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## BACKGROUND PAPER

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# Fisheries and Aquaculture in the Context of Blue Economy

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## Abstract

Ocean and inland waters (seas, lakes, rivers and reservoirs) provide significant benefits to humanity, encompassing i) food and nutrition security from fisheries and aquaculture, ii) economic and social development from fisheries and aquaculture, marine and coastal tourism, shipping, mining, energy and iii) ecosystem services such as carbon sequestration, water filtration, atmospheric and temperature regulation, protection from erosion and extreme weather events.

However, the asset base of oceans and inland waters has been eroding rapidly because of over-fishing, pollution from land-based sources, mangrove deforestation, climate change and ocean acidification.

Hence, realizing the full potential of the oceans and inland waters requires a paradigm shift to embrace a new, responsible and sustainable approach that is more environmentally, socially and economically effective. This comes at a crucial time when the need for food and resources from the ocean is increasing rapidly to meet the needs of the growing population.

There is a wide consensus that Blue Economy/Blue Growth can fulfil the requirements for such an approach. This has been debated in various fora and adopted by several institutions such as OECD, UNEP and FAO to cite a few. It featured prominently during Rio+20, whose outcomes have proven to be a strong catalyst for driving new efforts towards the implementation of previous and new commitments on oceans and inland waters to restore, exploit and conserve aquatic resources. Rio + 20 focused on two key themes: to further the development and refinement of the institutional framework for sustainable development and the advancement of the Green Economy Concept. This concept was framed in the context of sustainable development and poverty eradication<sup>1</sup>. Since then, this concept has been at the center of key international consultations which in turn resulted in important commitments such as in the Hague Declaration Netherlands, 2014), the Djakarta Compass (Indonesia, 2014) or the recent Our Oceans Conference (Chile, 2015).

The scope of Blue Economy/Blue Growth can vary depending on the sectors considered. Economic sectors using oceans and inland waters include fisheries, aquaculture, tourism, shipping, biotechnologies, maritime security, mining, oil and gas, renewable energy. These various sectors and their carbon footprint have a direct impact on the aquatic eco-systems and the fauna and flora they sustain. The aim of an overarching Blue Economy/Blue Growth strategy is to assess ways and means to mitigate the cumulative impact of these economic sectors on the living aquatic resources, biodiversity and eco-system services. In several coastal developing countries, including Small Island Developing States (SIDS), Blue Economy/Blue Growth strategies have been adopted to promote at the initial stages food security and decent livelihoods. They initially include fisheries, aquaculture, eco-system services, marine and coastal tourism and aim at gradually integrating other important sectors depending on the context.

This paper looks at the current situation of fisheries and aquaculture in the context of the Blue Economy/Blue Growth and its relevance for African coastal countries. It describes the current status

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<sup>1</sup> Rio + 20, 2012. *The Future We Want*, Paragraph 56.  
[http://www.un.org/disabilities/documents/rio20\\_outcome\\_document\\_complete.pdf](http://www.un.org/disabilities/documents/rio20_outcome_document_complete.pdf)

of thinking and action plans for Blue Economy/Blue Growth, in particular for sustainable fisheries and aquaculture, with sufficient details on FAO's approach and interventions. It will be enriched soon by experiences from other organizations concerned with fisheries and aquaculture development in Africa.

# 1. BACKGROUND

## 1.1 The opportunity

Ocean and inland waters (lakes, rivers and reservoirs) provide significant benefits to humanity, encompassing i) food and nutrition security from fisheries and aquaculture, ii) economic and social development from fisheries and aquaculture, marine and coastal tourism, shipping, mining, energy and iii) ecosystem services such as carbon sequestration, water filtration, atmospheric and temperature regulation, protection from erosion and extreme weather events.

Fisheries and aquaculture supply 17 percent of global animal proteins and support livelihoods of about 660– 820 million livelihoods (or 10–12 percent of the world’s population). Currently 3 billion people depend on fish for twenty percent of their average per capita intake of animal protein. It is greater for the Low Income Food Deficit Countries (LIFDCs) and much greater for the population of many SIDS.

More than 40 percent of the global population lives within 100 kilometers of the coast. Thirteen of the world’s 20 mega-cities lie along coasts. Nearly 700 million people live in low-lying coastal areas less than 10 meters above sea level. Over 90 percent of the livelihoods that are directly dependent on fisheries and aquaculture occur in developing countries, mostly in small-scale operations.

Marine ecosystem services have substantial economic value. While exact figures are still debated, the estimated figures are in the order of trillions of US dollars annually. Nearly three-quarters of this value resides in coastal zones. These ecosystem services offer a renewable opportunity to meet basic human needs, support a healthy and sustainable economy, and provide jobs for a growing global population.

