The Role of Blue Financing in Blue Economy in Nigeria

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Abstract: **The study examined the role of blue finance on blue economy in Nigeria for the period 2000 to 2023. The specific objectives of the study were to ascertain whether blue financing factors such as government expenditure on agriculture (GEXAGR), loans to agriculture and fishery (LAGFISH), agricultural credit guarantee scheme funds (ACGSF) and employment rate (EMPR) significantly impact blue economy. For this reason, the ordinary least square (OLS) technique was employed for the analysis of data. The result obtained indicate that government expenditure on agriculture (GEXAGR) does not have significant impact on blue economy; loans to agriculture and fishery (LAGFISH) had a significant negative impact on blue economy; while agricultural credit guarantee scheme funds had a significant positive impact on blue economy, employment rate (EMPR) had a weak negative impact on blue economy. The study recommends among others that, government should have specific budgetary allocation directly targeted at promoting the blue economy like the way it is done by the advanced countries. This way, government expenditure will positively impact blue economy in Nigeria.**

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Keywords: **Blue Economy, Blue Finance, Fishery, Aquaculture, Government Expenditure, Statistical and Econometric Methods.**

1. INTRODUCTION

Globally, billions of people are seen to be highly dependent on oceans for their livelihood, food security, health, and recreation, among others. However, with the attendant impact of climate change on oceans activities, it has resulted in marine pollution, unsustainable fishing, and rapid, unsustainable coastal development increasingly threaten the ecosystems of these coastal economies (Huang & Morgan, 2022). These oceanic activities relating to fishery and aquaculture is known as blue economy, and it has become increasingly popular today among experts due to its relevant role in human wellbeing. The concept of blue economy (inclusive of fisheries and related industries) was first coined by the World Bank (2016) as the sustainable use of ocean resources for economic growth, improved livelihoods, and job creation while preserving the health of ocean ecosystems. According to Atoyebi (2024), "the idea of blue economy is predicated on ocean being a space for development, and where spatial planning integrates preservation, sustainable use, oil and mineral wealth extraction, sustainable energy production and marine transport; and also, it breaks the mode of the business development model, where the oceans have been recognized as a mode of free resource extraction and waste dumping; with costs externalized from economic calculations" (p. 2).

The concepts of blue economy and blue finance are reflected in the 2030 Agenda for Sustainable Development, which is a set of international development goals from 2016 to 2030, adopted by the United Nations Sustainable Development Summit in 2015(Huang & Morgan, 2022). According to them, "the 2030 Agenda highlighted the Sustainable Development Goals (SDGs), which consist of 17 goals to eradicate poverty and realize a sustainable world; and these represents universal goals applicable to all countries, where Goal 14Life Below Water, calls for a healthy and sustainable manner of using marine

resources which maintains the ecosystem while enabling economic development" (p. 25). It further entails the need to provide financial resources to safeguard human access to clean water, protect underwater environment, and invest in a sustainable water economy efficiently.

Despite the importance of ocean economy as enunciated above, there are still serious threats to food security and livelihood opportunities emanating there from. Human activities that constantly pollute water bodies are negatively affecting the overall health of the ocean by the day; and seafood industry, which provides nutrition and livelihoods to millions of people in Nigeria, is facing serious threat from declining fish stocks and degrading ocean habitats(World Bank, 2020).In spite of the Nigerian government efforts coupled with the introduction of blue bonds, blue loans/credits among others, it is still not clear how these efforts have helped to tackle these threats to the ocean economy in Nigeria. This has eventually created a gap in the literature that needed to be filled. Therefore, this study is an attempt to empirically investigate the extent to which blue finance have affected blue economy in the Nigeria marital space.

In addition, empirical studies on blue economy and blue finance are still very scanty in Nigeria. To the best of the researcher's knowledge, apart from the study of Dare (2024), Osuji and Agbakwuru (2024), no other blue economy-blue finance/sustainable finance related studies have been carried out in Nigeria. Hence, this is one of the very fewest and recent study in this regard. The rest of the paper is therefore structured such that section two is on literature review, section three deals with methodology, section four is on data analysis and interpretation of results and while conclusion and recommendations are contained in section five.

2. LITERATURE REVIEW

2.1 The Blue Economy

The concepts of blue economy and blue finance are major components of the United Nations 2030 Agenda for Sustainable Development which was adopted in 2015. In the agenda which contains 17 goals to eradicate poverty and realize a sustainable world, and Goal 14 specifically stated "Life Below Water, which calls for a healthy and sustainable manner of using marine resources which maintains the ecosystem while enabling economic development". The World Bank (2017), defined blue economy as "the range of economic sectors and related policies that together determine whether the use of oceanic resources is sustainable" (p. 6). The Organization for Economic Co-operation and Development (2019)sees it as the evaluation of the critical function of innovative ways for a sustainable ocean economy which in turn guarantee ecosystems preservation and economic growth at large. While the European Commission (2021), defines it as "all economic activities related to oceans, seas and coasts; such as aquaculture, fisheries, clean energy, maritime transport, green shipping, shipbuilding and coastal tourism, among others" (p.1);the Commonwealth of Nations (2023) sees it "as an emerging concept that encourages sustainable exploitation, innovation and stewardship of our ocean and its life-giving 'blue' resources" (p. 1).

