that benefit the corrupt rather than the poor. Asides, corruption discourage foreign investment reduce economic growth and limits job opportunities, thereby perpetuating poverty. Corruption reduces the resilience of communities, making it more challenging for them to recover from shocks and

setbacks. Corruption therefore has a thoughtful impact on poverty, exacerbating it and making it more challenging to eradicate. Addressing corruption is essential in reducing poverty and promoting sustainable development.

Blue Economy and Poverty Alleviation

The blue economy, encompassing all economic activities related to oceans, seas, and coasts, offers significant potential for improving livelihoods and bringing majority of the poverty trap households out of poverty when effectively harnessed. The various ways in which the development of the different sectors of the Blue Economy could help in alleviating poverty in Nigeria are highlighted as follows:

Fisheries and Aquaculture:

Fisheries and aquaculture could contribute to poverty reduction in Nigeria economy in a multidimensional and very significant ways viz-a-v-z:

i) Employment Generation and Poverty Reduction: Fisheries and aquaculture provide employment outlets for millions of Nigerians, particularly in rural coastal communities often characterized by severe and chronic poverty. The sector is estimated to directly employ about 1 million people, with many more employed indirectly in supporting activities like manufacturing and fish processing.

ii) Food Security and Nutrition: Fish is an important source of animal protein for poor households particularly in the highly impoverished rural coastal communities and the fisheries sector significantly contributes in meeting and addressing the protein needs of the population. Fish is a cheaper and more accessible source of protein unlike meat, making it a staple food item for many Nigerians. The World Bank emphasizes the contribution of blue food (fish, seafood, and seaweed) in food security and nutrition, as well as the potential of blue jobs (in fisheries, aquaculture, shipping, and marine conservation) for livelihood improvement among the poor households.

iii) Foreign Exchange Earnings: Nigeria is a major exported of fish and fishery products, contributing to the foreign exchange earnings of the country. The sector earns significant foreign exchange through export, which helps improve the wellbeing of the population and the nation's balance of trade.

iv) Contribution to GDP: The fishery sector significantly contributes about 4% to the nation's GDP. The sector has shown a promising growth rate in recent years, with significant prospect for more growth and development.

v) Aquaculture: Nigeria has become the second aquaculture producer in Africa, with fish farming becoming one of the fastest-growing farming businesses in the country. The sector has great potential for growth, with more openings for investment in fish processing, marketing and export.

Tourism:

The tourism and hospitality sectors in Nigeria contribute to the economy by creating jobs and increasing GDP. Data on the contribution of the travel and tourism sector of the Blue Economy in Nigeria indicates that:

i) Employment Generation: Available data reveals that in 2022, travel and tourism employed about 1.91 million people in Nigeria, which is about 2.9% of the country's total employment while the tourism and hospitality sectors create jobs in many areas, including transportation, accommodation, food and beverage, travel agencies, and tour operators.

ii) Gross Domestic Product (GDP): Statistics show that in 2022, travel and tourism contributed 3.6% to Nigeria's GDP, which is about \$17.3 billion. The hospitality industry is closely tied to the Nigerian economy, and a stable economy is important for poverty alleviation.

Renewable Energy:

The renewable energy sector of the Blue Economy when fully harnessed could make significant contributions to poverty alleviation and Nigeria's economy. According to the International Renewable Energy Agency (IRENA), about 60% of Nigeria's energy demand in 2050 can be met with renewable energy sources, saving 40% in natural gas and 65% in oil needs. The shift towards renewable energy could have numerous economic benefits in poverty alleviation through:

i) Job Creation: Renewable energy can create new job opportunities in manufacturing, installation, and maintenance of renewable energy systems.

ii) Economic Growth: Investing in renewable energy can stimulate local economies and contribute to the growth of Nigeria's GDP which could significantly take majority of their poor households out of poverty.

iii) Reduced Over-reliance on Fossil Fuels: Transitioning to renewable energy can minimize Nigeria's reliance on fossil fuels, thereby increasing the disposable income of the poor households mitigating the impact of price volatility and climate change which has displaced the majority of the population from their livelihoods source.

iv) **Improved Energy Access:** Investing in renewable energy by the government can increase access for the rural and underserved rural communities majority of which are enmeshed in acute poverty thereby promoting energy equity and social inclusion. Study by Esin (2014) has shown that improving access of the rural households to energy (electricity) has considerable potential welfare benefits to rural households as such energy provision could enhance the thriving of small and medium scale industry which in turn induces the growth of the rural economy by 19.4%. Conversely, their absence from the rural communities deprives such areas of the much needed growth which may result in increased poverty.

