



Challenges and Prospects of the Deployment of Blue Economy in the Coastal Areas of Ondo State

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Abstract: *The coastal region of Ondo State, South-western Nigeria is located within the geographical coordinates of Latitude 6 21'0" North and Longitude 4 46'o" East. It is the longest coastal line in Nigeria and blessed with marine resources waiting to be exploited. The Blue Economy (BE) is an economic model proposed by Gunter Pauli that lay emphasis on economic activities that depends on the sea and associated sectors, including fishing, transportation, tourism, maritime and energy. Blue Economy growth supports the sustainable growth of the maritime and marine sectors as the oceans and seas are engines of the global economy and have great potential for growth and development of the coastal areas in particular and the nation at large. Apart from oil that are found in the area, other minerals associated with marine are also found in the coastal area under study and the natural environment of the area is particularly suitable for tourism and hospitality. The natural occupation of the people in this area is fishing and the fishing method presently being used is obsolete and cannot guarantee the well-being of the people. Beside oil that is being explored others resources and minerals are yet to be maximally harnessed.*

Despite the availability of marine resources in this area, the Blue Economy strategies and components are yet to be fully deployed. This research, therefore aims at identifying the different types of economy models in place in the area, undertake comparative analysis of these models with the goal of identifying their strengths and weaknesses relative to Blue Economy, resources available in the area, level of utilization of these resources and prospects of deployment of Blue Economy in order to achieve the sustainability growth of the coastal areas

Keywords: *Anthropogenic Activities, Blue Economy, Coastal Areas, Circular Economy, Exogenic Element, Geomorphic Agent, Green Economy and Sustainability.*



1. INTRODUCTION

Gunter Pauli, a Belgian Economist is the founder of the Blue Economy and ZERI (Zero Emissions Research and Initiatives) also, known as the Elon Musk of Sustainability. According to [32], the Blue Economy is defined as the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem and European Commission defines it as all economic activities related to oceans, seas and coasts. From these two definitions, Blue Economy can be appropriately said to be an economic term founded by Gunter Pauli that deals with the exploitation, preservation and regeneration of the marine environment. Furthermore, it is the utilization of ocean resources in order to improve the welfare and well-being of human beings while at the same time sustains the overall ocean resource base into perpetuity. This is in tandem with the World Bank policy that states that the Blue Economy is the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem. Since the discovery of Blue Economy system as a strategy and tool that can impact positively on the economy, growth and development, it has been fully embraced and practiced successfully in some economies of the world. The result of its implementation has been wonderful in improving the welfare and wellbeing of the citizenry by and large and people in coastal areas in particular.

The coast is one of the dynamic parts of the earth surface which is an area where land meets the ocean or sea or as a line that forms the boundary between the land and the ocean or a lake. The coastal region of Ondo State, South-western Nigeria is a location within geographical coordinates of Latitude 6 21'0" North and Longitude 4 46'o" East. The wet season is warm and overcast, the dry season is hot and partly cloudy year round, the temperature typically varies from 72°F to 90°F and is rarely below 6°F or above 93°F. Apart from oil found in the area, other mineral/ raw materials available in the area include glass sand salt, Tar sand/Bitumen, quartz and clay. Agricultural products such as fish, Poultry, piggery, Maize, Palm oil, Vegetables, Timber, Raffia, Poultry, Copra, Cocoyam, Bananas and Cassava are also found and grown in the area. The natural environment of the area is particularly suitable for the development of large scale rice plantations and the salt industry. All these resources are either not tapped or partially tapped. Aside the illegal activities being carried out on the resources located in the area and few of the people that are engaged in paid employment, the major occupation of the people of coastal areas is fishing. People that are gainfully employed do also take into fishing as alternative source of income.

