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2. Pedagogy Blue Economy in the University Curriculum

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Abstract

World in passing through a difficult time when we are facing multiple impact of Climate Change, COVID-19 and Conflicts like Ukraine -Russia war, Israel-Hamas war etc. We are not able to accelerate the speed needed to achieve SDG's which has slogan of "Leave No One Behind (LNOB)". It is the central, transformative promise of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs).

Keyword- COVID-19, Pedagogy, Blue Economy, University Curriculum, SDGs

Introduction

On **15 November 2022**, the world's population reached 8 billion people, a milestone in human development. Consumption per capita is increasing day by day. Many millions have lost their jobs during lockout in Corona time. Inflation is high throughout the world. In this situation, the Blue Economy is the hope for achieving SDG's for Peace, Development and Sustainable Climate Action .

Two-thirds of the earth's surface is water. This means that about two-thirds of the raw materials that humanity needs for the future are contained in the ocean. A new future for humanity cannot be accomplished without the ocean's resources. Developed countries are already extracting oil and natural gas from the ocean and selling it at high prices. The world has only begun to discover the immense resources in the ocean. The day is at hand when humanity will find itself much more dependent on the ocean.

The oceanic era will not begin without human effort. We must first go out into the oceans. We must go out on boats and fight the waves. Without such courage we cannot prepare ourselves for the oceanic age. The country that conquers the oceans will become a dominant power in the world and find the world eager to study its culture and language. India must become the champion steward of the Indo-Pacific oceanic zone.

We have not explored the marine resources properly, rather we have exploited its living and non-living resources ruthlessly and dumped tons of plastic and other wastes into the ocean and scratched the sea bed extensively.

The ocean changes constantly. That is why the ocean is both mysterious and beautiful. All we need to do is watch the ocean and talk to it. The longer a person spends time with the ocean, the greater the spiritual aspect of his life will become. The ocean, however, can be calm one minute but then quickly change its face and send us strong waves. Waves several times the height of a person will rise up above the boat, as if to devour it. A strong wind will tear at the sail and make a fearful sound.

Think of this, though. Even when the waves have risen and a fearful wind is blowing, the fish in the water have no trouble sleeping. They give themselves over to the waves and don't resist them. This is what we can learned from the fish. Let us not to be afraid, no matter how strong the waves are. Let the waves carry you. The ocean has been such a wonderful teacher for us.

The 2nd Ocean Conference by the United Nations (UN) was held in Lisbon, 27th June to 1st July 2022. The United Nations, Secretary-General, Mr. Antonio Guterres in this Second Ocean Conference, on 27 June 2022, in Lisbon stated that, and I quote:

- *"The ocean can be our biggest ally in responding to planetary crises of climate change, biodiversity loss & pollution. UN Ocean Conference is an opportunity to commit to a sustainable blue economy that can create jobs while protecting our planet.*

- *Ocean conference in Lisbon is Call to action. Listen to people's voice and the sound of nature "*

UN Secretary-General has further said, and I quote:

- *"I apologize to youth on behalf of my generation for not having protected the ocean. This week's UN Ocean Conference will be key to find ways to #SaveOurOcean for the benefit of people and planet. I count on young people's strength, dynamism and action to rescue our planet."*

World faces 'ocean emergency', UN warns, as activists urge action Oceans

- The world is facing an "ocean emergency", United Nations chief Antonio Guterres has warned, as thousands of activists, scientists and leaders gathered at the UN Ocean Conference in Portugal's capital to call for strengthening sea-protection measures.
- "We have taken the ocean for granted," Guterres told policymakers, experts and advocates at the opening plenary in Lisbon, describing how seas have been hammered by climate change and pollution.

- Activists' slogan was "**As the sea dies, we die**".

- The two-day event brought together hundreds of youths from some 165 countries with a shared goal: protecting the Ocean.

- Speaking in front of 100 youth advocates who gathered to inspire, amplify, and accelerate youth action for our ocean, Mr. Guterres reiterated the need to **rescue the planet**. He further said:

- "My generation, and those who were politically responsible – which is my case – we were slow or sometimes unwilling to recognize that things were getting worse and worse in these three dimensions: oceans, climate, and biodiversity", Mr. Guterres told the lively crowd.

