Harnessing Resources and Expertise to Reap Benefits of Blue Economy

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1. The Ocean

The Ocean is the live line of the earth. It is the largest ecosystem of the planet containing saline water. Ocean covers 72% of the planet's surface and contains 95% of the bio diversity and 97% of planet's water. Globally 350 million jobs are linked to marine fisheries providing a substantial portion of the global population with food and livelihoods. The seabed currently provides 32% of the global supply of hydrocarbon. 1 billion people in developing countries depend on seafood for their primary source of protein. Ocean provides a media of transport for 80% of global trade, source of Energy renewable energy (wind, wave, tidal, thermal and biomass) minerals (Manganese, Cobalt and Sulphides) and medicine. More than half of the world population lives within 100 km of the coast. Life originated in the oceans and they continue to support all life generating Oxygen. The Ocean recycling nutrients, the largest Carbon sink absorbing Carbon Dioxide while regulating global climate and temperature. Ocean divides as well as connects continents, people and ecosystems. Yet, more than 95% of the underwater world remains unexplored and unknown to human.

By further understanding the importance of the Ocean for the survival of the Earth Planet, Our Ocean conference 2017 held in Malta, was mainly based on the theme proposed by Karmenu Vella, European Commissioner for Environment, Maritime Affairs and Fisheries

"Forests are our planet's green lung, but oceans are its blue heart. It is now up to all of us to keep this blue heart beating."

Blue economy

The "Rio +20" United Nations Conference on Sustainable Development (UNCSD), held in Rio de Janeiro, 20-22 June 2012 mainly focused on poverty eradication through the concept of 'Green Economy'. The concept of "Green Economy" (GE): sustainable development which contributes to eradicate poverty, sustained economic growth and decent work while maintaining healthy ecosystems. However Small Island Developing States (SIDS) and coastal nations understood that GE did not do justice to their circumstances and questioned the focus of the Green Economy and its applicability and importance to their countries. Instead they highlighted that the Oceans have a major role to play in humanity's future and that the Blue Economy offers an approach to sustainable development better suited to their circumstances, constraints and challenges and stressed the

growing appreciation that the world's Oceans and Seas require more in depth attention and coordinated action. Therefore with the support of SIDS and Coastal and Island developing countries since 2012 the advocacy of Blue Economy attracted much needed attention at global forums.

What is the Blue Economy?

The "blue economy" concept seeks to promote economic growth, social inclusion, and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of the oceans and coastal areas. In a simple mode, Blue Economy refers to a range of economic sectors and related policies that together determine the use of oceanic resources in a sustainable manner. Blue Economy approach recognizes the productivity of healthy ocean ecosystems as a pathway for ocean-based economies as well as ensuring the rights of the coastal states to benefit from their marine resources. e.g. Fisheries, tourism, oil and gas and shipping and also fishery agreements, marine research, promote national equity, including gender equality, and in particular the generation of inclusive growth and decent jobs for all.

Components of the Blue Economy

Type of Activity	Activity Subcategories	Related Industries / Sectors	Drivers of Growth
Harvesting and trade of marine living resources	Seafood harvesting	Fisheries (primary fish production	Demand for food and nutrition, especially protein
		Secondary fisheries and related actives (e.g., processing, net and gear making, ice production and supply, boat construction and maintenance, manufacturing of fish-processing equipment, packaging, marketing and distribution)	Demand for food and nutrition, especially protein
		Trade of seafood products	Demand for food and nutrition, especially protein
		Trade for non-edible seafood products	Demand for cosmetic, pet, and pharmaceutical products
		Aquaculture	Demand for food and nutrition, especially protein
	Use of marine living resources for pharmaceutical products and chemical applications	Marine biotechnology and bioprospecting	R & D and usage for health care, cosmetic, enzyme ,nutraceutical and other industries
Extraction and use of marine non-living resources (non-renewable)	Extraction of Minerals	(Seabed) mining	Demand for minerals
	Extraction of energy sources	Oil and gas	Demand for (alternative) energy sources
	Freshwater generation	Desalination	Demand for freshwater

resources (non-renewable)			energy sources
	Freshwater generation	Desalination	Demand for freshwater
Use of renewable non-exhaustible natural forces (wind, wave and tidal energy)	Generation of (off-shore) renewable energy	Renewables	Demand for (alternative) energy sources
Commerce and trade in and around the oceans	Transport and trade	Shipping and shipbuilding	
		Marine transport	Growth in seaborne trade ; transport demand; international regulations; maritime transport industries (shipbuilding, scrapping, registration, seafaring, port operations, etc.)
		Ports and related services	
	Coastal development	National planning ministries and departments, private sector	Coastal urbanization, national regulations
	Tourism and recreation	National tourism authorities, private sector, other relevant sectors	Global growth of tourism
Indirect contribution to economic activities and environments	Carbon sequestration	Blue carbon	Climate mitigation
	Coastal Protection	Habitat protection, restoration	Resilient growth
	Water Disposal for land-based industry	Assimilation of nutrients, solid waste	Wastewater Management
	Existence of biodiversity	Protection of species, habitats	Conservation