Given the arrays of definitions offered in respect of blue economy above by various experts, we therefore defined blue economy in this study as the process of harnessing all ocean related activities, including marines for healthy and sustainable human life, protecting and preserving same for sustainable economic development.

2.2 Components of Blue Economy

Blue economy comprises of series of related ocean activities which goes beyond what we may ordinarily thought of. The study of - gave a clear picture or description of what blue economy entails; "and they include:

  i. **Fisheries and Aquaculture:** the aspect of blue economy activity that focuses on fishery and aquatic animals; Nigeria produces about 1.2 million metric tons of fish annually, 90% of which is consumed domestically, and despite this, annual per capita fish consumption is 11.3 kg, far below the global average of 21 kg

 ii. **Maritime Transport Business:** it is usually visible in the form of container-ships or oil and gas tankers; and it is the means of providing shipping services

iii. **Coastal Tourism:** in terms of employment, Tourism, is rapidly becoming the biggest global business and engages 1 out of every 11 persons globally (Supra, 2022);but in Nigeria, it has not been effectively utilized

 iv. **Exploration and Exploitation of Natural Resources:** these include resources like gemstones, gold oil and gas are explored under the ocean or sea, around the world" (p. 2).

2.3 The Blue Finance

On the other hands, Blue Finance entails the need to provide financial resources to safeguard human access to clean water, protect underwater environment, and invest in a sustainable water economy efficiently. It has been defined by International Finance Cooperation (2024) as "an emerging area in climate finance that offers tremendous opportunities to help safeguard our access to clean water, protect underwater environments, and invest in a sustainable water economy; which includes but not limited to blue bonds and blue loans financing instruments that provide funds for investments in water, wastewater management, reducing ocean plastic pollution, marine ecosystem restoration, sustainable shipping, eco-friendly tourism, or offshore renewable energy" (p. 2).According to The United Nations Environment Programmes (2024), "blue finance is the process by which financial institutions provide the financing, investment and insurance required to power ocean-linked sectors, including shipping, seafood, marine renewable energy; and thereby enhancing the overall health of the ocean and quickens the transition towards a sustainable blue economy" (p. 1).

Therefore, for this study, we define blue finance as the process of providing coordinated funding to protect and preserve the health of all ocean related activities such as fishery, marine, oil mining, aquaculture, deep seabed mining etc. in order to achieve steady and long term sustainable development.

2.4 Government Expenditure on Agriculture and Blue Economy

Government funding plays a crucial role in sustaining various economic activities, especially in the blue economy sub-sector (Bucci & Cozzi, 2021). This has been acknowledged globally by several experts, coupled with the fact that the trend towards increased government expenditure seems consistent across nations, irrespective of their developmental stage (Ahuja & Pandit, 2020). In Nigeria, the success of the agricultural sector, visa vice the blue economy, is closely tied to government initiatives and expenditure. Over the years, successive governments have introduced various agricultural programs and policies aimed at boosting economic growth (development of blue economy inclusive) through agricultural output. These include initiatives such as the National Accelerated Food Production Program (1973), Operation Feed the Nation (1976), the Agricultural Development Fund (2002), the 7 Points Agenda emphasizing Food Security and the Agricultural Transformation Agenda (2009), the Anchor Borrowers Program (2015), among others (CBN, 2020). Also, government and indeed non-governmental organizations, including Agricultural Organization of the United Nations, the World Bank, among others, also encourage funding of agriculture and blue economy through off-farm and on-farm assistance in the form of funds, material supply and boosting related skilled capacity.

2.5 Loans to Agriculture and Fishery and Blue Economy

When accessible credit facilities are constantly made available to the agriculture and fishery sub-sector of the economy such that famers are able to purchase all relevant assets to enhance productive capacity to exploit fishery and aquatic animals profitable, then blue economy would have been achieved. Hence, banks and financial institutions are expected to commit certain percentage of their total earnings to support development of blue economy and by extension, harnessing all ocean related activities, including marines for healthy and sustainable human life, protecting and preserving same for sustainable economic development (Adekanye, 1986; Atoyebi, 2024). According to Shan, and Qureshi, Akhtar (1996), loans has the ability to solve challenges faced by agrarians by providing motivation that enable them adapt quickly to modern technological advancement which can promote and fast-track fecundity and growth. Even the view of Otubu (2019) corroborated this by stating that "financial institutions loans and advances is a catalyst that can ignite the locomotiveness of growth potential that is inherent in blue economy and thereby encourage the theorized path".

