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Potential of blue growth in India

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Abstract
Ocean covers 72% surface of our blue planet and constitutes more than 95% of the biosphere. Life originated in the oceans and they continue to support all life today by generating oxygen, absorbing carbon dioxide, recycling nutrients and regulating global climate and temperature. Oceans provide a substantial portion of the global population with food and livelihoods and are the means of transport for 80% of global trade. The Blue Growth framework promotes responsible and sustainable fisheries and aquaculture by way of an integrated approach involving all stakeholders. Through capacity development, it will strengthen the policy environment, institutional arrangements and the collaborative processes that empower fishing and fish-farming communities, civil society organizations and public entities. Marine and inland capture fisheries; aquaculture; livelihoods and food systems and economic growth from ecosystem services are the various component aims at economic growth, food security and poverty reduction through strengthened fisheries management, reduced fishing capacity and proportion of overfished stocks, as well as improved aquatic ecosystems and habitats. Sustainable use of biodiversity climate change and managing carbon budget; Marine & coastal tourism; pollution and marine debris & governance and international cooperation are issues governing with the blue growth with substantial increase in growth noticed by BOBP-IGO - Bay of Bengal Programme Inter-Governmental Organisation & IOTC - Indian Ocean Tuna Commission regional fishery bodies. Based on the review, the suggestions and recommendations are given for the better management and implementation of principles of blue growth in India.

Keywords: Ocean; Blue growth; Regional fishery bodies; Suggestions & Recommendations

1. Introduction
In this world where more than 800 million continue to suffer from chronic malnourishment and where the global population is expected to grow by another 2 billion to reach 9.6 billion people by 2050; with a concentration in coastal urban areas. Fisheries and aquaculture is a source not just of health but also of wealth (FAO 2010, 2012) [1]. Employment in the sector has grown faster than the world's population. The fisheries sector provides jobs to tens of millions and supports the livelihoods of hundreds of millions. Fish continues to be one of the most-traded food commodities worldwide. It is especially important for developing countries, sometimes worth half the total value of their traded commodities.

To provide wider ecosystem stewardship and improved governance of the sector, FAO is advancing Blue Growth as a coherent framework (FAO 2010, 2012) [1] for the sustainable and socioeconomic management of our aquatic resources. Anchored in the principles set out in the benchmark Code of Conduct for Responsible Fisheries back in 1995, Blue Growth focuses on capture fisheries, aquaculture, ecosystem services, trade and social protection. In line with FAO's Reviewed Strategic Framework, the initiative focuses on promoting the sustainable use and conservation of aquatic renewable resources in an economically, socially and environmentally responsible manner. It aims at reconciling and balancing priorities between growth and conservation, and between industrial and artisanal fisheries and aquaculture, ensuring equitable benefits for communities. To reach these goals, the Blue Growth initiative taps into technical expertise throughout the Organization.

Recognizing 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. Cutting edge technologies and rising commodity prices are opening up new realms of opportunity for submarine exploitation, the High Seas constitute the last global commons and urgent attention is required to enable the sound management of ocean resources for the realization of sustainable development (FAO 2010, 2012) [1].

2. Background blue planet & its economy
Oceans cover 72% of the surface of our blue planet and constitute more than 95% of the biosphere. Life originated in the oceans and they continue to support all life today by generating oxygen, absorbing carbon dioxide, recycling nutrients and regulating global climate and temperature. Oceans provide a substantial portion of the global population

with food and livelihoods and are the means of transport for 80% of global trade (FAO 2010, 2012) [1]. At the core of the Blue Economy concept is the de-coupling of socioeconomic development from environmental degradation. To achieve this, the Blue Economy approach is founded upon the assessment and incorporation of the real value of the natural (blue) capital into all aspects of economic activity (conceptualization, planning, infrastructure development, trade, travel, renewable resource exploitation, energy production/consumption). Efficiency and optimization of resource use are paramount whilst respecting environmental and ecological parameters. This includes where sustainable the sourcing and usage of local raw materials and utilizing where feasible "blue" low energy options to realize efficiencies and benefits as opposed to the business as usual "brown" scenario of high energy, low employment, and industrialized development models.