Based on the morphological, vegetational and beach type characteristics, the coastal zone is classified into four broad regions namely, from west to east, the barrier lagoon coast, the transgressive mud coast, the Niger Delta, and the strand coast [WACA 2019] while the coastal states in Nigeria are Akwa-Ibom, Bayelsa, Cross-Rivers, Delta, Edo, Lagos, Ogun, Ondo and Rivers. All these coastal states are oil producing states except Lagos and Ogun States and therefore are referred to as Oil producing states. In each of these coastal states, there are areas that are specifically coastal areas. Coastal areas are local administrative units (LAUs) that are bordering or close to a coastline. A coastline is defined as the line where land and water surfaces meet (border each other). The coastal areas in Ondo state in the Southern senatorial district of the state are found in Okitipupa, Igbokoda, Eseedo and Irele Local Governments. Ondo state has a shoreline covering about 180 km thereby making her the state with the longest coastline in Nigeria.



The major focus of the Blue Economy is the transformation of the economic activities through the utilization of marine resources. Apart from oil which is being exploited by the Federal Government and fishing that the coastal people embrace as their major occupation, the rivers in the coastal areas of the state contain different types of resources that are waiting to be tapped or processed to transform the economy of the area and contribute meaningfully to the income of the state and national governments. There are noticeable challenges that are opposing the deployment of the Blue Economy by the Government and also prevent organizations to key into the strategies of the model. These challenges are in various forms and magnitude. This research is consequently being carried out to

- (i) identify the resources available in the coastal areas of Ondo State;
- (ii) point out the challenges preventing the deployment of B E in the coastal areas of Ondo state;
- (iii) proffer efficient ways to adopt in the implementation of the BE for the transformation of the economy of Ondo State and
- (iv) Bring out the prospects of the BE in the coastal areas of Ondo State

2. DESCRIPTION OF THE STUDY AREA

The coastal region of Ondo State, South-western Nigeria is located within the geographical coordinates of Latitude 6 21'0" North and Longitude 4 46'o" East. The wet season is warm and overcast, the dry season is hot and partly cloudy year round, the temperature typically varies from 72°F to 90°F and is rarely below 6°F or above 93°F. Apart from oil found in the area, other minerals associated with marine are found in the area and the natural environment of the area is particularly suitable for the cultivation of agricultural crops like cassava and rice.

The study area of the coastal region of Ondo state focused on Ilaje, Igbokoda and Okitipupa local governments of the state because of the monolithic nature of the coastal areas; coastal areas do have similar features, resources and occupation. Their occupational activities include fishing, canoe making, lumbering, net making, mat making, launch building, farming and trading while their major occupation is fishing because most part of the area is riverine and proximity to the sea. The large scale fishing activities of the people in the area do attract traders and consumers from different parts of the country to the area. One of the largest fish markets in Nigeria is in Igbokoda, an area in the coastal region of Ondo state.

2.1 Survey of the area

The survey was conducted in the study area with the use of GPS Garmin receiver to collect the area data points. The results got from the GPS were collated and entered in the Excel spreadsheet. These detailed results in Excel were exported to the ArcGIS hydrology tool software to create the map boundary of the study area. Data acquisition was carried out in seven major towns in the areas and the towns are Ode-Aiye, Idepe, Yewa, Igbokoda, Ugbonla, Ipore and Araromi. The data acquired were entered into the computer system ArcGIS hydrology tool software to generate the location map of the coastal areas of Ondo state as shown below.