Shipping and Logistics:

The shipping and logistics sector plays a significant role in Nigeria's economy in poverty reduction as it can create:

i) **Employment Opportunities:** The shipping and logistics industry provides employment opportunities for millions of Nigerians, either directly or indirectly. From dockworkers to shipping agents through freight forwarders to logistics providers, the industry supports massive workforce. If fully developed, the shipping and logistic sector of the blue economy would play significant role in reducing unemployment levels and poverty rates in the country.

ii) **Foreign Exchange Earnings:** Shipping and logistics activities generate considerable foreign exchange earnings for Nigeria which if efficiently utilized could facilitate the growth of the nation's economy and reduce the poverty incidence to minimal. The industry facilitates the export of goods such as oil, minerals, and agricultural items, generating valuable foreign exchange for the country.

iii) **Economic Growth:** The shipping and logistics sector of the Blue Economy contributes to economic growth in Nigeria by enhancing trade, both locally and internationally. The sector enables the transportation of goods, stimulates economic activity and supports the growth of allied industries. With good policies directed at poverty alleviation and devoid of corruption, the sector could significantly reduce poverty rates in the country.

iv) **Infrastructural Development:** The growth in the shipping and logistic sector drives the development of critical infrastructure such as seaports, airports, and inland container depots with vast potential in job generation and livelihoods improvement. These infrastructure developments have positive knock-on effects on other sectors of the nation's economy.

v) **Revenue Generation:** The shipping and logistics sector generates massive revenue for the government through taxes, levies, and other sundry charges. If these revenues are efficiently and effectively utilized, they can be employed to fund public expenditures, including infrastructure development and social services with obvious implication on poverty alleviation in the country.

II. Marine Biotechnology:

While Nigeria has not fully harnessed the potential of marine biotechnology sector of her Blue Economy, the sector has the potential to significantly drive the economic growth of the country and improves the living condition of the teeming population in the following ways:

i) **Job Creation:** Tapping the potential of marine technology can generate employment opportunities in areas like research and development, innovation and manufacturing and services.

ii) **Improves Export Earnings:** The products of marine biotechnology such as bioactive compounds can be exported by the country to other countries therefore earning valuable foreign exchange which can be used to develop ailing industries in the country with long term impacts on poverty alleviation.

iii) **Growth of Gross Domestic Product (GDP):** Growth in marine biotechnology sector can stimulate increase in Nigeria's GDP diversifying the country's economy and reducing its over-reliance on the oil and gas sector.

iv) **Economic Growth:** Harnessing the potential of the marine biotechnology sector can create high-value industries in pharmaceuticals, cosmetics, and biofuels. The discovery of new drugs and therapies can contribute to the pharmaceutical industry and agricultural sector through improve crop yields and disease resistant crops thereby contributing to the country's food security.

III. Conclusion and Recommendation:

While the blue economy offers immense potential in poverty alleviation, it is essential to embrace sustainable practices to ensure long-term benefits. The study has shown that blue economy has far-reaching potential for expanding economic activities and poverty reduction if the economic, social, technological, cultural and environmental challenges fettering the development of the sector are properly addressed. Consequently, the study recommends strong political will and robust institutions for effective development and implementation of blue economy policies in order to bolster livelihood activities in Nigeria. The need to establish thorough policy coordination and stakeholder engagement to provide formidable structure for the development of blue economy in Nigeria is also suggested.