The Blue Economy approach recognizes and places renewed emphasis on the critical need for the international community to address effectively the sound management of resources in and beneath international waters by the further development and refinement of international law and ocean governance mechanisms (FAO 2010, 2012) [1]. Every country must take its share of the responsibility to protect the high seas, which cover 64 % of the surface of our oceans and constitute more than 90% of their volume.

3. Blue revolution in India

Blue Revolution means the adoption of a package program to increase the production of fish and marine products. The Blue Revolution in India was started in 1970 during the Fifth Five-Year Plan when the Central Government sponsored the Fish Farmers Development Agency (FFDA). Subsequently, the Brackish Water Fish Farms Development Agency was set up to develop aquaculture. The Blue Revolution has brought improvement in aquaculture by adopting new techniques of fish breeding, fish rearing, fish marketing, and fish export. Under the Blue Revolution program, there had been a tremendous increase in the production of shrimp. Andhra Pradesh and Tamil Nadu have developed shrimp in a big way (FAO 2010, 2012) [1]. The Nellore District of Andhra Pradesh is known as the 'Shrimp Capital of India'. About 50 per cent of the country's total fish production comes from the inland fisheries including the freshwater fisheries like ponds, tanks, canals, rivers, reservoirs, and fresh water lakes. Marine fisheries contribute about 50 per cent of the total fish production of the country. Kerala is the leading producer followed by Maharashtra, Karnataka, Gujarat, and Goa. The fishing season extends from September to March. The higher fish production in the Arabian Sea is due to the broader continental shelf. The important fish varieties include sardines, mackerel and prawn. The East Coast contributes about 28 per cent of the total production of marine fish in the country. The fishing activity along the East coast is mainly carried on from Rameswaram in the south to Ganjam in the north, with fishing season from September to April along the Coromandal coast. The National Fisheries Development Board has been set up to realise the untapped potential of fishery sector with the application of modern tools of research and development including biotechnology (FAO 2010, 2012) [1].

4. Blue Growth

FAO is promoting "Blue Growth" as a coherent approach for the sustainable, integrated and socio-economically sensitive management of oceans and wetlands, focusing on capture fisheries, aquaculture, ecosystem services, trade and social protection of coastal communities. The Blue Growth framework promotes responsible and sustainable fisheries and aquaculture by way of an integrated approach involving all stakeholders. Through capacity development, it will strengthen the policy environment, institutional arrangements and the collaborative processes that empower fishing and fish-farming communities, civil society organizations and public entities (FAO 2010, 2012) [1]. The contributions of small-scale fisheries (SSFs) to poverty alleviation and food and nutrition security are being increasingly recognized, most notably in the Rio+20 outcome document (The Future We Want), in the Voluntary Guidelines for the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VG Tenure), and in the development of the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines). These initiatives aim to ensure that fishers and their communities have tenure security and market access while safeguarding their human rights (OECD, 2012) [8].

5. Blue growth – A framework for the future

Oceans, seas, coastal areas and the associated blue economy are critical to global and national development, food security and the fight against hunger and poverty. They are both engines for economic growth and sources of food and jobs. However, overfishing, pollution and unsustainable coastal development are contributing to irreversible damage to habitats, ecological functions and biodiversity. Climate change and ocean acidification are compounding such impacts at a time when the rising global population requires more fish as food and as coastal areas are becoming home to a growing percentage of the world's population. Investing in Blue Growth – the sustainable management and use of aquatic resources and the adoption of ecosystem approaches – can help to reduce stressors and restore the functions and structure of aquatic ecosystems (FAO 2010, 2012) [1]. The initiative is of particular significance to Small Island developing States and to coastal areas and wetlands around the globe. It offers an integrated approach in response to the increasing need for cooperation and coordination among all stakeholders and at all levels for more sustainable fisheries management and more effective conservation (OECD, 2012) [8]. It is an approach that could reap an estimated potential economic gain of US$50 billion per year for fisheries alone. In addition, Blue Growth can further the capacity development efforts needed to strengthen the policy environment, institutional arrangements and the collaborative processes that empower fishing and fish farming communities, civil society organizations and public entities. Grounded in the principles of the Code and its associated guidelines, Blue Growth provides a global framework to promote responsible and sustainable fisheries and aquaculture. Building on recent international and national initiatives, FAO will assist its Members and regional institutions in developing, fostering and implementing the blue economy agenda to help turn commitment into action (FAO 2010, 2012) [1].