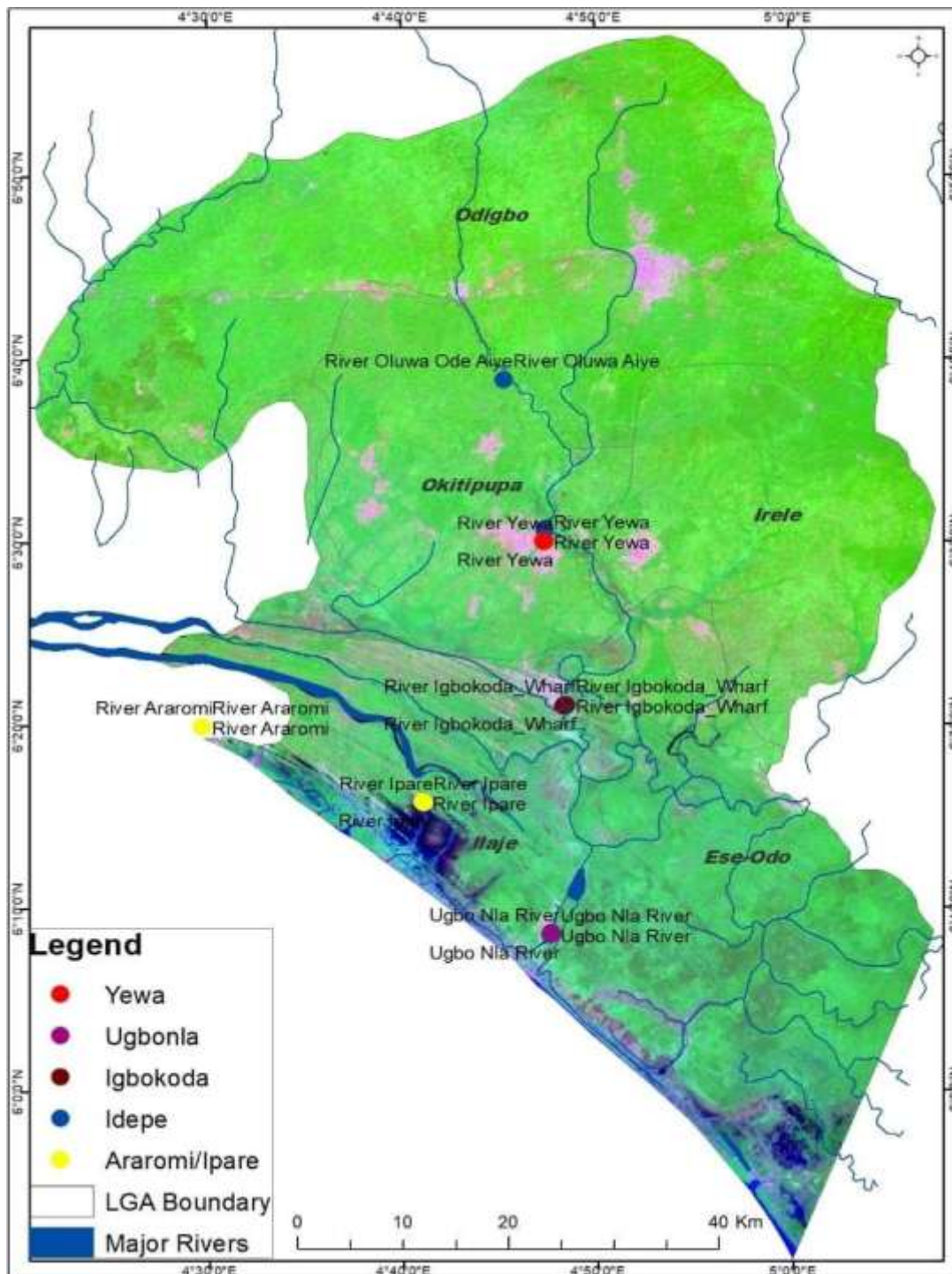


Fig.1. Map of the study area

3. ECONOMIC MODELS

In academic research, a literature review on the BE also needs to include similar models and concepts. Lee et al. [16] states that the term BE has been used in different ways and similar terms such as “ocean economy” or “marine economy” are used without clear definitions. At the same time, when analyzing other articles that addressed BE, it was observed that ocean



economy (OE), marine economy (ME), and blue growth (BG) were also used as synonyms [14], [29]. The concept of BE and other similar concepts to it had been adequately defined and explained in [14] [14] [30]. Before BE, there were some other models like linear economy, circular economy, Green Economy being successfully used so are necessary to be briefly defined and explained here.

3.1 Circular Economy

A circular economy is an economic system with focus on a model of production and consumption that involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. It is a systemic approach to economic development designed to benefit businesses, society, and the environment. The circular economy is an improvement over linear economy and it actually addressed most of the challenges and shortcomings associated with linear economy. Also, in difference to the take-make-waste feature of the linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources.