References

1. Ababouch, L. (2015). Fisheries and aquaculture in the context of blue economy. background paper. In: Carolu, C. (Ed.). Feeding Africa: an action plan for agricultural transformation, 21–23 October 2015, Dakar, Senegal. pp. 1–13.
2. Aijaz, U., & Butt, H. D. (2021). Bolstering Sustainable Growth through Blue Economy. Pakistan Journal of international Affairs, 4(1).
3. AU-IBAR (2018). Impact of international fish trade flows in Africa. accessed on march 5th, 2022 from <http://repository.auibar.org/bitstream/handle/123456789/1152/FULANDA%202018%20%20%20FISH%20TRADE%20FLOWS%20AFRICA%20REPORT%20FINAL%2020180817.pdf?sequence=1&isAllowed>.
4. Ayilu, R. K., Fabinyi, M., & Barclay, K. (2022). Small-scale fisheries in the blue economy: Review of scholarly papers and multilateral documents. Ocean and Coastal Management, 216, 105982.
5. Choudhary, P., Khade, M., Savant, S., Musale, A., Chelliah, M. S., & Dasgupta, S. (2021). Empowering blue economy: From underrated ecosystem to sustainable industry. Journal of Environmental Management, 291, 112697.
6. Cooray, N. S., Premarathna, U., Atapaththu, K. S. S., and Priyadarshana, T. (2022). Development and Challenges of Indian Ocean Blue Economy and Opportunities for Sri Lanka. In Global Blue Economy (pp. 221-257): CRC Press.
7. da Silva, L., Sergiienko, N., Cazzolato, B., and Ding, B. (2022). Dynamics of hybrid offshore renewable energy platforms: Heaving point absorbers connected to a semi-submersible floating offshore wind turbine. Renewable Energy, 199, 1424-1439.
8. EC. (2021). The EU blue economy report 2021. Publications office of the European Union, Available Online: <https://op.europa.eu/en/publication-detail/-/publication/0b0c5bfd-c737-11eb-a925-01aa75ed71a1> (Accessed June 10, 2022)
9. Effiong, J.A.L. Eze, E.U. and Njoku, G.U. (2021). Economics of fishing operations by trawling vessels in Nigeria. International Journal of Scientific Engineering and Applied Science (IJSEAS). 7 (6).
10. Esin, J.O (2014). Spatial analysis of rural poverty in akwa ibom state, Nigeria. A PhD thesis submitted to the department of geography, faculty of social sciences, University of Uyo, Akwa Ibom State, Nigeria.
11. Esin, J.O (2016). Rural poverty in Nigeria: A spatial analysis. Germany: lap lambert academic publishing. 284pp.
12. Esin, J.O and Nse, B. Okon (2024). Bolstering African's Sustainable Revenue Growth in the 21st Century through the Development of Blue Economy: The Case of Nigeria. International Journal of Research and Innovation in Applied Sciences. 9(7): 424-437.
13. Esin, J.O and Zelibe, C.J (2024). Analyzing the contributions of blue economy to national development through theoretical lens: Illustration from Nigeria. International Journal of Creative Research Thought. 12(9):967-979.
