

# Role of Blue Economy on Ecological Sustainability

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## Abstract

Blue economy is defined as sustainable use of oceans for economic development without impeding ecosystem of ocean. Blue economy consists of various activities like harvesting and trade of marine living resources; extraction and use of marine non-living resources; use of renewable non-exhaustible natural resources (wave, wind and tidal energy); commerce and trade in and around the oceans; and indirect contribution to economic activities and environments. These activities support various sectors and industries like shipping, fisheries, aquaculture, marine- biotechnology, bioprospecting, mining, desalination, blue carbon and habitat protection etc. This evidently elucidates the significance and scope of the blue economy. The significance of the blue economy is not concentrated at one place or to a country; rather it has been accepted internationally and countries are initiating various programs and activities to incorporate it in their system. China has five year development plans for the nation – marine economy. European Union has also initiated their plans for blue growth. Many water locked countries like Mauritius and Seychelles have also held their interest in the blue economy (Pauli, 2010). India has also launched several projects like "Sagarmala" and "Parivartan" in order to harness the benefits of the blue economy and ensure a safe Indian ocean region, deepening a security cooperation, and building the Indian ocean region as a frontier of sustainable development. The paper is an endeavour to highlight the basic concept of the blue economy and various benefits the blue economy can provide in economic growth and development. This model can also help in reducing burden on land. This paper has following objectives. To develop insight in the blue economy, To understand role of blue economy on sustainable economic growth of India, To understand the role of blue economy ecological sustainability.

## INTRODUCTION

Sustainable development refers to the concept wherein emphasis is on gaining economic strength and social prosperity without compromising on the resources which might be required by our future generations (Ronnelt, 2020). It encourages various countries to adopt practices and policies to improve wellbeing of society by providing adequate food, health, safety, etc. and increasing economic freedom by enhancing job opportunities, along with preserving ecosystems and conserving biodiversity (Panda, 2020). Sustainable development first time came in to being from 1987 Brundtland report (OECD, nd). This concept later took a broader view and helped in establishing the 2030 agenda

for sustainable development by the United Nations (OECD, nd). This agenda is most commonly known as 17 goals of sustainable development or SDGs which establish foundation towards international cooperation and provide vision to the governments of various countries for their economic and social upgradation. It also set an alarm towards more responsible and accountable behaviour towards environment and available resources (Morales, 2011). Out of numerous SDGs, the 14<sup>th</sup> goal set by the UN is “conserve and sustainably use the oceans, seas and marine resources” which is incorporated in the fundamental goal and function of Blue Economy (Pauli, 2010).

Blue economy is a term that rests on three pillars of sustainable development defined by the United Nations. These pillars are economic growth, social welfare and environment protection. Blue economy can be understood as harnessing and retrieving benefits from oceans and coastal areas for economic and social growth without hampering health of oceans and resources which may be required by future generations. Although the term blue economy was already came in to existence since the concept of sustainable development was established by UN but it came into prominence after Gunter Pauli's book “The Blue Economy: 10 years, 100 innovations, 100 jobs.” where he explained the term Blue Economy as “the integration of ocean economy development with the principle of social inclusions; environment sustainability and innovative, dynamic business model”. Similarly according to a report published by World Bank Group and United Nation department of Economic and Social Affairs; “The blue economy concept seeks to promote economic growth, social inclusions, preservation or improvement of livelihood while at the same time ensuring environmental sustainability”. Thus Blue economy is the term that encompasses economic and social growth by sustainable use of oceans and coastal ecosystems (Pauli, 2010).

Blue Economy aims at providing employment opportunity, reduction in poverty, providing food safety, health and wellbeing, reducing demand of clean water, enhancing resilient growth, protecting ecosystems and biodiversity of oceans and maritime by initiating economic growth activities like

fishery, aquaculture, marine biotechnology, seabed extractive activities, bioprospecting, tourism, transport. Etc. Blue economy is a comprehensive concept that defines how our oceans and seas can boost economic growth and lead their society towards better living standards. In order to call a concept a “Blue economy” merely economic and social growth with the help of oceans and sea is not sufficient. It should also incorporate clean technology, renewable energy, circular material flow that reduce wastage and recycle the resources (Bhohler, 2018).

India is fortunate enough to have the world third largest ocean i.e. Indian Ocean along with Arabian Sea and Bay of Bengal which makes it a focal point for many developed countries. The vast spread of these oceans around India blesses it with a long coastal line (Maini et al., 2011). Presently, there are 9 states and 2 union territories that have coastal lines and therefore a large number of populations depend on oceans and maritime activities for their livelihood. This elucidates that India holds huge opportunity and potential in adopting and utilising benefits of Blue Economy (Godfrey, 2016).

