Climatic Disruptions and Their Implications for the Blue Economy in India

Dr. Ashok Sengupta
Asst Prof, School of Management Sciences, Lucknow

Abstract

Our Oceans cover approx Seventy Two percent of the surface area of our earth and provide a maximum world population is depends on it, with food and livelihood. Intensifying more than 80 percent of global commerce, marine and coastal ecosystems establish a key resource for economic advancement on the basis of the imperative place of the Indian Ocean.

The objectives of the Blue Economy is to encourage lively, sustainable and comprehensive growth and employment opportunities within the Indian Ocean region's maritime economic exercises. The Blue Economy is defined to induct appropriate programs concerning the sustainable harnessing of ocean resources; research and development; developing important sectors of oceanography; stock evaluation of marine resources; introducing marine aquaculture, deep sea/longline fishing and biotechnology; and human resource development; among others.

In this paper, the researcher aims to find out the various opportunities and challenges due to climate change with the help of past data, which has been collected for various secondary sources and then analyzed by various statistical tools.

Keywords: Blue Economy, Global trade , Climate Change.

I .Introduction:

Oceans comprise three forth of the Earth's cover contain 97% of the Earth's sea and serve 99% of the living kingdom on the planet. Oceans are challenged to be 'last frontiers' of growth and development, but the immense potential that the Oceans present remains to be tapped fully. However, this impending needs to be harnessed in a fair manner, where the conservation and health of Oceans are given their due importance, along with adherence to the United Nation's Sustainable Development Goal that states "Conserve and sustainably use the oceans, seas and marine resources for sustainable development ."
The Ocean-based Blue Economy is the next dawn issue for development experts. 1Dr. Gunter Pauli introduced this concept in the book – "The Blue Economy: 10 years, 100 innovations, 100 million jobs". Blue Economy is based on the design to use locally available possessions and employ renewable inputs, for example, "ocean-as-a-resource" that addresses the problems of resource scarcity and enables

sustainable progress. This economy which based on marine will reduce environmental risks and mitigate ecological challenges. As a result, the optimized and accountable resource utilization will enable to get balanced socio-economic development.

II. Economic and Trade Potential:

The Indian Ocean Region is copious with resources, particularly in the sectors of fisheries, aquaculture, ocean energy, sea-bed mining and minerals etc and provides tremendous economic potential to develop marine tourism and shipping activities. Among these resources, fisheries and minerals are the most commercially viable industries. Fishery business sustain the livelihoods of more than 38 million people worldwide. In the Indian Ocean, fish production increased drastically from 861,000 tons in 1950 to 11,34,948 metric tonnes in 2016-17. As per the 2 United Nations Food and Agriculture Organization (FAO) report states that while other world oceans are nearing their fisheries limit, in certain areas, the Indian Ocean's resources have the potential to sustain increased production.

Polymetallic nodules and Polymetallic massive sulfides are the two mineral resources of commercial interest to developers in the Indian Ocean. Normally originate at 4-5 km in water depth, Polymetallic nodules are sized approx Goif to Tennis ball having nickel, cobalt, iron, and manganese that creates over millions of years on the deposit of the seafloor. India got exclusive rights for the looking at Polymetallic nodules in 1987, in the Central Indian Ocean Basin. After that, it has investigated 4 msq miles and established two mine sites.

A strong impulsion on Research and Development, and Innovation in the areas of Ocean Energy, Marine Biology and Biotechnology are for the nation to achieve significant market shares in these sectors.

It is essential for India to tap the mammoth potential of the Ocean based Blue Economy, which will impel the nation into a higher growth trajectory. The development of Blue Economy can dole out as a growth catalyst in realizing the vision to become a $10 trillion economy by 2032. Additionally, the Indian Ocean Region is of deliberate importance to India's economic growth as most of the country's oil, and gas is imported through the sea. Auxiliary, this craving is expected to rise by 2025 exponentially. The Indian Ocean province presents incredible trade potential for the country. The countries in the Indian Ocean Rim Association (IORA) exhibited important changes in the past few years as the trade in the region increased by over four times from US$ 302 billion in 2003 to US$ 5.78 billion (₹37,870.90 crore) 2016-17.