Aquatic ecosystems act as important reservoirs for inorganic carbon with the oceans storing roughly 50 times more carbon dioxide (CO<sub>2</sub>) than the atmosphere; ecosystems such as mangroves, seagrasses, and inland waters are among the most efficient ecosystems in sequestering CO<sub>2</sub> in the form of ‘blue carbon’ sinks. They can sequester up to five times the amounts of carbon absorbed by tropical forests and function as important nursery, feeding and reproduction areas for many species. In addition, mangrove forests provide natural protection against storms and erosion for coastal communities and breeding grounds for many aquatic species.

Almost 80 percent of global trade in goods is transported by sea. Coastal tourism is a key engine of economic growth for many coastal countries, in particular in the SIDS. Ocean revenues include some US\$ 161 billion annually from marine and coastal tourism, in addition to a growing range of products such as antibiotics, antifreeze, antifouling paints. Experts predict that ocean energy, which is still in its early stages of development, could be key for meeting the world’s energy demands, including with aquatic biofuels and renewable energies.

## 1.2 The threats

One of the biggest challenges of the 21st century is food and nutrition security: how to feed a population expected to reach 9.5 billion people by 2050 in the face of climate change, economic and financial uncertainty and the growing competition for natural resources. Unfortunately, the asset base of oceans and inland waters has been eroding rapidly because of over-fishing, pollution from land-based sources, mangrove deforestation, climate change, increase in hypoxic areas or “dead zones”, expansion of invasive species and ocean acidification. Mangroves have been reduced to 30 to 50 percent of their historical cover. Over 80 percent of the 232 marine eco-regions reported the presence of invasive species which is the second most significant cause of biodiversity loss on a global scale.

The multiple challenges of food insecurity and malnutrition, climate change, degradation of ecosystems, and economic recession require an integrated response and an urgent transition of the world economy towards a sustainable, inclusive and resource efficient path.

## 2. BLUE ECONOMY/BLUE GROWTH

There is a wide consensus that Blue Economy/Blue Growth can fulfil the requirements for such an approach. The first proposal for a “*Blue Economy*” is generally attributed to Gunter Pauli in his book “*The Blue Economy 10 years – 100 innovations – 100 million jobs*” (2010). Interestingly the concept was not initially intended to relate specifically to oceans or inland waters, rather the term “*Blue Economy*” was used to reflect an evolution and refinement of the ‘green economy’ concept<sup>2</sup>.

The concept of Blue Economy, which has been referred to also as, “*Blue Green Economy*” or “*Blue Growth, the new maritime Green Economy (EU, 2011)*”, “*Green Economy in a Blue World (UNEP, 2012)*”, “*Blue Growth (FAO, 2013)*” or “*Green Growth in Fisheries and Aquaculture (OECD, 2014)*” has developed during recent years as an emerging paradigm for the sustainable management of natural marine and freshwater resources.

The proponents of the “*Blue Growth*” prefer this terminology instead of “*Blue Economy*”, to emphasize the need for growth, because there has been criticism in some development circles of the “*green economy*” concept, in particular its early emphasis on conservation and environmental protection at the cost of economic growth and social development.

The Blue Economy/Blue Growth concept featured prominently during Rio+20 and its high profile Oceans Day. The outcomes of Rio+20 have proven to be a strong catalyst for driving new efforts towards the implementation of previous and new commitments on oceans and inland waters to restore, exploit and conserve aquatic resources. It is gaining even further visibility and importance within the framework of the post-2015 Sustainable Development Goals (SDGs), in particular, Goal 2 (end hunger, achieve food security and improved nutrition, and promote sustainable agriculture) and Goal 14 (conserve and sustainably use the oceans, seas and marine resources for sustainable development).

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<sup>2</sup> <http://www.theblueeconomy.org/blue/Home.html>

Since Rio +20, this concept has been at the center of international consultations, including the:

- “Asia Conference on Oceans, Food Security and Blue Growth (18–21 June 2013, Bali, Indonesia)”
- the “First Blue Economy Summit (19–20 January, Abu Dhabi, United Arab Emirates)”
- the “Global Oceans Action Summit for Food Security and Blue Growth (22–25 April 2014, The Hague, Netherlands)”
- the John Kerry’s “Our Ocean” Conference (16–17 June 2014),
- the “UN Conference on SIDS (1–4 September 2014, Apia, Samoa)”
- the “Workshop for the Development of a Voluntary Global Alliance/Network for Actions on Blue Growth and Food Security (8 – 9 September 2014, Jakarta, Indonesia)”
- the “Strategy Meeting for Action on Blue Growth and Food Security (11 – 13 March 2015, St George’s, Grenada)”
- The World Ocean Summit (Cascais, Portugal, 3-5 June 2015),
- The 2<sup>nd</sup> Our Ocean Conference, Valparaiso, Chile 5-6 October 2015) .