- Adding that globally, **the world is still moving too slow and must act now** to start rehabilitating the oceans, rescuing biodiversity, and halting climate change, the UN chief stressed that "it is a generational responsibility that goes far beyond political leaders".

What Is the Blue Economy

The Blue Economy is the latest concept for solving the problems relating to the preservation of the health of the ocean ecosystem besides providing improved livelihoods and job creation, improved transportation, in addition to encouraging better stewardship of our ocean, carbon storage facilities, coastal protection measures, cultural values and biodiversity. All these come under the blue resources and that is why all economic, scientific, social, cultural, technological, environmental measures for the sustainable and judicious use of ocean resources are covered under the Blue Economy.

Accordingly, the blue economy takes place in the ocean, lakes and rivers and also uses outputs or consumption as a major source of economic growth in the sustainable manner.

According to The World Bank, the blue economy is the "Sustainable use of ocean resources for economic growth, improved livelihoods, and job while preserving the health of ocean ecosystem"

UN Defined the "Blue Economy" as an economy that "comprises a range of economic sectors and related policies that together determine whether the use of ocean resources is sustainable. An important challenge of the blue economy is to understand the better manage the many aspects of oceanic sustainability, ranging from sustainable fisheries to ecosystem health to preventing pollution. Secondly, the blue economy challenges us to realize that sustainable management of ocean resources will require collaboration across boarders and sectors through a variety of partnerships, and on a scale that has not been previously achieved. This is a tall order, particularly for Small Island Developing States (SIDS) and Least Developed Countries

(LDCs) who face significant limitations." The UN notes that the Blue Economy will aid in achieving the UN Sustainable Development Goals, of which one goal, number 14, is on "Life Below Water".

European Commission defines the Blue economy as "all economic activities related to oceans, seas and coasts. It covers wide range of interlinked established and emerging sectors."

The Commonwealth of Nations considers it "an emerging concept which encourages better stewardship of our ocean or 'blue' resources."

The Centre for the Blue Economy defines as "it is now a widely used term around the world with three related but distinct meanings- the overall contribution of oceans to economies, the need to address the environmental and ecological sustainability of the oceans and the ocean economy as a growth opportunity for both developed and developing countries."

Conservation International adds that "blue economy also includes economic benefits that may not be marketed, such as carbon storage, coastal protection, cultural values and biodiversity."

World Wildlife Fund begins its report Principles for a Sustainable Blue Economy with two senses given to this term: "For some, blue economy means the use of the sea and its resources for sustainable economic development. For others, it is simply referring to any economic activity in the maritime sector, whether sustainable or not."

As it reflects from various definitions and reports, there is still no widely accepted definition of the term Blue Economy despite increasing high-level adoption of it as a concept and as a goal of policy-making and investment.

The related terms of the Blue Economy are the Ocean Economy, Green Economy, Blue Growth, Blue Justice etc.

In addition to the traditional ocean activities such as fisheries, tourism and maritime transport, blue economy entails emerging industries including renewable energy, aquaculture, seabed extractive activities and maritime biotechnology and bioprospecting. Blue economy also attempts to embrace ocean ecosystem services that are not captured by the market but provide signific ant contribution to economic and human activities. They include carbon sequestration, Coastal protection, waste disposal, and the existence of biodiversity.

The 2015 WWF briefly puts the value of key ocean assets over US$ 24 Trillion. Fisheries are now overexploited, but there is still plenty of room for aquaculture and offshore wind power. Aquaculture is the fastest growing food sector with the supply of 58 percent of fish to global markets. Aquaculture is vital to food security especially of the poorest countries. Only in the European Union, the blue economy employed 3362510 people in 2014.

There are several dimensions and challenges relating to blue economy. The World Bank specifies three challenges that limits the potential to develop the blue economy. Current economic trends that have been rapidly degrading ocean resources. The lack of investment in human capital for employment and development in innovative blue economy sectors. Inadequate care for marine resources and ecosystem services of the oceans.