14. Faran, F., and Ejaz, K. (2022). Blue Economy of Maritime Nations in South Asia: Challenges and Prospects South Asian Studies, 37(1).
15. Farmery, A. K., Allison, E. H., Andrew, N. L., Troell, M., Voyer, M., Campbell, B., Steenbergen, D. (2021). Blind spots in visions of a “blue economy” could undermine the ocean’s contribution to eliminating hunger and malnutrition. One Earth, 4(1), 28-38.
16. Fjellstedt, C., Ullah, M. I., Forslund, J., Jonasson, E., Temiz, I., and Thomas, K. (2022). A review of AC and DC collection grids for offshore renewable energy with a qualitative evaluation for marine energy resources. Energies, 15(16), 5816.
17. Food and Agriculture Organization (FAO). (2020). The State of World Fisheries and Aquaculture 2020. <http://www.fao.org/state-of-fisheries-aquaculture> (18.08.2021).
18. Food and Agriculture Organization (FAO). (2019a). Establishing and linking global fish-trade information networks, 2019. <http://www.fao.org/in-action/establishing-and-linking-global-fish-tradeinformationnetworks/en/> (20.04.2019).
19. GCIP (Global Consumption and Income Project). (2019). World data. www.un.org. (Retrieved on 20th August, 2023)
20. Gill, S. A., and Iqbal, J. (2021). Exploring the role of blue economy in sustainable development: A Perspective from Pakistan. P-J.
21. Hazra, S., and Bhukta, A. (2022). Blue Economy: An overview. The blue economy: An Asian Perspective, 3-13.
22. Heidkamp, C. P., Morrissey, J., Germond-Duret, C., and Rourke, M. (2022). Blue economy: People and regions in transitions. In Blue Economy (pp. 3-10): Routledge.
23. Iheonu, C. O. and Urama, N. E. (2019). Addressing poverty challenges in Nigeria. AfriHeritage Policy Brief. No.21, July 2019, 5p.
24. Khan, M. R. (2021). Blue economy and Pakistan’s maritime potential. Book Review/IJKIE. ORG, 51-53.
25. Lyons, P., Mynott, S., & Melbourne-Thomas, J. (2023). Enabling indigenous innovations to re- centre social licence to operate in the blue economy. Marine Policy, 147:105384.
26. Muhammad, D. M., Brohi, M. A., & Ullah, N. (2021). The Pakistan’s untapped blue economy potential. Journal of Global Peace and Security Studies (JGPSS), 2(1), 63-73.
27. National Bureau of Statistics (NBS). (2020). Demographics of Nigeria – statistics and facts. <https://www.statista.com/topics/6477/demographics..> (Retrieved on 14th Sept, 2023).
28. Nezhad, M. M., Neshat, M., Groppi, D., Marzioletti, P., Heydari, A., Sylaios, G., & Garcia, D. A. (2021). A primary offshore wind farm site assessment using reanalysis data: A case study for Samothraki island. Renewable Energy, 172, 667-679.