Ecology was the term coined by German zoologist, Ernst Haeckel and he explained it as “a discipline that studies relation of animal both to its organic and inorganic environment.” It includes study of all biodiversity and their habitats which can be biological or physical. Ecological sustainability can further be elaborated as promotion and initiatives to maintain ecological environment and make them sustainable for future generations (Coppola, 2014). Ecology includes various ecosystems, biodiversity, and various processes and cycles these ecosystems maintain. Ecological sustainability ensures that activities undertaken for human development and economic growth should not harm biodiversity and their ecosystems. Since our Earth comprises more than 90% with water, i.e.; Seas and Oceans thus leading to large part of pf coastal and oceanic biodiversity and ecosystems. In this paper the main focus is on biodiversity and ecosystems specific to maritime only. Ecological sustainability holds extremely high importance because it constitutes the majority of part on earth, three fold better in preserving the environment. Thus coastal



ecological sustainability can be the best buffer to territorial sustainability (Pauli, 2010). Apart From environmental advantages marine biodiversity and ecosystems supports human health, natural resource management, maintaining the food chain, and provides agricultural solutions and many more. Thus, ecological sustainability is extremely important to achieve the goal of sustainable development. Unfortunately, human beings, one of the most intelligent species of this ecosystem, are the reason for extreme destruction of environment and biodiversity due their short term benefits, selfish goals (Roberts, 2016). They don't realise that any harm to any ecosystem will ultimately harm us or our future generations (Silver et al., 2015).

Blue economy can be an effective tool to protect ecosystems thus leading to ecological sustainability. Blue economy and oceanic economy has only difference; the former is characterised by clean green and sustainable activities hence circumventing the harmful effect of developments (Roberts, 2016). Many coastal ecosystems like Marshes, mangroves and seagrasses help in sequestration of harmful gases and provide habitat to juvenile fishes, aquatic plants and herbs that retain health of oceans. From Agenda 21 to the latest goals established for sustainable development by the UN in 2015, the vision is to spread awareness across the world towards green growth (Maini et al., 2011). Blue economy can be an important instrument in achieving this goal. Large population and regular demand for food, jobs, and money is mounting extreme pressure on oceans and thus leading to exploitation, malpractices and consecutively defoliating health of water bodies and marine resources. Add-on destruction of coastal ecosystems is also due to incorrect assessment of value of marine resources and their corresponding ecosystem service. For example value of fisheries and renewable energy is much more than mining. Thus, it is necessary to make people aware about the same so that they can indulge in more profitable and ecologically sustainable activities (Roberts, 2016).

The above discussion clarifies that ecological and economical sustainability must go hand in hand in a blue economy. These concepts can be integrated in a concept called ecosystem based management. This is defined as "an integrated approach to

management that considers the entire ecosystem including human beings. The goal of EBM is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide services that humans want and need.", explained by COMPASS, the communication partnership for science and sea. It not only integrates the concept of economic development to ecological sustainability but also provides a new perspective to see our ecosystems.

## **Literature Review**

In the paper titled "the potential of Blue Economy-increasing long term benefits of the sustainable use of marine resources for small island developing states and coastal least developed countries". Published by world bank group and united nations, used descriptive research to elaborate relationship of SIDS and coastal LDCs to ocean, seas and marine resources. It also explained transition to blue economy and various challenges in attaining blue economy. It is an elaborated paper that is describing various sectors and activities related to blue economy. It gave scope for further study on the role of the Blue economy in India.

In another paper titled "The blue economy, growth, opportunity and sustainable ocean economy" published by an Economist Intelligence unit, the briefing paper for world ocean summit 2015. Author expounded the concept of blue economy, emphasised on the importance of balancing economy and conservation of coastal ecosystems. It emphasised potential investment strategies for the ocean economy. But theoretical knowledge is lacking on economic growth and opportunities available in India (Vierros, 2017)

In the paper titled "Road Map for development of Sustainable blue economy protocol" published by WWF elaborated factors necessary for sustainable blue economy protocol. It also clarified concepts and understanding about blue economy protocol. This paper did not talk about economic growth and ecological sustainability. It simply establishes a framework for sustainable blue economy (Benett, 2019).

According to paper "Blue-economy-Environment and behaviour aspect toward sustainable coastal development" written by Nicholas Kathjotes published in procedia-social and behaviour science,

volume 108, emphasised on importance of blue economy and elaborated application of “blue economy” concept and importance of innovation in regulating blue economy. Still the economic importance was not explained thus lots of scope is there to research on economic importance of the blue economy (Godfrey, 2016).