Following are the major sectors and dimensions identified for study and research in blue economy:

Aquaculture (fish farms, and also algaculture)
Maritime biotechnology
Bioprospecting
Fishing
Desalination
Maritime transport
Coastal maritime and maritime tourism (Blue Tourism)
Mineral resources
Offshore oil and gas
Offshore wind power (also tidal and wave energy)
Shipbuilding and ship repair
Carbon sequestration
Coastal protection
Waste disposal
Existence of marine biodiversity

Sea is called Ratnakar—the Treasure of gems. According to Hindu mythology, during the churning of the ocean many wonderful treasures were brought up from the depths: Moon, Parijat, four -tusked Elephant Airavat, Kamdhenu Mandira, Kalpvriksh, Apsara, Celestial Horse Uchchaishrava, Lakshami, Panchajanya, Vishnu's Mace and Magic Bow, Various Gems and Dhanvantari carrying Amrit.

Today also ,there is an urgent need for churning the ocean again for locating valuable resources for its judicious exploration with a view to giving a new dimension to Blue Economy for ensuring new jobs.

India's Role in promoting Blue Economy

PM Modi while addressing the BIMSTEC countries heads during adoption of its Charter on 30th March 2022, he invited all the heads of BIMSTEC for the international conference on Blue Economy next year in August. The Encyclopaedia on Blue Economy will be a reference book

and an assent for the conference and beyond. It had a wealth of references for further reading and research.

Recently India is celebrated the 75th year of its independence "Azadi ka Amrit Mahotsav" and aspiring to become the third largest economy of the world soon besides being the most populous country, India has also successfully organized the G-20 Summit under its Presidency of the G-20, it is timely that India should take lead in the Blue Economy to address the problem of food security and unemployment and attaining the sustainable Development Goals and become champion of the Ecological restoration by 2030.

Teaching needs to be started in various universities in the field of Blue Economy and research should be conducted actively with exploration for tapping this enormous source of wealth. Here lies the key to address almost all the SDG's including Poverty, food security and employment to youth.

The twentieth century saw the need and emergence of the green revolution, green technology, green economy, green economy indicators , and green economy policies , plans and programs all over the world. It was an all-out societal effort to help meet urgent societal needs of soil based foods and nutrition.

Largely because of enormous population growth worldwide and resulting disproportionate resource needs , soil based resources and economies began to fall short. And thus arose an urgent need for more and more resources and more and more innovative strategies, technologies and economies.

The twenty first century is seeing imaginative water based efforts in the making, akin to the twentieth century soil based efforts. We are now witnessing the beginnings of the blue revolution, blue technology, blue economy, blue economy indicators, blue policies , plans , and programs not only to help feed the world , but also to help it survive and flourish climate change wise.

There has been a great need to have in one place previously scattered pieces of information about numerous facets of blue economy. The two organizing editors of this unique eight volume encyclopaedia have been able to bring together a large number of contributors and organize their contributions in a thematic format in this encyclopaedia.

It is hoped that the Blue Economy community worldwide will find this encyclopaedia of great value. And, those curious about the blue economy will use it for education, enrichment and motivation to do more. Our society needs it.

Every one desires to possess magical crystal balls! It is our hope that this informative encyclopaedia will help trigger efforts to build meaningful multi- indicator-systemic crystal

cubes as approximations for the unavailable crystal balls for speedy progress on issues involving blue economy. Interestingly, some of us were involved at one time in constructing a multi-indicator crystal cube for ocean degradation. We have received many best wishes and congratulations to the encyclopaedia editors and the contributors.

The 8-Volume World Encyclopaedia of Blue Economy is the only publication of its type being brought out jointly under the aegis of Indian Institute of Ecology and Environment (IIEE) and Confederation of Indian Universities (CIU) in association with Inter-University Research Centre (IURC).

The Volume Number 1 deals with the introductory aspects of Blue Economy including its sectors besides the particular topics like Aquaculture; Seaweed; Fish; and Shrimp Farming; Freshwater Prawn Farming; Oyster Farming; Geoduck Aquaculture; Mariculture; Integrated Multi-Trophic Aquaculture; Copper Alloys in Aquaculture; Aquaculture of Salmonids; Pain in Fish; Pain in Invertebrates'; Algae; Algaculture; Microalgae in Hatcheries; Algae Fuel; Algal Bloom; Meat Analogue etc.