2.6 Agricultural Credit Guarantee Scheme Funds and Blue Economy

The Agricultural Credit Guarantee Scheme Fund (ACGSF) in Nigeria was established by decree No.20 of 1977 to encourage banks to lend to farmers engaged in agricultural production and its value chain activities. The essence of this scheme is to mitigate the risk of agricultural credit by government due to the realization of the crucial contribution of agriculture in the supply of raw material to the industrial sector, provision employment, a source of exchange earnings as well as provision food for the ever growing population of Nigeria (Ebidouwei, 2016).Furthermore, the ACGS promote sustainable growth by making available credit facilities to a significant number of farmers cutting across agrarian farming, fishery, aquaculture, poultry among others (Olaitan, 2006). It provides easy access to funds and guarantees 75 percent of credit from banks to farmers out of the total borrowed funds without collateral. Ebidouwei (2016) noted that "the CBN regulate and stipulate the guidelines as it handles the overall operations of the scheme

2.7 Employment Rate and Blue Economy

This is employed as proxy for labour/man power. This is the per centum of citizens engaged or occupied in Nigeria as regards agrarian/agricultural GDP contribution. Employment rate is expected to display positive effects on blue economy development since increase/enhancement in employment rate will result in increase in fisheries and aquatic production. According to Ninawe, 2017), ocean economy is very crucial in the global economic scheme and contribute significantly to the world's GDP, with the capacity to provide gainful employment for millions of people. This is true because of its activities that cut across fisheries, tourism, marine transportation and renewable energy production, which has equally become a major source of income and livelihood for coastal communities. However, the ocean is currently facing threats from overexploitation, climate change and pollution. (Arora & Mishra, 2020). The World Bank Group (2022), "the blue economy is a major engine for growing the economies of African countries because of the ability to constantly create new jobs both in established and emerging sectors; hence, new technologies and innovative partnerships are proven drivers of growth and job creation, while at the same time, marine and coastal natural capital deliver major economic, social, and environmental benefits" (p. 5).

2.8 The Ecological-Economic Theory

The ecological-economic theory was advocated by Daly (1980), and it emphasizes the interconnectedness of ecological systems and economic activities, highlighting the dependence of economic prosperity on the health and functioning of natural ecosystems (Costanza, et al. 1997). The theory underlines the importance of maintaining the health and resilience of marine ecosystems and emphasizes that economic development should not come at the expense of ecosystem degradation, as healthy oceans provide a wide range of ecosystem services essential for human well-being, such as fisheries, coastal protection, carbon sequestration, and tourism. In essence, to facilitate sustainable development, there must be a due recognition of the value of ecosystem services provided by marine environments and incorporating this value into economic decision-making processes. This was while Neo (2009) argued that, the fundamental problem of environment-economy is not in market failures, but in humans' inadequate understanding of their role, impacts, and responsibilities within the larger ecological system.

2.9 Empirical Literature

In this section, some relevant empirical literature in relation to blue economy and blue financing were reviewed. For example, Okechukwu, George, Hikarofemi and Eluwa(2019) investigated the effect of fishery agricultural loans and insurance premium on the economic growth of fishery production sub-sector in Nigeria over the period 1989 to 2015.Employing the OLS technique, it was observed that agricultural loans on fishery production had a significant positive impact on economic growth in fishery production It was also found that insurance premium on fishery had a significant positive impact on fishery production. Also, Otubu(2020)investigated the impact of bank credits on yield of fisheries production in Nigeria over the period 1980 to 2019. Using the OLS method of analysis, it was discovered that bank credits had significant positive impact on fisheries production in Nigeria. It was also observed that causality runs from bank credits to fisheries production output in Nigeria. In another related study, Shan, Mirza, Umar, Hasnaoui (2023) examined the impact of lending to blue on sustainable firms and digitalization on the performance of the banking sector of 11 European countries for the period 2001 to 2021. Employing the panel data analysis, it was found that blue lending, sustainable credit, and digitalization had significant positive impact on banks' performance. Even Dare (2024) empirically examined the impact of blue economy on sustainable development in the Nigerian environment for the period 1981 to 2022. Due to the constraint of data availability, the study examined the effect of two blue economy variables; revenue from fishing as well as revenue from water transport, on sustainable development from two perspectives-economic and health (per capita income and life expectancy respectively). Employing the fully modified least square (FMOLS), it was found that revenue from fishing had a significant positive impact on per capita income, while revenue from water transport has a weak positive relationship with per capita income.

Furthermore, Osuji and Agbakwuru (2024) assessed the effect of oceanic and coastal resources on sustainable development in Nigeria used the OLS technique, discovered that oil/gas exploration, maritime transport/shipping, and fisheries had strong positive impact on sustainable development in Nigeria. In the same vein, Yang and Wang (2024) examined the impact of industrial capital and commercial capital on the sustainable development of agriculture of 30 provinces in China (except Tibet) over the period 2013 to 2022. The panel data analysis technique was employed and the findings showed that industrial and commercial capital had significant positive impact on sustainable development of agriculture; also, industrial and commercial capital had a strong positive impact on sustainable development of agriculture in non-major grain producing

areas. Abdelwahed and Bhat (2024) empirically examined the drivers of blue economy investments, and the overall impact on the sustainability of the supply chain performance of marine shipping firms in Egypt. Employing the regression analysis, it was found that technological, organisational, environmental, cost spending and supply chain management had significant positive impact on blue economy investment decisions in Egypt.