The further literature was available on “Ocean based blue economy: an insight into sagar as the last growth frontier” written by Hemant main and Lipi Budhraj established linkages between blue economy , economic growth and port development, international relation and security and ocean resource conservation and highlighted the opportunities and challenges for India. It did not focus on ecological sustainability. Thus researchers can extend the study by providing ecological perspective also. In one more paper titled “State of sustainability initiative review: standards and blue economy” written by Jason Potts, Ann wilking, Matthew Lunch, Scott Mcfatridge published by IISD, elaborated text on seafood and certified sea food. It did not express any view on economic or ecological sustainability (Maini, 2016).

Literature was also reviewed from several books like, “The Blue Economy and Small states,” written by Deodat Maharaj and published by commonwealth, elaborates the blue economy concept, potential that blue economy holds and how small states of India can be benefited out of it (Robert, 2016). The chapters did not highlight ecological sustainability. in another book titled “perspectives on blue economy” written by Vijay Sakuja and Kapil Narula gave importance and ground work necessary to execute the concept of blue economy. It also wrote about the international role and capacity building for implementation of the blue economy. The book did not include any chapter on ecological sustainability (Narula, 2019). Thus, extensive work is done in the field of blue economy. Lots of literature is available about concepts, importance of sustainable development etc. This paper will add literature on economic and ecological sustainability.

## Research Methodology

In this paper researchers conduct exploratory study by collecting qualitative data. The paper has following objectives:

- To develop insight in the blue economy.
- To understand role of blue economy on sustainable economic growth of India
- To understand the role of blue economy ecological sustainability.

The data is collected through secondary sources both from electronic and non-electronic sources. The data has been collected within the time frame of 6-7 years from various books, journals, periodicals, abstracts, indexes, research reports, conference papers, market reports, Newspaper and magazines. The researcher also accessed electronic mediums for retrieving information. The data will be analysed by summarising and gathering facts and figures from these sources. The data collected will be secondary and therefore has following limitations:

- Since study was based on secondary data thus data collected had different objectives.
- This study cannot be exhaustive as Blue Economics has many components and it was difficult for the author to cover every aspect.
- This study was conducted as particular time period and therefore results can vary over the period

## Finding and Interpretations

There are several factors that lead to economic growth of any country. Some of these factors are discovery of natural resources, increase in physical capital and infrastructure, availability of labour, human capital, technology, and laws of the country. Thus for any country to grow economically must undertake activities that promote these things. Blue economy can be an important tool in gaining such prosperity along with long term sustainability. Following are the components of the Blue economy that can lead to economic growth of any County. Although in India certain activities are practiced but still many activities can be explored and executed upon (Bohler, 2018).

**Fisheries:** According to a report generated by World Bank 2013 it is expected that fishery will include two-third food consumption by 2030. This leads to huge opportunities for any country. It can be extremely beneficial in gaining economic and food security. This component of the blue economy has become a source of occupations, economic freedom



and wellbeing of the coastal population. Majority of the women population living in coastal areas has adopted this occupation as a part time source of income. Thus, apart from providing economic freedom, this sector is one of the largest sources of providing animal protein, omega3 fatty acid and essential nutrients (OECD, nd). But as explained in the introduction any sector to be part of the blue economy must render sustainable growth and must consist of clean technology. But over a period of time this is one industry which is leading to great harm to the health of the oceans and various ecosystems. Overcapacity, overfishing, unregulated development, habitat degradation. Agencies have stipulated a maximum limit for fishery but these mal practices are leading to 31% more than stipulated guidelines. According to SDGs, improving fisheries management, effective regulation, and prohibiting certain forms of fisheries will help in controlling this problem (Coppola,2018).

**Aquaculture:** Aquaculture can further add volumes to economic growth by providing food safety, reducing fish imports, increase employment leading to wellbeing of the society. But this component has not gained much value and has been ignored by businesses. As claimed by Unsteer can be 30 % increase in production if investment is done in field of aquaculture policy and legal framework. For sustainable aquaculture it is important for any country to invest on multi-trophic aquaculture seaweed aquaculture, shellfish aquaculture and well planned fisheries based on saving ecosystems (Maini et. al., 2011).

**Coastal and Maritime Tourism:** It is another component of the blue economy that can improve a country's social, economic, and environmental wellbeing. It is not only an important source of employment generation, financial stability, and improved living standards but also an excellent source of earning foreign exchange (Roberts, 2016). There are several types of coastal tourism like ecotourism, cruises, surfing, maritime archaeology, dive tourism etc. This also needs sincere attention from regulatory bodies and should be well managed and monitored to avoid problems generated due to maritime tourism. It is also an important tool to maintain local culture, tradition and heritage.

**Marine Biotechnology & Bioprospecting:** Oceans and seas are considered to be treasure of numerous eukaryotic and prokaryotic species. These species and many other aquatic organisms are source of several genes and natural products that are used in industries like pharmaceutical, enzymes, and developing genetic resource. The country has to attract and provide incentives to scientists and researchers to explore and excel in this field (Silver et al., 2015).