Blue Growth builds on the three pillars underpinning sustainable development by addressing the environmental, social and economic issues and challenges facing the sustainable and responsible management of aquatic resources. This translates into recognizing and addressing the rights of those dependent on fisheries and aquaculture for their livelihoods – some 12 percent of the world's population. Their rights relate to tenure, income, market access, and decent living and working conditions. By dynamically supporting an integrated approach, Blue Growth can foster and sustain the valuable contribution of oceans, seas and coasts to food security, nutrition and decent employment for future generations. Moreover, the plight of those who work in the fisheries sector needs greater recognition. Fishing continues to be one of the most hazardous occupations in the world, leading to more than 24 000 deaths annually, mainly on board small fishing vessels (FAO 2010, 2012) [1]. There is an urgent need to ensure the safety of these fishers as well as their livelihoods. This includes recognizing their human rights, including those relating to income, fair access to markets, and their living and working conditions.

In August 2013, the Blue Growth initiative took many forms among RFBs, for example: broadening the implementation of the ecosystem approach to fisheries (EAF) or the ecosystem approach to aquaculture (EAA); researching the impact of climate change on the spatial distribution of fisheries; pursuing habitat restoration; establishment of marine protected areas (MPAs); identification and regulation of vulnerable marine ecosystems; control of invasive species; reducing pollution; safeguarding the rights of small-scale fishers; and establishing a group insurance scheme for fishers in Bangladesh. As an extension of the Blue Growth initiative, it is important for RFBs to monitor and act on the ecosystem consequences of: overfishing; lost, abandoned or destructive fishing gear; and destructive fishing practices that result in by-catch. Many RFBs are attempting to deal with ongoing ecosystem impacts caused by bottom trawling, drift net fishing, wire leaders in long line fishing, and fish aggregating devices. In 2013, after years of examining evidence from observer reports, stranded carcasses and wounds on live animals, the International Whaling Commission's Scientific Committee agreed that the entanglement of large whales in fishing gear is a substantial problem, occurring in all the world's oceans, and yet it is severely underreported. The information demonstrates that it is not just other fish that are victims of ghost fishing, and that lost and abandoned fishing gear has implications for the entire ecosystem. The subject of biodegradable fishing nets and lines is certain to become more topical and urgent at future RFB meetings.

Accordingly, all future trade in these sharks will require a CITES permit (a so-called non-detriment finding) confirming that they were harvested sustainably and legally and that the trade is reported to the CITES secretariat. Seabirds, turtles and red corals are included within the other ecologically related species that are frequently caught as by-catch, and they are included in many RFB regulations and/or recommendations relating to by-catch mitigation.

6. Key components of blue growth

The FAO Global Blue Growth Initiative is composed of four key components:

(1) Marine and Inland Capture Fisheries: This component aims at economic growth, food security and poverty reduction through strengthened fisheries management, reduced fishing capacity and proportion of overfished stocks, as well as improved aquatic ecosystems and habitats. The substantive work would be based on implementation of the FAO Code of Conduct for Responsible Fisheries, the related International Plans of Action (IPOAs) (e.g. IPOA for managing fishing capacity, for IUU fishing), International Agreements and Guidelines, the Ecosystem Approach to Fisheries, the International Guidelines on Securing Sustainable Small-Scale Fisheries, the Committee on World Food Security (CFS), and the Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security. Implementation will be through cooperation with Regional Fisheries Bodies (RFBs), other multilateral organizations, other Initiatives, Member States, academia, the private sector, CSOs and other stakeholders (FAO 2010, 2012) [1]. It will support strengthening and reform of policy and legislative framework at the national and regional levels providing policy, technical and capacity building support needed to Governments, RFBs and industry to ensure that an adequate institutional, scientific and legal framework is in place for introducing, supporting and enforcing tenure rights that respect the rights of present and future generations, addresses broader human rights principles when defining and allocating rights, and supports empowerment of fishing communities through social inclusion and capacity building.