3. METHODOLOGY

The research design utilized for this study is the expos-fact or the longitudinal research design which entails the use of data in which the researchers cannot manipulate because it has already occurred. The population of the study which is also the sample size is the Nigerian economy, with a particular focus on the green finance-carbon footprint aspect for the period 1996 to 2023. The sampling technique adopted for the study is the census sampling technique where population equals sample size. The data for the study were sourced from the World Bank Data and the Central Bank of Nigeria Statistical Bulletin (2023).

3.1 Theoretical Framework and Model Specification

The theoretical framework for this study is anchored on the ecological-economic theory advocated by Daly (1980), which emphasizes the interconnectedness of ecological systems and economic activities. This was also corroborated by Neo (2009) that, the fundamental problem of environment-economy is not in market failures, but in humans' inadequate understanding of their role, impacts, and responsibilities within the larger ecological system". Thus in this study, humans responsibilities to the larger ecological system is modified to represents government expenditure on agriculture, agricultural credit guarantee scheme funds, other responsible humans include financial institutions (in terms of loans to agriculture and fishery), and employment rate. These are hypothesize to significantly impact blue economy activities.

Thus, the functional form of the model for the study is stated as follows:

$$BLECON = f(GEXAGR, LAGFISH, ACGSF, EMPR)..………………..………………3.1$$

The econometric form of equation 3.1 is restated as follows:

$$BLECON_t = \beta_0 + \beta_1 GEXAGR_t + \beta_2 LAGFISH_t + \beta_3 ACGSF_t + \beta_4 EMPR_t +…………..……..3.2$$

Where:

BLECON = Blue Economy (Measured by Average Value of Fishery Production, Aquaculture Production and Maritime Transportation)

GEXAGR = Government Expenditure on Agriculture

LAGFISH = Loans to Agriculture and Fishery

ACGSF = Agricultural Credit Guarantee Scheme Funds

EMPR = Employment Rate

u_t= the Error Term

The Appriori expectations are $\beta_1, \beta_2, \beta_3, \beta_4 < 0$

3.2 Method of Data Analysis

Three methods are used; these are the unit root tests (which help to ascertain the stationarity property of the data set in order to avoid spurious regression results, descriptive statistics which was used to establish the background characteristics among the data set, and the ordinary least square (OLS). We perform also the Ordinary Least Squares (OLS) estimation technique which is the Best, Linear Unbiased Estimator. It is based on the minimization of the sum of squares residuals of the model. Hence, the estimation technique of time series data that is employed in this study is the Ordinary Least Squares OLS) method that easily estimates the behavioural relationships among time series variables. The coefficients obtained from the estimation are then used to verify the working hypotheses of the study.

3.3 Measurement of Variables

The measurements of variables utilized in this study are expressed in Table 3.1 below.

Table 3.1: Definition of Variables

Indicators	Indicators	Index calculation/definition	Source
BLECON	Blue Economy	Measured by Average value of fishery production, aquaculture production and Maritan transportation	World Bank Data; Osuji and Agbakwuru (2024), Dare (2024)
GEXAGR	Government Expenditure on Agriculture	Aggregate government budgetary allocation to Agricultural sector	CBN Statistical Bulletin (2023); Huang and Morgan (2022)
LAGFISH	Loans to Agriculture and Fishery	Total accessible loans to agriculture and fishery development	CBN Statistical Bulletin (2023), Dare (2024)
ACGSF	Agricultural Credit Guarantee Scheme Funds	Aggregate amount the Nigeria agricultural credit guarantee scheme funds committed to blue economy	Otubu (2020), CBN Statistical Bulletin (2023)
EMPR	Employment Rate	Measured as labour/man power. This is the per centum of citizens engaged or occupied in Nigeria as regards agrarian/agricultural GDP contribution.	Otubu (2020); Chinweoke et.al (2015)

Source: Author's Compilation (2025)

4. DATA ANALYSIS AND INTERPRETATION OF RESULTS

This section focuses on the empirical analysis of data on the impact of blue finance and blue economy using the methods of data analysis earlier stated in section three. These include the unit root test, descriptive statistics, co-integration test and the ordinary least square (OLS) econometric technique.