The Sagarmala project was launched by the Ministry of Shipping is the strategic proposal for port-led development through the extensive use of IT-enabled services for modernization of ports. It handles the issue of underutilized ports by aiming on port modernization, proficient evacuation, and coastal economic

development. The government has allocated over Rs. 3 lakh crore to fund 199 projects under the Sagarmala programme will be implement in the next three years. Of these recognized programmes, projects of additional than Rs. 1 lakh crore are by now under accomplishment. Furthermore, the Union Budget of 2017-18 has increased the allocation to the project from Rs. 406 crore (RE 2016-17) to Rs. 600 crore (BE 2017-18), giving further impetus to the port-led enlargement.

In the Make in India program of the Government, the shipbuilding industry can promote from a major thrust. This industry has a high multiplier effect on investment in addition, can pick up the pace industrial growth along with its large number of associated industries. December 2014, India had a convoy power of just over 1,200 ships, which is expected to reach over 1,600 by 2025. A strapping push in India's commercial shipbuilding and ship repair sectors, complementing the Sagarmala project of port development has the potential to drive economic renovation.

III. International Relations and Security:

The Indian Ocean has always enjoyed a place of eminence in global strategy. Several nations have established a presence in the region to ensure their strategic interests. India was very active in the UN Adhoc Committee that was set up on the Indian Ocean and supported the reasons of keeping the Indian Ocean, a Zone of Peace during the Cold War.

However, with the recurrence of piracy issues and growing importance to secure the oceanic ecosystem, India has been pro-actively involved in cooperative preparations with like-minded neighboring countries. The 'Trilateral Cooperative in Maritime Security between India, Sri Lanka, and the Maldives' is one such example. The India Maritime Security Strategy published by the Indian Navy articulates country's policy in the Indian Ocean region. It states that in the Indian Ocean region, India is steadfast to:

- Guarantee a safe, protected and constant Indian Ocean Region;
- Extending protection assistance, through increased surveillance and monitoring with regional partners;
- Forging a multilateral obliging maritime security proposal in the Indian Ocean to combat terrorism and piracy;
- Deepening cultural linkages with the people in region; and
- Building Indian Ocean Region as a frontier of sustainable economic development .

However, even though the above, other persuasive issues demand a coordinated move toward amid stakeholders in the region in combating, the out breaking issues of the rise in narco-terrorism and human trafficking. These need to afforded by strengthening trans-oceanic partnerships and developing a harmonized approach for a way forward.

IV. Way Forward for India

In this era of advanced technology, oceans will become new centers of economic movement. Oceans already account for importance trade and commerce in the fields of shipping, offshore oil and gas, fishing, marine cables, and tourism. Besides these areas, there are other emerging industries such as aquaculture, marine biotechnology, ocean energy and sea-bed mining that have the potential to create jobs and spur worldwide economic growth.

The Indian Ocean region needs a sustainable and inclusive framework for international partnerships. Countries in the region need to not only coordinate and manage the growing security challenges in the region but also realize the substantial economic potential the Indian Ocean area presents.

India has significantly upped its development efforts in Seychelles, Mauritius, Africa, and Sri Lanka. Such an approach earmarks a shift from the traditional focus on naval operations and anti-piracy efforts to that of environmental protection, national security, infrastructure creation, industrial capacity building and marine development.

India’s commitment to strengthen its cooperation with the regional partners and build a sustainable ocean economy aligns well with its domestic mega-modernization projects that will enable the nation to harness the full potential of the Ocean based Blue Economy.

V. Strategic Crucible

The Indian Ocean is important for three reasons. First, it enjoys a privileged location at the crossroads of global trade, connecting the major engines of the international economy in the Northern Atlantic and Asia-Pacific. This is particularly important in an era in which global shipping has burgeoned. Today, the almost 90,000 vessels in the world’s commercial fleet transport 9.84 billion tonnes per year. This represents an almost four-fold increase in the volume of commercial shipping since 1970. The energy flows through the Indian Ocean are of particular consequence. Some 36 million barrels per day—equivalent to about 40 per cent of the world’s oil supply and 64 per cent of oil trade—travel through the entryways into and out of the Indian Ocean, including the Straits of Malacca and Hormuz and the Bab-el-Mandeb.

But the Indian Ocean is more than just a conduit for commerce. The Ocean's vast drainage basin is important in its own right, home to some two billion people. This creates opportunities, especially given the high rates of economic growth around the Indian Ocean rim, including in India, Bangladesh, Southeast Asia, and Eastern and Southern Africa. However, the densely populated littoral is also vulnerable to natural or environmental disasters. Two of the most devastating natural disasters in recent memory occurred in the Indian Ocean rim: the 2004 tsunami that killed 228,000 people, and Cyclone Nargis that hit Myanmar in 2008 and took 138,300 lives.