3.2 The Blue Economy

The BE is an economic system proposed by Gunter Pauli in his work published 2010. According to the World Bank, the BE is the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem [32]. European Commission defines it as all economic activities related to oceans, seas and coasts. It is obvious from the various definitions and meanings ascribed to BE that its main concern is ocean resources and economic growth. The BE proposed a new type of business model to achieve societal sustainability based on three guiding principles:

- a. be continually inspired by nature;
- b. change the rules of the game and
- c. focus on what is locally available.

The model focused primarily on the exploitation and utilization of ocean resources for the sustainability of the society. It is an emerging concept which encourages better stewardship of the ocean or 'blue' resources. The BE is related to the green economy in some areas because model aims for improvement of human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities.

3.3 Circular Economy, Green Economy and Blue Economy

Most known economic models are applicable and can be associated with the study area especially circular, green and blue economies. These economic models have their peculiar distinctive factors and variables that determine their effectiveness and applicability in the area of study. Consequently it is imperative to comparatively examine some of these models with the BE in order to determine the adaptability, functionality, efficiency and most importantly, the prospects of the BE in the study area. The green economy is widely applauded as being the most suitable economy in the riverine area because of its strong tie with agriculture and other sectors but there are many variables and strategies that differentiate green economy from BE. Green economy strategies primarily focus on the sectors of energy, transport, agriculture and forestry, while the BE focuses on fisheries sectors and marine and coastal resources. The strategies being adopted to achieve the goals



of green economy obviously differs in form and scope from that of BE even though both may face similar challenges and impediments. However, their similarity is that the BE model aims for improvement of human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities like the green economy

As pointed out earlier, circular economy is a circular elongation of linear economy to reduce waste and create additional opportunities. Therefore circular economy is associated with reuse and recycle of resources in order to prevent waste irrespective of the origin of such resource. On the other hand, BE deals basically with genuine and economic utilization of ocean resources in order to ensure sustainability. The focus of circular economy is based on the current linear business models with focus on businesses that center on one core business. The BE shows that having a portfolio of businesses can create more value, not only in economic terms but for society and nature as a whole. Furthermore, in a circular economy, manufacturers design products to be reusable. For example, in the design of electrical devices there are chances of repair or replacement of any faulty part. Products and raw materials are also reused as much as possible. Circular economy permits redesign, reuse, repair, remanufacturing and recycling of products which are a way of achieving SDG 12 (Sustainable Production and Consumption). However, BE in practice, in coastal areas will intend to improve the economy base of such areas and consequently achieve the goal of sustainability and wellness of people living in such areas through maximum utilisation of ocean resources while maintaining the health of the ocean. It offers a twin advantage of sustainability and development.

4. OCCUPATION OF THE PEOPLE OF THE COASTAL AREA

It is an established fact that coastal regions is a critical source of raw materials for industry including water, sand and space for shipping and ports; lumbering, canoe making, opportunities for recreational activities such as fishing and diving; and other raw materials, including salt and sand. These nevertheless people living in coastal areas are predominantly into fishing. This is because of their peculiar location, nature and presence of water throughout the year. However, their daily production despite the availability of water is declining and can barely sustain their families due to anthropogenic activities, geomorphological agents, natural hazards and artificial hindrances.

Besides fishing, some of the locals are engaged in paid jobs by government, oil exploration and allied companies and other organizations. However, these job opportunities are not enough to take care of the population of people living in coastal areas which is daily increasing

5. CHALLENGES OF THE COASTAL AREAS OF ONDO STATE

The coastal areas are facing several challenges and these challenges can be simply traced and categorized into geomorphological agents, anthropogenic activities and lack of infrastructure.

5.1 Anthropogenic Activities: Anthropogenic refers to environmental change that are either caused or influenced by people directly or indirectly. The anthropogenic activities vary in forms and mode. While some resulted from activities of organizations working in the coastal area like exploration, some are man-made. These activities in whatever form, mode and scope have heavily affected natural water supplies such as rivers, streams, and aquifers.

The anthropogenic activities that have greatly affected the study area due to organizational activities are oil exploration, oil development and dredging among others.