4.1 Descriptive Statistics

The descriptive statistics show the summary of data and other basic characteristics within the series. The annualized summary statistics for the main variables in the study are presented for the sampled banks in table 4.1.The average value of blue economy (BLECON) for the entire sample is ₦343700 billion Naira, and the median value is 375722. The maximum value of the entire sampled blue economy is about 502895, while the minimum value is 164271. With this result, many blue economy seem to be performing very well than the others within the period. That is while the minimum BLECON value is far lee than those of the maximum value. The standard deviation value of 119802 is quiet low compare to the mean value of 343700; this show that the level of variability among the BLECON data is low across the sample. Also, the data series appears to be skewed to the left with coefficient of -0.309, suggesting why the mean value is lower than the median value. The summary statistics with respect to Jaque-Bera (J-B) value of 2.6352 for BLECON is not significant and implies that the probability distribution of the sample for the variable is normally distributed.

On the other hand, the mean value for government expenditure on agriculture (GEXAGR)is ₦39.179, while the maximum value is ₦81.870. By this result, it becomes glaring that government has spent more on agriculture thereby contributing to the development of blue economy in Nigeria. The standard deviation value of 24.982 indicated that the variation among the BLECON variable is quiet high across the sample. The skewness coefficient of 0.3475 indicates that the distribution is positively skewed to the right; and the results of the J-B and Probability suggest that the BLECON variable is normally distributed.

The mean value of loans to agriculture and fishery (LAGFISH) and agricultural credit guarantee scheme funds (ACGSF) are₦471.55 and ₦353378, and they are very high when compare to their minimum values of 41.030 and 899.00. This means that on average, blue financing of blue economy (LAGFISH and ACGSF) has been very high over the sampled period. Also, the two variables are skewed to the right; and while LAGFISH is not normally distributed as suggested by the significant values of the J-B statistic and probability (0.0073), those of ACGSF is normally distributed due to the insignificant nature of the probability value of 0.5896 percent.

Table 4.1: Descriptive Statistics

	Mean.	Med.	Max.	Min.	Std. Dev.	Skew.	Kurt.	J-B.	Prob.
BLUECON	343700.	375722.	502895.	164271.	119802.	-0.309	1.4990	2.6352	0.2677
GEXAGR	39.179	36.500	81.870	6.3400	24.982	0.3475	1.9109	1.6693	0.4340
LAGFISH	471.55	285.78	1812.4	41.030	543.33	1.4735	4.0616	9.8129	0.0073
ACGSF	353378.	370016.	919646.	899.00	26526	0.4985	2.7508	1.0564	0.5896
EMPR	697.74	695.51	786.41	542.52	71.484	-0.4984	2.3783	1.3789	0.5018

Source: Author's Computation (2025)

4.2 Unit Root Analysis

The Augmented Dickey Fuller (ADF) test is employed in order to analyze the unit roots. The results are presented in levels and first difference in Table 4.2. In the result, the ADF test statistic for each of the variables is shown in the second and fifth column, while the 95 percent critical ADF value is shown in the third and sixth column respectively. The result indicates that all the variables are not stationary at level (see panel 1). However, after the first difference was taken, all the variables were now stationary (see panel 2). This implies that the variables are actually difference-stationary. Thus, we would accept the hypothesis that the variables possess unit roots; indeed, the variables are integrated of order one (i.e. I[1]).

Table 4.2: Unit Root Tests

	At Levels	Panel 1		First	Difference	Panel 2
Variable	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**
BLECON	-1.405528	-2.998064	Non-Stationary	-4.430351	-3.004861	Stationary
GEXAGR	-1.060106	-2.998064	Non-stationary	-5.167705	-3.012363	Stationary
LAGFISH	2.919901	-2.998064	Non-stationary	-2.398229	-3.004861	Stationary
ACGSF	-1.028372	-2.998064	Non-stationary	-4.759342	-3.004861	Stationary
EMPR	-2.255277	-2.998064	Non-stationary	-4.969818	-3.004861	Stationary

Source: Author's Computations (2025)

4.3 Cointegration Test

To test for cointegration, we employ Johansen Cointegration Test. The tests is based on two main tests statistic (the eigenvalue test (λ-max) and the trace test statistics). As can be seen from Table 4.3, the trace test and eigenvalue test statistics indicate that there are about three (3) significant cointegrating vectors between blue finance and blue economy in Nigeria. This implies that a long run relationship exists among the variables. Hence, the results of the cointegration tests are summarized in Table 4.3.

Table 4.3: Johansen Cointegration Tests Results.

	Trace Test			Maximum Eigenvalue Test		
Null Hypothesis	**Statistic**	**0.05 Critical Value**	**Prob. Value**	**Statistic**	**0.05 Critical Value**	**Prob. Value**
r = 0*	70.75137	69.81889	0.0421*	32.81909	33.87687	0.0665
r ≤ 1	37.93228	47.85613	0.3050	15.41517	27.58434	0.7147
r ≤ 2	22.51710	29.79707	0.2706	9.269677	21.13162	0.8101
r ≤ 3	13.24743	15.49471	0.1060	9.232555	14.26460	0.2673
r ≤ 4	4.014873	3.841466	0.0451*	4.014873	3.841466	0.0451*

Source: Author's Compilations (2025).