Finally, the Indian Ocean is rich in natural resources. Forty per cent of the world's offshore oil production takes place in the Indian Ocean basin. Fishing in the Indian Ocean now accounts for almost 15 per cent of the world's total and has increased some 13-fold between 1950 and 2010 to 11.5 million tonnes. Aquaculture in the region has also grown 12-fold since 1980. Although global fishing is reaching its natural limitations, the Indian Ocean may be able to sustain increases in production. Mineral resources are equally important, with nodules containing nickel, cobalt, and iron, and massive sulphide deposits of manganese, copper, iron, zinc, silver, and gold present in sizeable quantities on the sea bed. Indian Ocean coastal sediments are also important sources of titanium, zirconium, tin, zinc, and copper. Additionally, various rare earth elements are present, even if their extraction is not always commercially feasible.

The challenges of securing the free passage of trade and energy, ensuring the sustainable and equitable exploitation of fishing and mineral resources, and managing humanitarian assistance and disaster relief (HADR) operations would be daunting enough even if the Indian Ocean were not so contested. Beginning in 2005, pirates operating mostly from Somalia began to hijack commercial ships with alarming regularity, with such incidents peaking in 2010. Industry and various governments took following global attention and the growing notoriety of Somali piracy, a series of steps. These included naval operations, transnational coordination, and security measures taken by the shipping industry. These developments resulted in a sharp drop in incidents in 2012. Nonetheless, as late as 2012, maritime piracy was costing the global economy between $5.7 and $6.1 billion, the bulk of which was borne by industry. Non-state actors such as pirates are not the only entities contesting the Indian Ocean. With an eye on securing trade routes, resource rights, and commercial interests, the naval forces of maritime states in the Indian Ocean region and beyond are becoming increasingly active.

Fig 1. Map of India Ocean

Source :Google

VI Methodology

This paper is based on descriptive research; the data has been collected from various secondary sources from websites, journals, articles.

Objectives

- To Understand the concept of Blue Economy.
- To study the change in temperature of Indian ocean
- To find out the causes & impacts of climate change on Blue Economy

VII Climate Change

Different authors/scientists are working on climate change. Scientists have zeroed in on the tropical Pacific as a major player in taking up that heat. However, while it might have held that heat for a bit, new research illustrate that the Pacific has passed the potato to the Indian Ocean, which has seen an extraordinary rise in heat content over the past decade.

The new work builds on a series of papers that have tracked the causes for what has been dubbed the global warming delay, a period over the past 15 years that has seen surface temperatures rise slower than they did the previous decade. Shifts in Pacific trade winds have helped sequester heat from the surface to the top 2,300 feet of the ocean. But unlike Vegas, what happens in the Pacific doesn’t stay in the Pacific.

Sang-Ki Lee, a scientist at the Cooperative Institute for Marine and Atmospheric Studies, said. “Lee, who led the new research published in Nature Geoscience, looked at records going back to 1950 and noticed that the Indian Ocean heat uptake “was pretty much flat” until 2003. Suddenly, heat began to build there, but it wasn’t coming from above. By running ocean circulation models, he established that the heat stashed in the Pacific had hitched a traverse on the ocean conveyor belt and danced its way through the Indonesian archipelago, ending up in the Indian Ocean. The Indonesian shuffle means that the Indian Ocean is now home to 70 percent of all heat taken up by global oceans during the past decade.

“This is a really important study as it resolves how Pacific Ocean variability has led to the warming slowdown without storing excess ocean heat locally,” Matthew England, a professor at the University of New South Wales, said. “This resolves a long-standing debate about how the Pacific has led to a warming slowdown when total heat content in that basin has not changed significantly.”England led previous research that examined the role of the tradewinds in the Pacific’s heat uptake.

Tom Delworth, a climate modeler at Geophysical Fluid Dynamics Laboratory who has also examined the Pacific trade winds in the hiatus, agreed, though he noted, “the results are very interesting, but I’m not sure they help us with predicting the future evolution of the hiatus.”

Ocean heat content has risen dramatically over the past decade even as surface temperatures have not. Globally, oceans account for 93 percent of the heat that has accumulated on the planet since 1970 due to human greenhouse gas emissions.

What its means for future El Niño cycles is less clear, however.