The Volume Number 2 deal with the areas specialized like Marine Biotechnology; Bioprospecting; Biomining; Convention on Biological Diversity; History of Fishing and Seafood; Recreational Fishing; Fishing Techniques; Fishing Practices; Fishing Tackle; Vessel; Industry and Commercial Fishing; Fish Processing; Fish Products; Fish as Nutritious Food; Deep Sea Fish; Big-Game Fishing; Fishing in the Dark; Seafood; Fish Market; Fisheries Management; Fisheries Science etc.

The Volume Number 3 deal with the specialized areas like Sustainable Fishery; Desalination; Soil Salinity Control; Desalination by Country; Sea Lane; Sea Transport Systems; History of Ship and Shipping; Canal; Ship Canal; Watercraft; Ocean Transport; Maritime and Coastal Tourism; Blue Economy and Maritime Power; Maritime Power Constituents and Enablers etc.

The Volume Number 4 deal with the specialized areas like Deep Sea Mining; Offshore Drilling; Oil Platform; Offshore Wind Power; Floating Wind Turbine; Environmental Impact of Wind Power; Offshore Wind Farms; Tidal Power; Wave Power; Shipbuilding; Carbon Sequestration; Carbon Farming; Iron Fertilization; Ocean Fertilization; Bio-Energy with Carbon Capture and Storage; Biochar; Ocean Storage of Carbon Dioxide; Carbon Dioxide Removal; Blue Carbon etc.

The Volume Number 5 deal with the specialized areas like Marine Debris; Beach Cleaning; Coastal Pollution and Impacts; Circular Economy; Cruise Ship; Blue Justice; Marine Resources; Blue Economy Masterplan; Blue Economy vs. Standards etc.

The Volume Number 6 deal with the specialized areas like Blue Economy for India and Partner Countries; India's Aquatic Ecosystem; Blue Economy and its Enablers; Blue Economy and

Maritime Power Conversions; Vibrant Fisheries and Aquaculture; Importance and Priorities for Blue Economy Initiatives; Blue Growth; Sustainable Blue Economy and the Indian Ocean; Poverty, Environment, Coast and the Blue Economy; Skills for Blue Economic Growth; India's Plans and Policies for Blue Economy; Blue Economy Protection; Blue Economy and Ocean Health; Blue Economy for a Self-Reliant India; Fisheries, Organized Crime and Ocean Economy; Blue Economy and the Bay of Bengal; Human Impact of Ocean Related Crime; Role of Oceans in Industrial Development; Blue Economy, Sustainable Tourism, Ocean Wealth and Health; Blue Economy, Small Islands and Tourism; Deep-Sea Mining and India's Blue Economy Policy; Blue Economy and Tourism in India; Blue Economy Practices in Seychelles; Blue Economy and Clean Technologies; Marine Renewable Energy; Blue Economy, Ocean Health and COVID-19 etc.

The Volume Number 7 deal with the specialized areas like Ocean and Maritime Security; Blue Justice; Ocean Health and Governance; Future Workplace and the Oceans; Youth Empowerment for Blue Economy in Kenya; Opportunities in Blue Economy; Blue Economy in Africa; Potentials of Marine Resources for Blue Economic Development; Blue Economy Development Paradigm; Women's Empowerment and Blue Economy; Status and Vision of Blue Economy in India; Blue Economy and Youth Development; Heritage Management in Coastal and Fluvial Areas etc.

Conclusion

The Volume Number 8 deal with the specialized areas like Blue Economy Assessments; Global Trends Influencing Blue Economy; Ocean Environment and Ocean Economy; Science and Technology for Ocean Economy; Industry Based Blue Economy and Maritime Regulations; Blue Economy and its Contribution; Challenges and Dimensions of Ocean Based Industries; Blue Economy and Ocean Utilization by 2030; Ocean Management; Biodiversity and Climate; Recommendations for Blue Economic Development etc.

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1. Dr. Priyaranjan Trivedi & Dr. Markandey Rai: World Encyclopedia of Blue Economy (8 volumes) with foreword by Pawan G. Patil, Senior Economist, The World Bank, Jnanada Prakashan, New Delhi, ISBN : 987-81-7139-177-6 (Set)