4.4 The Regression Analysis

In Table 4.4, the behaviour of blue economy (BLECON) in Nigeria in context of blue financing is analyzed using the OLS estimation. The result has an impressive goodness of fit information. It is seen that the R squared value of 0.93 is high and it indicates that the explanatory variables in the model effectively predict variations in the dependent variable (BLECON) with about 93 percent. Even the adjusted R squared value of 0.91 is equally very high, indicating that the model possessed good predictive ability. The F-Statistics value of 46.486 passes the 1 percent significance level. This means that we cannot reject the hypothesis of a significant linear relationship between the dependent variable blue economy (BLECON) and all the explanatory variables combined.

Now, looking at the individual coefficients of the explanatory variables, government expenditure on agriculture (GEXAGR) is rightly signed and in line with the apriori expectation. However, it failed the 5 percent significance level, suggesting that the amount of government expenditure on agriculture overtime has not positively impacted the development of blue economy in Nigeria. Probably there is need for the government to have specific budgetary allocation directly targeted at promoting the blue economy like the way it is done by the advanced countries. This way, government expenditure will positively impact blue economy in Nigeria. This finding seems not to align with the views of Huang and Morgan (2022) and International Finance Cooperation (2024) who submitted that government financing, where financial instruments like blue bonds, blue credits provide funding for projects and programmes have positive impacts on ocean, by reducing pollution as well as creating marine protected areas.

The coefficient of loans to agriculture and fishery (LAGFISH) has a strong negative impact on blue economy (BLECON), the variable was significant at the 1 percent level. This suggests that in the determination of blue economy (BLECON) performance in Nigeria, the amount of loans dedicated to agriculture and fishery (LAGFISH) is a potent factor that must not be dawn played on. Indeed, the negative sign is an indication that a unit increase in the amount of LAGFISH reduces blue economy by -111.6119 approximately. This result might probably be that the amount of loans given to the blue economy are inadequate or might have been mis-appropriated due to corrupt practices among those saddled with the responsibility of managing such fund. Therefore, banks and indeed, bank of agriculture in the country should be re-mandated to set aside good percentage of their annual profit towards strengthening the blue economy subsector of the Nigeria economy, and trusted hands should be engage to ensure efficient utilization of the loans. This way, LAGFISH will continue to impact positively on blue economy development in Nigeria. This finding completely disagreed with the findings of Otubu (2020), Okechukwu et.al (2019), Shan et.al (2023), Yang and Wang (2024) who found that loans/credit to fisheries production (blue economy) had significant positive impact on blue economy in their respective studies.

The coefficient of agricultural credit guarantee scheme funds (ACGSF) has significant positive relationship with blue economy (BLECON), it was significant at the 1 percent level. This means that the level of agricultural credit guarantee scheme funds (ACGSF) to blue economy (BLECON) within the investigating period is a major determinant of the development of blue economy (BLECON) in Nigeria. Indeed, it is seen that as agricultural credit guarantee scheme funds increase the level of blue economy development rises by approximately 0.118618 percent. Therefore, in order for ACGSF to continue to have positive impact on blue economy, current policy regarding agricultural credit guarantee scheme funds in the country should either be sustained or improve on. Thus, the outcome of this finding could be seen aligning with the submissions of Tirumala and Tiwari (2022) that efficient utilization of funding dedicated to blue economy in a healthy and sustainable manner is at the heart of building a blue economy that will make Sustainable Development Goal 14, Life below Water, achievable. It was also in line with the findings of Okechukwu et.al (2019), Osuji and Agbakwuru (2024), Yang and Wang (2024) who submitted that fishery agricultural loans insurance premium as well as industrial commercial capital significantly and positively influence blue economy development.

Furthermore, employment rate (EMPR) which is believed to be very central to blue economy and the country in general has a weak negative relationship with blue economy. This presupposes that employment rate (EMPR) does not play any relevant role in blue economy development in Nigeria rather, it even have the tendency of reducing blue economy as suggested by the negative sign. Also, the lagged value of blue economy (BLECON(-3)) has significant positive relationship with blue economy, it was significant at the 1 percent level. The implication of this is that, previous value of BLECON significantly impact blue economy than the current value.

The overall results obtained from the model estimation are effectively acceptable because the D.W. statistic value of 1.94 is appropriate and it indicates the absence of autocorrelation in the model. Thus, the results are applicable for structural analysis as well as policy directions.

Table 4.4: Blue Finance and Blue Economy in Nigeria(OLS)

Variables	Coefficient	T-Ratio	Prob.
Constant	77400.65	0.614309	0.5482
GEXAGR	395.0773	0.642631	0.5302
LAGFISH	-111.6119	-3.776864	0.0018**
ACGSF	0.118618	3.100559	0.0073**
EMPR	-91.46895	-0.411555	0.6865
BLECON(-3)	1.063079	7.697065	0.0000**
$R^2 = 0.93$	$\bar{R}^2 = 0.91$	F-Stat = 46.486	DW = 1.94

Source: Author's Compilations (2025): Note: **sig at 1% level; *sig at 5% level.