Source : World Bank and United Nations Department of Economic and Social Affairs. 2017

1. Harvesting and trade of marine living resources

Though there is a capacity, expansion of current fishing effort, trade of non-edible seafood products and seafood production options have always had its intrinsic issues such as limited stocks, over exploitation and resource depletion. Illegal, Unreported and Unregulated (IUU) fishing is an international issue around the world. It is estimated that IUU occurs in most fisheries especially in Asia and South East Asia, and accounts for up to 30% of total catches in some important fisheries. However these problems could have been solved for some extents with the support of stock assessments, stock management, gear selectivity and the usage of technology. Focusing on the untapped fisheries resources in unused water bodies such as deep water to increase their productivity and sustainability through mobilizing the stakeholders of all levels need to be done with better understanding.

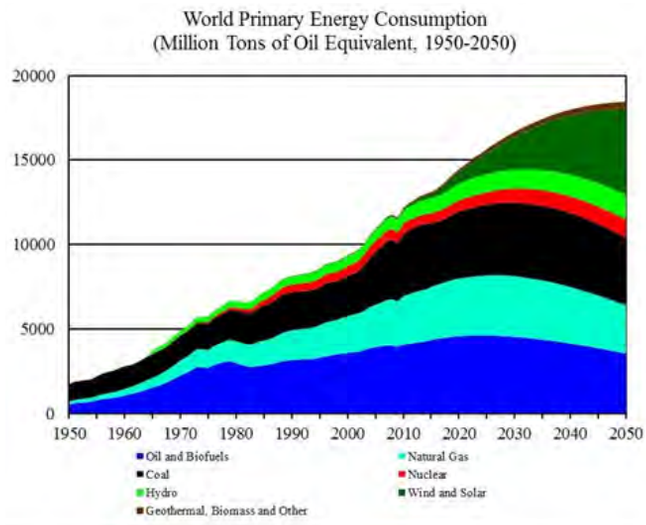
Secondary fisheries related activities, aquaculture, marine biotechnology and bio prospecting shows high potential to grow with the technology development. Since aquaculture has a high potential to meet future protein demand, and provide solutions for the depletion of wild fish stocks. For example, Closing the tuna life

cycle and creating more sustainable feeds are both needed to ensure the future of tuna production and conservation. Following the achievement of closed-cycle Pacific bluefin tuna production and advances in hatchery technology, farming bluefin is becoming a reality in most parts of the world, particularly in the Mediterranean, west coast of the US, Australia, Mexico and Japan. Technology transfer, capacity building; both human and infrastructure and proper planning are essential elements to boost the industry for high levels.

2. Extraction and use of marine nonliving resources (non-renewable)

Extraction of minerals from shoreline deposits and deep-water sea bed is an ongoing industry in most of developing coastal nations, in particular shore based deposits. However, value addition and targeting for end products provides high economic incentives for developing countries rather than exporting raw minerals and importation of expensive commodities such as electronic, electric and mechanical parts. More economic benefits can be obtained through the promotion of research and training capabilities, invest on infrastructure development, technology transfer and employment opportunities.

The world consumes 30 billion barrels (4.8 km^3) of oil per year, with developed nations being the largest consumers. The World Bank estimates that over 150 cubic kilometers of natural gas are flared or vented annually indicating the magnitude of the industry. Oil extraction is being expanded rapidly with the escalation of oil price and the input of new technology into the industry. In recent years, hydraulic fracturing has moved to the forefront of the industry as new technology plays an extremely crucial and controversial role in new methods of oil extraction. The figure indicates that oil and gas consumption will contribute significantly for global energy consumption even by 2050.



Source - https://seekingalpha.com/article/4083393-world-energy-2017minus-2050-annual-report

However, it is evident that extraction of marine non-living resources often claims high environmental pollution. Especially extractions of minerals from sand and sea bed deposits. Further, Oil and gas extractions have its own risk of spilling or mega disasters.

Extraction of freshwater through desalination is particularly relevant in dry countries such as Australia, Middle East and small island nations which traditionally have relied on collecting rainfall behind dams for water. Currently, approximately 1% of the world's population is dependent on desalinated water to meet daily needs, but the UN expects that 14% of the world's population will encounter water scarcity by 2025. Therefore the high demand for freshwater extraction from the sea water and its interlinked job and income opportunities in the near future becomes inevitable.

3. Use of renewable non-exhaustible natural forces

Extraction of wind, wave, and tidal energy from the Ocean is now attracting more attention at current power generation forums. Though wave and tidal energy in most of the places are at the experimental level, extraction of energy from wind has a long history from Europe continent. T present Europe is the world leader in offshore wind power, with the first offshore wind farm

(Vindeby) being installed in Denmarkin 1991. All the largest offshore wind farms are currently in Northern Europe, especially in the United Kingdom and Germany, which together account for over two thirds of the total offshore wind power installed worldwide, which accounts for 18.8 GW in 2017. Although wave and tidal energy has a higher potential to meet future energy demands, most of the extracting devices for wave and tidal energy at present are at prototype level and are called wave energy converter (WEC). Invest on research projects for the enhancement of the efficiency of wind power generation, more practical, durable and economically feasible wave and tidal power extracting devises mush be given high priority with government incentive schemes encouraging researchers and investors on this type of potential renewable energy sources.