Lee said it is likely to continue globetrotting all along the ocean conveyor belt and find its way to the Atlantic in the coming decades. “If this warm blob of water in upper Indian Ocean is transported all the way to North Atlantic, that could affect the melting of Arctic sea ice,” Lee said. “That can also increase hurricane activity and influence the effects of drought in the U.S. These are simply hypotheses that need to be tested an/d studied in the future work.”

The world’s oceans are playing a game of hot potato with the excess heat trapped by greenhouse gas emissions.

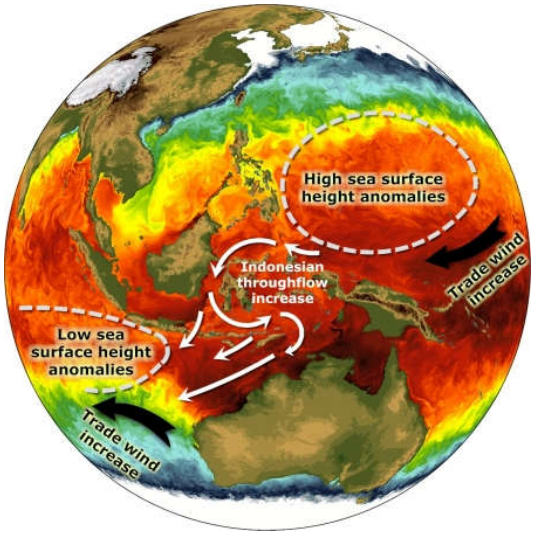

Fig 2 :An illustration showing movement of water from the Pacific to the Indian Ocean.Credit: Lee et al., 2015

.

VII Causes of Ocean Warming

Oceans and coastal regions worldwide are coming under increasing environmental pressures. These growing stresses include habitat destruction and biodiversity loss, land-based and marine pollution, overfishing, and the rising impacts of global warming and mounting greenhouse gas emissions. The countries of the Indian Ocean rim are especially vulnerable, particularly to the prospective repercussions of global climate change on coastal zones and marine resources. Significant portions of the Indian Ocean now figure among the most highly impacted ecosystems on Earth and the littoral countries count among the world's most susceptible to coastal environmental risks, posing substantial governance challenges for policymakers throughout the region.

Around the Indian Ocean, coastal development for ports, aquaculture, roads, buildings, and urban infrastructure is destroying or diminishing mangroves, coral reefs, wetlands, and other habitats. Pollution, destructive fishing practices such as the use of dynamite and poisons, coral mining for construction materials, and coral bleaching endanger two-thirds of the Indian Ocean's 12,070 km2 of coral reefs and four-fifths of the 3,175 km2 of corals in the Red Sea. By one estimate, some 40-trillion liters of sewage and 4-trillion liters of industrial wastes enter the region's coastal waters every year. Agricultural runoff, and domestic and industrial effluents dumped in the sea can cause eutrophication (blooms of phytoplankton resulting from the added nutrients in the effluents) and attendant hypoxia (depletion of

oxygen in the water), or act as toxic substances, killing local flora and fauna. Eutrophication and hypoxia can engender effective dead zones in coastal areas. Eight such zones now blot the Indian Ocean.

Projected impacts from global warming include rising sea levels, stronger tropical cyclones, larger storm surges, increasing sea surface temperatures, and-as the oceans absorb more of the carbon dioxide that human activities emit to the atmosphere-growing acidification of surface waters. For coastal ecosystems and communities, the potential consequences could be considerable, threatening the livelihoods, health, and welfare of millions of people. More frequent and severe storms can inundate low-lying coastal zones, destroying infrastructure and displacing populations. Higher water levels and larger wave surges can contribute to accelerated shoreline erosion and retreat. Mounting sea levels can also exacerbate saltwater intrusion into the rivers and aquifers that furnish freshwater to coastal settlements. Warmer water temperatures and acidifying oceans can degrade the ecology of coral reefs, and threaten the artisanal and commercial fisheries that nourish many seaboard communities.