4.5 Discussion of Findings

The blue economy has become increasingly important for countries to generate new growth sources while maintaining environmental stability. The idea of blue economy and blue finance are reflected in the 2030 Agenda for Sustainable Development, which is a set of international development goals from 2016 to 2030, adopted by the United Nations Sustainable Development Summit in 2015 (Huang & Morgan, 2022). Specifically, Goal 14 stressed on Life below Water, calls for a healthy and sustainable manner of using ocean/marine resources which maintains the ecosystem while enabling economic development". Therefore, to actualize the above goals and beyond, the need for effective and well-coordinated financing, ranging from the state (governments) to the private sector become very critical. China and few other advanced countries have taken advantage of this and are well ahead of other countries in the world. Although Nigeria have since adopted it is yet to completely take advantage of the enormous opportunities that lies in blue economy. Even the sale of blue bond, green bond, green credit and others are still not available or accessible today when compared to its counterparts in china and western countries. Although Nigeria is in the forefront in fishery production; for instance, in 2022, the total fisheries production in Nigeria was estimated at about 1.1 million tonnes, out of which marine catch contributed 36 percent, inland waters catch contributed 36 percent and aquaculture 28 percent. The sector contributed 0.83 percent of national GDP in 2022. Despite these, the country is yet to reach its full potential due to inadequate blue financing mechanism in this regard.

The Nigeria government must wake up and face the new reality of exploiting the deep sea (blue economy) because as it stands, there are still serious threats to food security and livelihood opportunities emanating there from. Human activities are constantly polluting water bodies thereby negatively affecting the overall health of the ocean by the day. The World Bank (2020) reported that "seafood industry, which provides nutrition and livelihoods to millions of people in Nigeria, is facing serious threat from declining fish stocks and degrading ocean habitats". The weak effect of government expenditure on agriculture (GEXAGR) as well as the negative effect of loans to agriculture and fishery (LAGFISH) on blue economy course in Nigeria is a pointer to the fact that the country still have a long way to go in terms of blue financing and realizing the United Nations Goal 14 agenda for Sustainable Development. It was only agricultural credit guarantee scheme funds (ACGSF) that seems to be going in the right direction because it was found in this study to have significant positive impact on development of blue economy in Nigeria.

5. CONCLUSION

Blue economy encompasses fisheries and aquaculture of different categories; maritime transport business which entails provision of shipping services like container-ships or oil and gas tankers; coastal tourism in terms of employment, which is rapidly becoming the biggest global business and engages one (1) out of every eleven (11) persons globally. Given the relevant dimension blue economy in relation to blue financing has taken in the past two decades, it become imperative to investigate it in the Nigerian context in order to see the extent to which blue finance have impacted blue economy. Data covering the period 2000 to 2023 were analyzed using the ordinary least (OLS) econometric technique; the result from the analysis generally revealed that government expenditure on agriculture (GEXAGR) does not have significant impact on blue economy; loans to agriculture and fishery (LAGFISH) had a significant negative impact on blue economy; while agricultural credit guarantee scheme funds had a significant positive impact on blue economy, employment rate (EMPR) had a weak negative impact on blue economy. The study conclude that, in the determination of the development of blue

economy in Nigeria, loans to agriculture and fishery (LAGFISH) and agricultural credit guarantee scheme funds (ACGSF) are the only blue finance factors to be considered.

5.1 Recommendations

Based on the findings of this study, the following recommendations are brought forward.

First, there is need for the government to have specific budgetary allocation directly targeted at promoting the blue economy like the way it is done by the advanced countries. This way, government expenditure will positively impact blue economy in Nigeria.

Secondly, banks and indeed, bank of agriculture in the country should be re-mandated to set aside good percentage of their annual profit towards strengthening the blue economy subsector of the Nigeria economy, and trusted hands should be engage to ensure efficient utilization of the loans. This way, LAGFISH will continue to impact positively on blue economy development in Nigeria.

Lastly, to actualize Goal 14 of the United Nations development goals which also include blue economy, there is urgent need for effective and well-coordinated financing, ranging from the state (governments) to the private sector. One of the ways to do this is to encourage the development and sales of blue bond, green bond, blue credit and others that are still not available or accessible today when compared to its counterparts in china and western countries.

REFERENCES

[1] Abdelwahed, G., & Bhat, Mohd. A. (2024). Beneath the surface: Discovering the fascinating factors shaping blue economy investment behaviour and paving the way for sustainable performance: an empirical study of the marine shipping firms in Egypt. *Australian Journal of Maritime & Ocean Affairs*, 1–23. https://doi.org/10.1080/18366503.2024.2383059

[2] Arora, N. K., & Mishra, I. (2020). Ocean sustainability: Essential for blue planet. *Environmental Sustainability*, *3*(1), 1–3. https://doi.org/10.1007/s42398-020-00100-6.

[3] Atoyebi, O.M. (2024). A call for exploit on the blue economy in Nigeria and the legal framework. *International Trade & Commerce, Maritime Law, 1*, 1-14.