4. Commerce and trade in and around the oceans

Freight transport has been achieved widely by sea throughout recorded history. Transport by water is cheaper than transport by air. Therefore sea transport has naturally become a choice of transport in the current system. The industry is ever increasing with the development. Ship building, shipping, port operations and employment opportunities in the sector provide high waged opportunities for qualified younger generations. Incentives and provision of necessary facilities for foreign investors, provision of skilled labor and work force through internationally standard training, scholarships opportunities and technology transfer provide higher benefits to coastal nations.

Major Shipping Routes across the World
https://www.shipmap.org/

Development of ports through the development of long term port development and management policies, improvement of basic port facilities and quality of port management and operation, collect the necessary data and information to examine the progress of the long term port development plans and to revise existing plans are necessary to meet and compete with future demand.

Marine spatial planning (MSP) refers to a process that articulates all stakeholders of the coast and the ocean – including energy, industry, government, conservation and recreation to practically plan the way use marine resources sustainably. MSP considers all the aspects of the marine environment and provide diagrammatic representations to create a more comprehensive picture of a marine area with its planned uses. At the same time it emphasizes the role of each agency and provides overarching mechanism to coordinate all proposals under one theme or management. Ultimately MSP provides a marine spatial use plan aiming a longer period. Since MSP process provides a well elaborated zonal plan for the coastal sector development, urbanization and helps improve available legal setup. The process become more critical in Blue Economy concept, as it reduces the overlaps, save time and resources and expedites the decision making process and development process while achieving Blue Economy targets in much shorter periods.

Tourism and recreation

In the Ocean environment, tourism and recreation together consider as a growing source of consumer demand. It has become one of the most important social and economic activities in terms of employment contributing to GDP. These activities bring income and employment opportunities, increased understanding and exchange of information on other cultures, preservation of cultural and natural heritage and investment in infrastructure, education which in turn brings more social and cultural benefits and other opportunities. Diversification of tourism activities to marine mammal watching, kite surfing, surfing, diving and all other sort of water sports attract more tourists while ensuring the safety, proper facilities, air accessibility and

simplified official processes such as issuance of Visas. At present, travel and tourism generated us$7.2 trillion in 2015, accounting for 9.8% of global gross domestic product, and 1 in 11 jobs worldwide were in the travel and tourism sector.

On the other hand, some forms of tourism, and some recreational activities, can cause destruction of habitats, degradation of landscapes and competition for scarce resources and services, such as land, freshwater, energy and sewage treatment. In addition, deterioration of social and cultural values and suffering of the host population due to over dependence of tourism incomes are already experienced in most tourist destinations.

5. Indirect contribution to economic activities and environments

Activities boost the diversity, protection of marine ecosystems and increase opportunities such as Carbon sequestration, coastal protection, and ecosystem restoration provide indirect contribution to Blue economy. They are equally important components of Blue economy by establishing sound ecosystems and environments needed. Carbon sequestration refers to the provision of long-term storage of carbon in the terrestrial biosphere, underground, or in the oceans so that the build-up of Carbon Dioxide (the principal greenhouse gas) concentration in the atmosphere will reduce or slow. The ocean "carbon sink" is very capable of absorbing an much larger increment of additional carbon than terrestrial systems. In every ocean of the world the bottom of the food chain and foundation for all life are the multitudes of tiny microscopic plants collectively known as phyto-plankton. Ocean phyto-plankton are the bonsai "trees" in the greatest forests on Earth. The oceans hold 50 - 60,000 gigatonnes where as Carbon in forests and soils worldwide together hold just under 2,000 gigatonnes of carbon. The whole process regulates climate change, boost marine productivity, and enhance coral growth at considerable levels. Coral reef and seagrass restoration, coral transplantation, mangrove conservation, green belt establishment replanting are anthropogenic mediated natural phenomenon. In contrast, there are ways of 'forced' or 'artificial' carbon fixation occurring in the Ocean such as fertilization, direct injection and carbonate dissolution. However, in this sector, there are enormous potential to infrastructure and human capacity development, technology transfer and more research potentials.

Conclusions

Blue economy is current, global and challenging. Collaboration and cooperation is the key factor for harnessing resource uses and capacity building. Collaboration at UN level, regional and local levels leads for a better implementation at the grassroots level while attracting support from regional and international players. In order to make Blue economy concept further highlighted proper awareness, human capacity building through foreign exposure, data and information sharing become essential. Proper planning, innovative future visions, willingness and focused commitment is needed to see timely and effective results of Blue Economy.

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