29. Nwaobi, G. C. (2003). Solving the poverty crisis in Nigeria: an applied general equilibrium approach. Quantitative Economic Research Bureau. Gwagwalada, Abuja. 34p.
30. Odongkara, K.O., Abila, R.O. & Luomba, J. (2009). The Contribution of Lake Victoria Fisheries to National Economies. *African Journal of Tropical Hydrobiology and Fisheries*, 12: 47– 51. Available from: DOI: 10.4314/ajthf.v12i1.57369.
31. OECD (2017). The Ocean economy in 2030. Retrieved from <http://www.oecd.org/futures/oceaneconomy.htm>
32. Orokpo, O. F., Haruna P. O., Asmau M. A. and Mutong, S. M. (2018). Nigeria's raising poverty profile amidst poverty alleviation programmes: interrogating the paradox. *International Journal of Innovative Development and Policy Studies*, 6(2):109-116.
33. Pereira, C. G. (2022). Special issue on advances in marine biotechnology: Exploitation of halophyte plants. In MDPI, 12:10573
34. Pramanik, A., Das, S., and Ghosh, T. (2022). Role and prospect of marine biotechnology in blue economy. In *The Blue Economy: An Asian Perspective*, 77-90: Springer.
35. Rehman, A., Cismas, L. M., and Milin, I. A. (2022). "The three Evils": Inflation, poverty and unemployment's shadow on economic progress: A novel exploration from the asymmetric technique. *Sustainability*, 14(14), 8642.
36. Rigaud, K. K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McCusker, B., Heuser, S., & Midgley, A. (2018, March 19). Toward a blue economy. Open knowledge repository. Retrieved February 1, 2023, from <https://openknowledge.worldbank.org/handle/10986/29461>
37. Samad, G., and Abbasi, J. (2022). Advancement of science and technology: Future prospect of blue economy. In *The Blue Economy: An Asian Perspective*, 15-35: Springer.
38. Schneider, X. T., Stroil, B. K., Tourapi, C., Rebours, C., Gaudêncio, S. P., Novoveska, L., and Vasquez, M. I. (2022). Responsible research and innovation framework, the Nagoya protocol and other European blue biotechnology strategies and regulations: Gaps analysis and recommendations for increased knowledge in the marine biotechnology community. *Marine Drugs*, 20(5), 290.
39. Setiyowati, H., Nugroho, M., & Halik, A. (2022). Developing a blue economy in Depok West Java, Indonesia: Opportunities and challenges of neon tetra fish cultivation. *Sustainability*, 14(20), 13028.
40. Sharma, M., Gupta, M., Sharma, R. L., and Sharma, A. K. (2021). Prospects and challenges of microfinance as a tool in poverty reduction. *Academy of Marketing Studies Journal*, 25(6), 1-6.
41. Smith-Godfrey, S. (2016). Defining the blue economy. *Maritime affairs: Journal of the National Maritime Foundation of India*, 12(1), 58-64.
42. Suleman, R., Javed, M. S., and Amjad, M. A. (2022). Influence of food products sudden inflation on livelihoods of daily income wagers of Pakistan. *Annals of Social Sciences and Perspective*, 3(1), 129-135.
43. Syed, R., and Safdar, A. (2021). Revisiting blue economy: challenges and prospects for the maritime sector of pakistan. *Journal of Contemporary Studies*, 10(2), 16-37.
44. Tagar, H. K., Shaikh, S. M., Tagar, A. K., and Bijarni, G. A. (2021). Economic growth of pakistan in 21st century and the use of 'blue economy' resources for Sustainability. *European Journal of Social Sciences*, 62(2), 38-49.
45. Trifonova, N., Scott, B., Griffin, R., Pennock, S., and Jeffrey, H. (2022). An ecosystem-based natural capital evaluation framework that combines environmental and socio-economic implications of offshore renewable energy developments. *Progress in Energy*, 4(3), 032005.
46. United Nations Economic Commission for Africa (UNECA). (2016). Africa Regional Integration Index. Report 2016. Addis Ababa. UNECA. Available from: <https://hdl.handle.net/10855/23200> (Accessed 20th February, 2022).
47. UNICEF (2022) Country Office Annual Report in Nigeria. www.unicef.org.
48. UNWTO (2015) World tourism barometer. 2015 Edition.
49. van de Water, J. A., Tignat-Perrier, R., Allemand, D., and Ferrier-Pagès, C. (2022). Coral holobionts and biotechnology: From blue economy to coral reef conservation. *Current Opinion in Biotechnology*, 74, 110-121.
50. Wang, Y and Wang, B. (2016). Multidimensional poverty measure and analysis: a case study from Hechi City, China. SpringerPlus, 5:642.
51. World Bank (2022). Gender Integration in the Blue Economy Portfolio: Review of Experiences and Future Opportunities.
52. World Bank (2018). Poverty and shared prosperity 2018, The World Bank, Washington, DC, 98p.
53. World Bank. (2019). A blue future for Costa Rica's fisheries. [blogs.worldbank.org](https://blogs.worldbank.org/latinamerica/bluefuturecostaricafisheries?cid=SHRB), Available Online: <https://blogs.worldbank.org/latinamerica/bluefuturecostaricafisheries?cid=SHRB> logSiteTweetab.
54. World Data Lab. (2019). The percentage of Nigerians living in extreme poverty could increase by 2030. Retrieved from World Poverty Clock: www.worldpoverty.io/blog/index.php. (Retrieved on 14 Sept, 2023).
55. WorldFish, (2022). WorldFish in Nigeria. <https://www.worldfishcenter.org/where-we-work/africa/nigeria> #:~: text=Fish%20is%20an%20important%20part,kg%2Fperson %2Fper%20year (9/03/2022) WorldFish, (2018).
56. World Travel and Tourism Council. (2015). The economic impact of travel & tourism, Nigeria fact file. World Travel and Tourism Council, 1–17.
57. WWF, (2019). Principles for a sustainable blue economy. WWF Baltic ecoregion programme.