[4] Daly, H. (1980). *Economics, Ecology, Ethics: Essays toward a Steady-State Economy*, W.H. Freeman and Company, ISBN 0716711796.

[5] Dare, F.D. (2024). *Blue economy and sustainable development: Empirical evidence from Nigerian environment*, 1-17.

[6] Ebidouwei, J. (2016). Agricultural credit guarantee scheme and economic growth in Nigeria. *A Research Dissertation* Submitted to the Department of Accounting, Banking and Finance, Faculty Of Management Sciences, Delta State University, Abraka (Asaba Campus), 1-75.

[7] European Commission (2021). *Sustainable Blue Economy.* Assessed on 08/01/2025 from https://oceans-and-fisheries.ec.europa.eu/ocean/blue-economy/sustainable-blue-economy_en

[8] Food and Agriculture Organization (FAO) (2016). *Contribution of Fisheries to Food Security. Rome: Fisheries and Aquaculture Department, Food and Agriculture Organization of the United Nations,* 1-20.

[9] Food and Agriculture Organization (FAO) (2020b). *The State of World Fisheries and Aquaculture 2020*. Rome: Assessed 04 January 2025 from http://www.fao.org/state-of-fisheries-aquaculture.

[10] Huang, M., & Morgan, P.J. (2022). Overview of the blue economy and blue finance. *Asian Development Bank Institute, 1-380.*

[11] International Finance Cooperation (2024). *Blue Finance.* Assessed on 08/01/2025 from https://www.ifc.org/en/what-we-do/sector-expertise/financial-institutions/climate-finance/blue-finance

[12] Ninawe, A. (2017). Blue economy is the economic activities that directly or indirectly take place in the ocean and seas, use outputs, goods and services into ocean and land based activities. *Examines in Marine Biology & Oceanography*, *1*(1), 1-17. https://doi.org/10.31031/eimbo.2017.01.000501

[13] Okechukwu, C., George, S.M., HikarofemI, E., &Eluwa, A. (2019). Impact of fishery agricultural loans and co-operators' insurance premium on economic growth of fishery production sub-sector in Nigeria. *IOSR Journal of Economics and Finance (IOSR-JEF), 10*(1), 0-68.

[14] Olaitan. M.A. (2006). Finance for small and medium enterprises: Nigeria's Agricultural Credit Guarantee Scheme Fund. *Journal of international farm management, 3*(2), 1-2.

[15] Organisation for Economic Co-operation and Development (OECD)(2019). *Rethinking Innovation for a Sustainable Ocean Economy*. Paris: OECD Publishing. https://doi.org/10.1787/9789264311053-en

[16] Osuji, J.N., &Agbakwuru, J. (2024). Ocean and coastal resources components and their contributions to sustainable development of Nigeria. *Journal of Applied Science Environmental Management, 28*(1), 135-146.

[17] Otubu, O.P. (2020). Bank credits and yield of fisheries production in Nigeria. *International Journal of Research and Innovation in Social Science (IJRISS, 4*(6), 621-632.

[18] Shan, S., Mirza, N., Umar, M., & Hasnaoui, A. (2023). The nexus of sustainable development, blue financing, digitalization, and financial intermediation. *Technological Forecasting and Social Change, 195*, 1-15. https://doi.org/ 10.1016/j.techfore.2023.122772

[19] Supra (2022). *World Bank Document.* Accessed on 04/01/2025, from production-new-commonwealth-files.s3.eu-west-2.amazonaws.com.

[20] The Commonwealth of Nations (2023). *Sustainable Blue Economy: Action Group on Sustainable Blue Economy.* Assessed on 08/01/2025 from https://thecommonwealth.org/bluecharter/sustainable-blue-economy

[21] The United Nations Environment Programmes (2024). *Ocean Finance for Sustainability.* Assessed on 08/01/2025 from. https://www.unepfi.org/blue-finance/

[22] The World Bank (2021). *Riding the Blue Wave: Applying the Blue Economy Approach to World Bank Operations,* 1-33.

[23] The World Bank Group (2022). Jobs and livelihoods in the blue economy. *Blue Economy for Resilient Africa Program,* 1-10.

[24] Tirumala, R.D., & Tiwari, P. (2022). Approaches to strengthening fisheries financing and institutional mechanisms: A cross-country comparison of Cambodia, India, and Indonesia. *Blue Economy and Blue Finance: Toward Sustainable Development and Ocean Governance*,11-42.

[25] World Bank. (2017). *What is Blue Economy? Infographic*. Accessed 04 January 2025 from https://www.worldbank. org/en/news/infographic/2017/06/06/blue-economy.

[26] Yang, H., & Wang, F. (2024). The impact of industrial and commercial capital influx on sustainable agricultural development: Evidence from 30 provinces in china from 2013 to 2022. S*ustainability*, *17*(1), 312-327.https://doi. org/10.3390/su17010312