These have caused flooding, water degradation, pollution and flooding problems and challenges

5.1.1 Pollution: One of the serious challenges being faced by coastal area and caused by anthropogenic activities is pollution. The pollution has actually affected both the environment and water. The most serious effect of this is that fishing which is the people's main occupation has gradually become impossible to practice due to the polluted water and high tide. Majority of those that are trying to ignore the consequences of water pollution and degradation do experience reduced harvest, sustain various degrees of injury and in some cases paid with their lives. The added consequence of the pollution of the area and rising sea level have led to the loss of properties, plants, animal species, among others, while some families have been separated over the need for shelter

5.2 Geomorphic Agent: This is any exogenic element of nature (like water, ice, wind, etc.,) capable of acquiring and transporting earth materials. The primary geomorphic agents driving exogenic processes are water, ice, and wind. When these elements of nature become mobile due to gradients, they remove the materials above and below the surface and transport them over slopes and deposit them at lower level. Exogenic are processes that manifest on the Earth's surface and that generally reduce relief and these processes include weathering and the erosion, transport, and deposition of soil and rocks.

The geomorphological agents noticeable in some parts of the coastal zone including the study area include winds, the astronomically generated tides, the wind-generated waves, and various forms of current flow [24]. These generate specific geomorphic processes and interact to produce an energy input which shapes and modifies the coast. Through feedback mechanisms, the developing morphology influences geomorphological processes, thereby becoming a factor influencing subsequent coastal evolution.

Man as a geomorphological agent through his activities, also contributes and aids in no small measure to geomorphological processes. It was widely noticed and reported that within the last three decades, accelerated coastal erosion, sea incursion and flooding have surfaced and reached alarming dimensions in some other parts of the Niger Delta, notably along the transgressive mud coast in Ondo state due to geomorphological agents.

5.3 Lack of infrastructure; The social and economic development of any given area depend largely on and is a function of the basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of the area or enterprise that are available. Any area without infrastructure will obviously not grow or develop at the expected pace. The study area has been without electricity for over a decade and there is no hope that there will be electricity in the nearest time. The intra and inter roads are bad and water hyacinth has made water transportation very difficult. Lack of or inadequate or when there are infrastructure but they are not operating properly, the chain of production will be disrupted or totally stalled. The consequences of this disruption is that development is hindered, it causes economic deficit and, in turn, brings low standards of living and may lead to unemployment or loss of job. In summary, it is not possible to expect development in the absence of infrastructure.

6. PROSPECTS OF DEPLOYMENT OF BLUE ECONOMY

Sustainable development is the organizing principle for meeting human development goals while at the same time sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depend [22]. The



major goal of any economy model is to ensure sustainable development; therefore, one of the prospects of the BE if appropriately deployed in the study area is to ensure sustainable development. One way of achieving the sustainable development goal is the maximum utilization of ocean resources and this can be done by deploying BE. Unlike the Millennium Development Goal (MDG) 7B relating to fish stocks and protect marine areas, SDG adequately addressed the issue of ocean and ocean resources. SDG goal number-14 lay emphasis on conservation and sustainability use of the oceans, seas and marine resources for sustainable development, goal 12 addresses sustainable production and consumption patterns, goal 13 explains urgent action on climate change and goal 15 talks about protection, restoration and promotion of sustainable use of ecosystems and biodiversity and lightly overlapping with few other points too. [22] clearly identified and explained targets and indicators proposed under the goal 14 that are more relevant to the oceans economy to include:

- 1) Reduction of marine pollution, including from land-based activities;
- 2) Sustainable management and protection of marine and coastal ecosystems;
- 3) Mitigation of the impacts of ocean acidification;
- 4) Regulation of fish harvesting with the aim of controlling over fishing;
- 5) Restoration of fish stocks to ecologically safe levels;
- 6) Ensuring the full implementation of existing regional and international regimes on oceans and seas;
- 7) Elimination of IUU fishing and destructive fishing practices;
- 8) Elimination of subsidies which contribute to overcapacity and over fishing;
- 9) Providing access of small-scale and artisanal fishers to marine resources and markets; and increasing the economic benefits to Small Island Developing States (SIDS) and Least Developing Countries (LDCs) from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

There are several advantages derivable from the deployment of BE in the study area and some of these are:

- a. There will be a significant increase in the human flow to the southern part of Ondo State which is the base of the coastal areas if the blue economic models are deployed.
- b. It will create employment opportunities and other income-generating activities,
- c. Development of other social services, security services as well as the overall standard of life for the local people at coastal areas.