**Desalination:** It is another activity that provides fresh water and makes available with adequate quantity of clean drinking water in areas where there is scarcity of it. Although the process of desalination is highly energy consuming and requires huge technical and financial capacity. If not managed properly leads to temperature pollution and gradually increase in salinity due to brine released in the process. This creates an urgent need for innovation and to conserve energy and harmful effects (Gadfrey, 2016).

**Renewable Marine (off-Shore Energy):** Marine energy is a type of renewable energy. It has various forms like wave, tidal and ocean thermal energy that can be a great substitute to non-renewable resources of energy. Unlike other renewable resources like solar it consumes very less energy in manufacturing. Most of the countries still depend on fossil fuel for their energy requirement. Renewable marine energy can be an alternative to this non-renewable energy (Benett., 2019).

**Marine Time Transport and Related Services:** It is a well known fact that maritime transport is the most economic mode of transport. According to the report published by the UN, 80% of the volume of international trade is done through sea and oceans. Thus, it is prime mode to undertake trade across international borders. This leads to several environmental issues and inappropriate effects on ocean health like, atmospheric pollution, marine litter, underwater noise and the introduction and spread of invasive species. Thus, to make it a part of sustainable economic growth. Proper functional policies are required to regulate marine transport (Morales, 2019).

**Waste Disposal Management:** One of the serious problems which most of the countries are coming across is disposal of waste. Most of the waste



generated through human and non-human activities is thrown on landfill or into water bodies. Pollution caused due to marine litter, nutrients from fertilizers, burning of fossil fuel impacting biodiversity and ecosystems of oceans. However, waste management is not just a requirement of human beings but also legal obligations. This provides opportunities to many ventures like repurposing plastic, debris, chemical treatment plants and various other innovative ventures for economic opportunities and sustainability (Voyer, 2018).

Consequently, for sustainable development, the blue economy is not just an important tool but an opportunity through which one can gain competitive advantage. Any Gain which is for short term is actually not worth till it does not promise to render long term benefit. Blue economy provides a new perspective through which one can enlighten their minds towards new innovations, entrepreneurial ideas and ventures that promises to strengthen basic pillars of sustainable development, economy, society and environment (Vierros, 2017).

In the first part of the paper we discussed the economic feasibility of the blue economy and now this part will highlight ecological sustainability due to the blue economy. Our ecosystems and biodiversity not only provide food energy, nutrients but also provide us life support systems. These are various cycles like carbon, nitrogen, and reducing carbon footprints and leading to blue carbon. Ecological sustainability refers to maintaining and regulating biodiversity of ecosystems. Since 95% of earth is covered with oceans, it makes up a major part of biodiversity and ecosystem. As explained earlier any country can adopt any venture to gain its economic sustainability but following measures can support ecological sustainability:

### **Ocean Monitoring and Surveillance**

a component of the blue economy that protects it from illegal practices, environment safety, disaster response, and keeps a vigilance on any type of leakage or spills of oil or any other pollutant (Bennett, 2019).

### **Ecosystem based management**

It is an integrated system in which no individual species; ecosystem or habitat is considered

separately rather a holistic approach is undertaken. Even human beings are also part of this system and every activity conducted as a part of this system should be sustainable and effective in terms of the environment (Morales, 2020).

### **Legal and Policy Framework**

Effective implementation of UNCLOS is very important. UNCLOS is a complete set of legal outline that acts as the constitution of oceans, thus regulating the entire ocean system and safeguarding it from various ignorant and irresponsible practices (Malone, 1983).

Thus Economic growth and ecological sustainability are two sides of a blue economy. On one hand the blue economy opens a vast array of prospects from oceans thus leading to better social and economic systems and on other hand it also emphasizes ecological balance for never ending resource and growth.

### **CONCLUSION**

Blue economics can be a new paradigm shift towards the economy of any country's sustainable growth. But it is still blocked by several barriers like sea level rise which leads to various devastative cyclones, storms disturbing lives at the coast. Second issue of coastal economies is that they face scarcity of fresh drinking water. Thirdly, sea surface temperature, ocean acidification, leads to disturbances in various ecosystems. Thus the blue economy is an entire concept which requires lots of awareness, innovation, research, and management.

Blue economy provides ample options for financial freedom, job opportunities, human well-being, nutrients, food safety, and better living standards. These options are not short term rather long term. It is a concept that can provide both economic and ecological sustainability and maintain life support systems. It promises a healthy, resilient and productive environment. Blue economy can only do what it aims to do if it is supported by good governance at national and regional level, opportunities and strategies, business development, investment and financial and legal framework to encourage valuable businesses and discourage mal-practices. Blue economy can be a bonus for any country and has great potential to convert scarcity into abundance.



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