The Blue Growth concept has also become important in the oceanic and freshwater development strategies of international organizations such as UNEP, the World Bank, OECD, the European Union, and many nations, both developed and developing. Several coastal states, especially SIDS have championed the Blue Growth concept and the transformational changes it can bring into balancing growth and conservation in oceans.

The scope of Blue Economy/Blue Growth initiatives is variable depending on the sectors considered by the initiative. Economic sectors using oceans and inland waters include fisheries, aquaculture, tourism, shipping, biotechnologies, maritime security, mining, oil and gas, renewable energy, ecosystem services. These various sectors and their carbon footprint have a direct impact on the aquatic eco-systems and the fauna and flora they sustain. The aim of an overarching Blue Economy strategy is to assess ways and means to mitigate the cumulative impact of these economic sectors on the living aquatic resources, biodiversity and eco-system services and to develop synergies between the sectors. In several coastal developing countries, including SIDS, Blue Economy/Blue Growth strategies have been adopted to promote food security, economic growth and decent livelihoods. They initially include fisheries, aquaculture, marine and coastal tourism and aim at gradually integrating eco-system services and other important sectors depending on the context.

Due to the FAO’s recognition of the importance and need for the aquaculture and fisheries sector to sustainably grow in order to meet rising food demand and contribute to poverty alleviation, and the fact that zero growth of fish production is neither realistic nor desirable, FAO is specifically promoting “Blue Growth” in support of food security, poverty alleviation and sustainable management of living aquatic resources.

Other organizations (e.g. OECD<sup>3</sup>, UNEP<sup>4</sup>), institutions (e.g. European Union<sup>5</sup>) and several SIDS have developed Blue Economy/Blue Growth strategies and programmes which expand to other marine and maritime sectors such as shipping, tourism or mining.

For example, the European Commission strategy in support of sustainable growth in the marine and maritime sectors, called the Blue Growth, aims at achieving the goals of the Europe 2020 strategy for smart, sustainable and inclusive growth. The EU recognizes that oceans and seas are drivers for the European economy with great potential for innovation and growth. Following an analysis of the potential for job creation, research and development, the EU identified 5 major value chains for economic growth and job creation, namely ocean energy, aquaculture, blue biotechnology, coastal tourism and marine mineral extraction. Furthermore, the EU is providing support to develop marine knowledge to improve access to information about the sea, maritime spatial planning to ensure an efficient and sustainable management of activities at sea; an integrated maritime surveillance to give authorities a better picture of what is happening at sea.

To ensure tailor-made measures and to foster cooperation between EU countries, 7 sea basin Blue Growth strategies have been developed, namely for the Adriatic, and Ionian Sea, the Arctic Ocean, the Atlantic Ocean, the Black Sea and the North Sea.

### **3. FISHERIES AND AQUACULTURE IN THE CONTEXT OF THE BLUE ECONOMY: The FAO BLUE GROWTH INITIATIVE**

Fisheries and aquaculture make a significant contribution to food security and livelihoods of millions of people in the world. The production was estimated at 164 million tons in 2014, supplying around 20 kg/capita per year and 17percent of global animal proteins and essential micronutrients (vitamins A, B and D, zinc, iodine, selenium, calcium and iron). Populations in LIFDCs, Africa and Asia rely even more on fish for their intake of animal proteins, for respectively 24.5 percent, 19.6 percent and 22.4 percent.

While fish production from capture fisheries has stagnated at around 88 to 90 million tons over the years, the demand for fish and fishery products has continued to rise. Consumption has more than doubled since 1973. The increasing demand has been steadily met by a robust increase in aquaculture production, estimated at an average 8 percent yearly growth during the period 1970 – 2014, while the world population grew at an average of 1.6 percent per year. As a result, the average annual contribution of food fish from aquaculture for human consumption has increased seven folds, from 7 percent in 1970 to around 50 percent in 2014. This trend is projected to continue, with the contribution of aquaculture to fish food supply estimated to reach 65 percent by 2030. But the development of aquaculture is uneven as Asia produces almost 90 percent of the global aquaculture, whereas Africa, which has an important potential, produces less than 2 percent, half of which is Tilapia in Egypt.

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<sup>3</sup> [http://www.oecd-ilibrary.org/agriculture-and-food/green-growth-in-fisheries-and-aquaculture/green-growth-in-the-blue-economy-integrating-fisheries-aquaculture-and-the-environment\\_9789264232143-4-en](http://www.oecd-ilibrary.org/agriculture-and-food/green-growth-in-fisheries-and-aquaculture/green-growth-in-the-blue-economy-integrating-fisheries-aquaculture-and-the-environment_9789264232143-4-en)

<sup>4</sup> [http://www.unep.org/pdf/Green\\_Economy\\_Blue\\_Full.pdf](http://www.unep.org/pdf/Green_Economy_Blue_Full.pdf)

<sup>5</sup> [http://ec.europa.eu/maritimeaffairs/policy/blue\\_growth/](http://ec.europa.eu/maritimeaffairs/policy/blue_growth/)

Likewise, Around 58 million people are directly employed in fisheries and aquaculture and some 200 million direct and indirect employment opportunities occur along the value chain from harvesting to distribution, making the livelihoods of some 660 to 880 million people (10- 12percent of the global population) dependent on the sector. Employment in the fisheries and aquaculture sectors has grown faster than the world's population and faster than employment in traditional agriculture. Fishing harbors, landing sites and associated processing facilities provide significant employment and economic benefits to countries and local coastal communities.