The prospects of the deployment of BE can be achieved by placing emphasis on the following sectors:

6.1 Fishery: The main occupation of the coastal people is fishing. Globally 350 million jobs are linked to marine fisheries, with 90% of fishers living in developing countries. The value of fish traded by developing countries is estimated at US\$ 25 billion making it their largest single trade item [30]. Fishing activities will continue to represent a large part of economic and food output for many developing countries. At least more than seventy percent of the population of people living in coastal area engages in fishing and related activities. These fishes are normally caught, smoked and sold in their natural forms without further processing and packaging. A large number of commercially important fishes have long been exploited which are of high export values through this system and this has clandestinely be a source of loss of revenue and employment opportunities. Furthermore, the economic value of shrimp aquaculture is daily increasing to the extent that it has become a highly traded export-oriented industry. The prospects in this sector call for the actualization and development of marine



aquaculture on a commercial basis as well as marine stock enhancement and sea ranching. Furthermore, there is need to curtail chronic disintegration and mismanagement of marine fishes in order to derive its maximum benefits.

6.2 Aquaculture: Aquaculture is the farming of aquatic animals or plants, including breeding, raising and harvesting in all types of water environments in controlled conditions. It is used to produce food and commercial products, restore and create healthier habitats and rebuild threatened or endangered species populations. Aquaculture is the fastest growing global food sector now providing 47% of the fish for human consumption [9]. Aquaculture offers huge potential for the provision of food and livelihoods. Aquaculture under the BE will definitely improve the national income, provide decent employment and offer high value commodities for export. Aquaculture is different from fishing; fishing is the harvesting of already existing population of fish and other aquatic animals. (Seaweed harvesting is a separate activity.) while aquaculture is the purposeful cultivation and subsequent harvesting of both freshwater and marine aquatic plants and animals. There is a reliable and sustainable prospects in aquaculture if BE is deployed in the coastal area of Ondo State.

6.3 Tourism: This is the commercial organization and operation of holidays and visits to places of interest. One place of interest which most people like to visit is an area with serene and cool environment and ocean environment provides such type of environment. A larger percentage of global tourism is majorly on the marine and coastal environment due to the serenity of the environment. Cruise tourism is the fastest growing sector in the leisure travel industry. It was 16 million in 2011 [10]. According to the United Nations World Tourism Organization (UNWTO), approximately one of every two tourists visited the seaside [31]. Tourism offers the advantages of providing employment, income, businesses and entertainment among others. Therefore, sustainable tourism is an essential economic sector for many nations for improved national income, foreign exchange earnings and investment. Sustainable tourism needs to be followed logically in tandem with the concepts and strategies of BE to realize its goals

6.4 Shipping: Lumbering, Canoe Making and Maritime Transport: Water transportation is a reliable and responsive means of transportation. It enables movement of goods and passengers on and across water both within and outside the country. It is indifferent in form and mode. In today's globalized world, ports play a strategic and important role in national and international national trade and national economy. About half of the world's population, most of its largest cities and industries along with critical value chains tend to be concentrated in coastal areas to ensure access to transport routes and continuous flows of resources and products [5]. Without oceanic and sea routes, international trade and allied cooperation would not have been possible. There are many business opportunities associated with water transportation. These businesses will consequently open doors of opportunities that can sustain the sustainability goals of BE.