All told, Indian Ocean nations represent six of the 10 most vulnerable states worldwide-ranked by total population living in low-lying coastal settlements. A 2009 World Bank study examining the dangers to developing nations from potential storm-surge disasters concluded that five of the 10 countries with the greatest percentage of coastal population at risk, five of the 10 countries with the highest percentage of coastal GDP at risk, six of the 10 countries with the highest proportion of coastal urban areas, and 21 of the 50 most vulnerable major cities at risk lie on the Indian Ocean. The Intergovernmental Panel on Climate Change estimates that, even under the most conservative scenarios, the annual number of coastal flood victims will soar from 13 to 94 million by 2100, with almost 80 percent of this increase occurring along the Indian Ocean from Pakistan to Thailand and Indonesia. One meter of sea-level rise would inundate 5,800 km2 of Indian territory and submerge 14 percent of the land area of Bahrain. Climate pressures especially endanger small or low-lying islands like the Maldives, Mauritius, and Seychelles. Major infrastructure in these countries-roads, airports, seaports, towns-is situated almost exclusively along the coasts. With little space to retreat from rising seas, citizens might be forced to abandon certain islands, or even evacuate their territory altogether. (In the Maldives, one meter of sea-level rise, added to the ocean's highest astronomical tide, would flood out the entire capital city of Malé). Such population displacements would prompt multiple tangled questions for the countries of origin - including issues of sovereignty and control of EEZs - for the destination countries, and for the migrants themselves.

Human exposure to such hazards will almost certainly increase with ongoing coastal development. According to detailed analyses undertaken for the UK government, the global population living in low-elevation coastal zones could grow from 625 million in 2000 to 1 to 1.4 billion in 2060. Yet policymakers

frequently lack the financial, institutional, and information resources necessary to devise and deploy effective national response strategies, much less targeted local measures. Worldwide, financing climate change adaptation measures in coastal zones could require additional annual investment flows of $10 to 30 billion per year by 2030.

All the nations of the Indian Ocean rim will have to take action to address a growing host of coastal and marine environmental challenges. Yet though the individual countries of the region struggle with many of the same issues, they lack a common policy framework for addressing their shared problems in integrated fashion. Around the Indian Ocean, littoral states belong to a patchwork of regional political and economic organizations, from the East African Community and the South Asian Association for Regional Cooperation to the Association of Southeast Asian Nations and the Indian Ocean Rim Association for Regional Cooperation, which differ considerably in their mandates and engagement with environmental issues, none of them encompassing all of the region's coastal countries. Those entities specifically devoted to environmental matters, such as UNEP's Regional Seas programs and the Indian Ocean's various fisheries commissions, similarly diverge in their geographical coverage, and topical capacities and competencies.

The region has little need and less appetite for erecting new international institutions on top of the existing ones. Rather, the Indian Ocean nations must sustain and strengthen the architecture already in place; ensure the resources and will to implement, enforce, and build on their existing commitments; and devise mechanisms to share lessons and coordinate activities between organizations and actors around the region to further their common goals.

VIII Conclusion:

In this paper, I conclude that our ocean seems to be hot like a potato, there are various region which causes rise in sea temperature and sea level. The continues rising is sea level will submerge our coastal cities, which are important for trade in blue economy. Three sides, important metropolitan cities like Mumbai, surround India. Chinnai, Kolkata with other trade cities like Vishakapatman, Kerela etc.

We are witness of cyclones on Bay o Bengal , Indian Ocean which destroyed millions of trade revenue . Climate disturbance is affect Blue economy with population. We can save the our environment with worldwide regime. All countries should focus on environmental safety and ocean policies.

IX References

- Pauli, G. A. (2010). The blue economy: 10 years, 100 innovations, 100 million jobs. Paradigm publications.
- Iasscore.in. (n.d.). GS Score: Best IAS Coaching in Delhi, Best UPSC Coaching in Delhi, IAS Online Classes, IAS Prelims and Mains Test Series 2019, Best IAS online classes in Delhi. [online] Available at: https://iasscore.in [Accessed 21 Dec. 2018].
- Hoerling, M. P., Hurrell, J. W., Xu, T., Bates, G. T., & Phillips, A. S. (2004). Twentieth century North Atlantic climate change. Part II: Understanding the effect of Indian Ocean warming. Climate Dynamics, 23(3-4), 391-405.
- Vedachalam, N., Ravindran, M., & Atmanand, M. A. (2018). Technology developments for the strategic Indian blue economy. Marine Georesources & Geotechnology, 1-17.
- Scott, D. (2006). India's “grand strategy” for the Indian Ocean: Mahanian visions. Asia-Pacific Review, 13(2), 97-129.
- Michel D (2012) Tempest Tossed: Meeting Environmental Challenges in the Indian Ocean, Environment Security and Ocean Security.