(2) Aquaculture: The component will contribute to this aim by providing technical and capacity building support to governments and farmers to develop national strategies for aquaculture development, disseminate and adopt better management and governance policies and best practices that increase productivity and reduce environmental and disease risk to stimulate investment (FAO 2010, 2012) [1]. In addition, the support provided (IFFO, 2013) [7] through this component would help adoption of improved technologies including improved feed production, developing disseminating new strains and breeds for production, advancing regulatory reforms to enable better disease surveillance and enforcement at an ecosystem scale, including proper site selection, production density and avoidance of externalities on capture fisheries, as well as better water management. Public-private partnership will be actively explored.

(3) Livelihoods and foods systems: The expected outcome of this component will be food security, sustainable livelihoods and social protection through strengthened trade and improved economic performance.

(4) Economic growth from ecosystem services: The expected outcome of this component will be continued provision of ecosystem services and adaptation to climate change. Oceans and waterways play a key role in atmospheric and climate regulation, while coastal areas provide flood protection, erosion control for low lying communities, and act as a sink for waste and nutrient disposal especially from agriculture & aquaculture.

7. Issues in blue growth

1. Sustainable use of biodiversity: An ecosystem approach is required that factors in restoration of biodiversity and renewable resources, and proper management of resource extraction (IEA, 2012). For example in fisheries, some of the renowned "Sunken Billions" could be restored providing the basis for productive, efficient, sustainable fisheries and enhanced food security (IEA, 2010). The scientific determination and designation of appropriate MPAs can play a key role in this regard reconstituting biodiversity, ecosystem services and general resilience to other system shocks. Currently only some 2% of our oceans are protected, despite the CBD/WSSD 2012 target of a representative 10% area, whereas approximately 12% of terrestrial areas are under protection (IFFO, 2013) [7].
2. Food security: Aquaculture under the Blue Economy will incorporate the value of the natural capital in its development, respecting ecological parameters throughout the cycle of production, creating sustainable, decent employment and offering high value commodities for export (IFFO, 2013) [7].
3. Unsustainable fisheries
4. Climate change and Managing carbon budget

- Ocean acidification: Oceans are estimated to have absorbed approximately 25% of anthropogenic carbon dioxide since the commencement of the industrial revolution resulting in a 26% increase in the acidity of the Ocean. As ocean acidity increases, its capacity to absorb carbon dioxide from the atmosphere decreases thereby reduces the ocean's capacity to moderate climate change. There is currently no international mechanism to specifically address acidification; appropriate means need to be elaborated to enable coordinated international action.
- Blue carbon: Several key coastal habitats such as mangroves, salt marshes and sea grass meadows have been found to fix carbon at a much higher rate per unit area than land based systems and be more effective at the long-term sequestration of carbon than terrestrial forest ecosystems

5. Marine & coastal tourism: Marine and coastal tourism is of key importance to many developing countries. Despite the global economic crisis international tourism has continued to grow. Tourism brings challenges in terms of increased: greenhouse gas emissions, water consumption, sewage, waste generation and loss or degradation of coastal habitat, biodiversity and ecosystem services.
6. Pollution and marine debris: The international mechanisms (e.g. Regional Seas Conventions, MARPOL) in place to address these matters need implementation with renewed vigour incorporating the analysis of the true costs and benefits of rectifying these concerns in the context of the natural blue capital (Hunt and Vincent, 2006).
7. Governance and international cooperation