6.5 Renewable Marine Energy: Marine energy, also known as marine and hydrokinetic energy or marine renewable energy, is a renewable power source that is harnessed from the natural movement of water, including waves, tides, and river and ocean currents. The country as a whole has not enjoyed seamless electricity supply since time immemorial due to restricted centralization of electricity generation and distribution. Due emphasis should be shifted to enormous potentials for the generation of renewable energy through wind, wave, tidal, biomass, thermal offer by the Ocean. The generation of renewable energy from tides



and waves, wind turbines located in offshore areas, submarine geothermal resources and marine biomass could be viable alternatives to meet the energy needs of the nation

6.6. Biotechnology, Bioprospecting and Medical Technology: Biotechnology is a technology that utilizes biological systems, living organisms or parts of this to develop or create different products. The four main types of biotechnology are medical biotechnology (red), industrial biotechnology (white), environmental biotechnology (green), and marine biotechnology (blue) Marine bacteria are a rich source of potential drugs. In 2011 there were over 36 marine derived drugs in clinical development, including 15 for the treatment of cancer. One area where marine bio-tech may make a critical contribution is the development of new antibiotics [13]. [2] stated opined as the ocean is the largest reservoir of the world's animal and plant species and subjects these species to a wide range of thermal, pressure, and nutrient pressures with extensive photic and aphotic zones, evolution has produced a dazzling array of unique genes, molecules, and compounds that are waiting for their systematic discovery through marine bioprospecting [25], and application through marine biotechnology. Marine biotechnology encompasses fields such as marine drug discovery [4], antifouling solutions [18], food production and processing [21], cosmeceuticals [23], and energy [28], [19], amongst other sectors [20].Prospects abound in the deployment of BE in the coastal areas due to availability of marine bacteria that is a source of input for the establishment of marine biotechnology.

6.7 Food Security: Seafood and allied products are the main source of protein to a greater percentage of the people in the developing countries. Besides this, all around the globe, a lot of people like seafood. Oceans can be the biggest sources for food for all the developing countries and may help to meet the challenges of food production and curtail the spread of diseases caused by inadequate protein

6.8 Tertiary Institution: The presence of a University of science and technology in the coastal area is a booster to solve some of the problems and challenges militating against the deployment of BE in the study area and an additional prospect for the transformation of research output to reality. The prospects in this is that the University will definitely run programmes that are relevant for the transformation of socio-economic ground of the area, carry out research and proffer solutions to the myriads of problems and challenges being faced in the area. Succinctly, the output of the University research works will be useful to government, organizations and people living in and out of the area and will contribute meaningfully to the sustainability index of the coastal areas of Ondo state

7. CONCLUSION

The coastal area of Ondo is obviously wallowing in poverty in the midst of available resources which government at all levels totally ignored. The three models that are presently being practiced within the study area have up to a certain level contributed in no small measure to reduce the poverty level but lack of supporting strategies to harness fully the resources available in the ocean cannot ensure anticipated growth and development. This has transparently left a vacuum which can be filled by the deployment of Blue Economy. The major goal of BE is the utilization of marine resources to improve and sustain growth and development. Ondo State coastal area being the longest in the country has no reason or any justification to be poor if BE is adequately deployed. Though BE is a development that has not been widely embraced, it is due for deployment in coastal areas due to the fact that it is



deeply rooted in sustainable development through efficient utilization of marine resources and it makes it possible to continue with economic activities arising from the seas and oceans in a more sustainable way in tandem with other economic models. It is not unlikely for conflicts between sectors to emerge due to the nature of the resource itself (as it is a limited resource), its use and the commitment to develop efficient management of ocean resources, for example tourism versus offshore hydrocarbon extraction [27] or even within the same sector, with differences between the fishing fleet, fish farms and small-scale artisanal fisheries. Therefore, it is necessary to generate synergies between the different economic models in existence in the coastal areas with sectors that make up the BE in order to contribute to the economic development of the area and achieve the SDGs.

Despite the tremendous potential in the oceans' sustainability, the growth of the BE presents some challenges. One of the most obvious obstacles is the lack of common and agreed-upon goals of BG. For some, BG revolves around maximizing economic growth derived from marine and aquatic resources [3], [12]. However, for others, it means maximizing "inclusive" economic growth derived from marine and aquatic resources [8] [11], [26] [29]. There are many challenges that accounted for the slow development of the coastal area and which also serve as stumbling block in the deployment of suitable and appropriate economic models. Some of these challenges as previously stated and explained are surmountable and can be addressed by adopting appropriate measures by government and private and public institutions. If appropriate measures were put in place to address these challenges, the prospects of BE will be realistic through the deployment of BE models.

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