8. Opportunities

- Shipping and Port Facilities
- Fisheries
- Tourism
- Aquaculture
- Energy
- Biotechnology
- Submarine mining

9. Regional Fisheries Body

- ACAP - Agreement on the Conservation of Albatrosses and Petrels
- APFIC - Asia-Pacific Fishery Commission
- BOBP-IGO - Bay of Bengal Programme Inter-Governmental Organisation (INDIA)
- CACFish - Central Asian and Caucasus Regional Fisheries and Aquaculture Commission
- CCAMLR - Commission for the Conservation of Antarctic Marine Living Resources
- CCSBT - Commission for the Conservation of Southern Blue fin Tuna
- CPPS - Permanent Commission for the South Pacific
- CRFM - Caribbean Regional Fisheries Mechanism
- EIFAAC - European Inland Fisheries and Aquaculture Advisory Commission
- ICES - International Council for the Exploration of the Sea
- IOTC - Indian Ocean Tuna Commission (INDIA)
- LTA - Lake Tanganyika Authority
- NAFO - Northwest Atlantic Fisheries Organization
- NASCO - North Atlantic Salmon Conservation Organization
- NPFC - North Pacific Fisheries Commission
- OSPESCA - Central American Fisheries and Aquaculture Organization
- PERSGA - Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden
- PICES - North Pacific Marine Science Organization

10. Steps taken for sustainability of marine fisheries

- Effect of the Marine protected areas on Biodiversity restoration program should be clearly studied.
- Unrestrained expansion of fishing efforts and extensive use of non-selective fishing gears have led to increasing pressure on several groups of fishes should be regulated with suitable measures.
- Need based management measures should be followed like restriction of fleet size & mesh size; implementing or extending the period of closed seasons (Inputs) and restriction on fishery for certain species size of fish caught etc., (Outputs).
- Ban on the destructive gears.
- Promotion of marine fish sanctuaries.
- Installation of artificial reefs and FADs.
- Sea ranching & effective CCRF.
- Awareness creation among the stakeholders against non-sustainable fishing practices with a participatory approach.

11. Positive & negatives of blue growth activities in India

- Providing food security.
- Providing nutrition security.
- Providing employment, fishing, aquaculture and a host of allied activities are a source of livelihood to over 14 million people in India.

- A major foreign exchange earner.
- Unfortunately, since the advent of more intensive modern industrial aquaculture, serious environmental and social issues have developed. Millions of indigenous coastal people are being adversely affected.
- Among the most serious problems is the degradation and loss of natural coastal resources.
- Local waters and species may also become contaminated with antibiotics, herbicides and other medicines that are be used in aquaculture ponds.
- Accumulation of organic matter, both in the form of unconsumed feed and feces. When aquacultural activities are conducted directly in the marine or brackish environment lead to a process of eutrophication, with associated depletion of oxygen in the water bodies.
- The loss of mangrove swamps and wetlands by conversion their area into shrimp farms will lead to exposure of coastal areas to erosion, flooding, increased storm damage, altered natural drainage patterns, increased salt intrusion and removed critical habitats for aquatic and terrestrial species.
- Outbreaks of pathogens are also a major risk factor in commercial aquaculture with millions of dollars lost annually. Pathogens cannot only wipe out a cultured fishery but they also can infect nearby wild species, which can result in a collapse of these wild fisheries (GOC, 2008).

12. Conclusion

Optimize the benefits received from the development of their marine environments e.g. fishery agreements, bio-prospecting, oil and mineral extraction. Promote national equity, including gender equality, and in particular the generation of inclusive growth and decent jobs for all. Have their concerns and interests properly reflected in the development of seas beyond national jurisdiction; including the refinement of international governance mechanisms and their concerns as States proximate to seabed development (PARM 2004).

Recognize that issues related to the ocean are closely interrelated and should be considered as a whole, in a global, integrated, holistic, coherent and coordinated approach; Maritime spatial planning and management is a relevant tool to foster sustainable development of the ocean by promoting synergies and sound coordination within marine coastal areas and taking into consideration mitigation and adaptation of climate change.

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