In Pacific SIDS, fishing can provide between 30 and 80 percent of exports and GDP – an advantage of the large Exclusive Economic Zones (EEZs) and the economic values they are able to capture; e.g. transboundary and highly migratory fisheries such as the tuna fishery.

Finally, fish and seafood is one of the most traded food commodities. Some 38 percent of the world production enters international trade in various forms and shapes, generating a value of US\$ 145 billion in 2014 from a mere 8 billion in 1976. Over 53 percent of this trade originates in developing countries whose net trade income (export – import), valued at US\$ 39 billion in 2014, is greater than the net trade income of the other agricultural commodities combined.

This places the oceans, seas, lakes and rivers at the centre of an important economic activity to feed and provide livelihoods to a global population set to rise by 2.5 billion over the next 35 years. Economic growth in fisheries and aquaculture in recent decades has been accomplished in several parts of the world through unsustainable exploitation of many aquatic resources. In the case of fisheries, such growth has commonly not allowed fish stocks or habitats to regenerate resulting in overfishing, ecosystem degradation and biodiversity loss. The share of marine fish stocks that are over-exploited has steadily increased during the last three decades from 10 percent in 1970 to nearly one third in 2011 but, the potential economic gain from restoring fish stocks and reducing fishing capacity to an optimal level is on the order of USD 50 billion per year. A further 53 percent of the fish stocks are fully exploited. Illegal Unreported and Unregulated (IUU) fishing is estimated at 15 to 20 million tons a year. Fishing continues to be one, if not the most hazardous occupation in the world, leading to over 24,000 deaths annually, mainly on board small fishing vessels. Disease outbreaks have cost the global aquaculture industry tens of billions of dollars over the last 20 years. Natural disasters such as tsunamis and typhoons can cause massive loss of life and severe damages to the physical infrastructure of coastal communities, in particular SIDS.

Many factors contribute to circumstances where IUU fishing flourishes, including economic incentives which negate attempts to make fishing behavior more responsible. It thrives where limited capacity or weak governance arrangements prevail and is further encouraged by the failure of countries to meet their international responsibilities. It puts unsustainable pressure on fish stocks, marine wildlife and habitats, subverts labor standards and distorts markets.

There is a serious risk that climate change will have a severe effect on fishing and fish farming communities at global scale because of the increased number of people at risk, especially in coastal and low lying areas and atolls, causing loss of livelihoods, displacement and migration of human populations from floods, storms and/or to follow changes in fish distributions. This is more alarming as many fishing and coastal communities in developing tropical countries already live in poor, precarious and vulnerable conditions, with their livelihoods often undermined by



overexploitation of fishery resources and degraded ecosystems. The vulnerability of coastal communities is further exacerbated by inexistent adaptive capacity.

Another issue of fisheries which directly affects overfishing is the large number of harmful subsidies that have resulted in marine capture fisheries underperforming as a global asset. Perverse subsidies to the fisheries sector (such as for vessel construction and fuel tax waivers) reduce the real costs of fishing and enable fishing to continue when it would otherwise be unprofitable. The cumulative economic loss to the global economy over the last three decades is estimated to be in the order of two trillion dollars. In many countries the catching operations are buoyed up by subsidies, so that the global fishery economy to the point of landing (the harvest sub-sector) is in deficit.

Fisheries and aquaculture can be vital in the transition towards a Blue Economy/Blue Growth due to their interconnectivity with and reliance on aquatic ecosystems and the potential for people employed in it to act not only as resource users, but also as resource stewards. To continue “business as usual” would indeed be unwise and ultimately unsustainable, involving risks that could impose human and environmental costs and constraints on economic growth and development.

Due to a recognition by FAO of the importance and need for the aquaculture and fisheries sector to sustainably grow in order to meet rising seafood demand and contribute to poverty alleviation, and the fact that zero growth of fish production is neither realistic nor desirable, FAO launched in 2013 the “*Blue Growth Initiative (BGI)*” in support of food security, poverty alleviation and sustainable management of living aquatic resources. As a consequence and within the context of its mandate, FAO defines Blue Growth as economic growth and social development emanating from living resources of the oceans and inland waters and from related activities in the coastal zones, which minimize environmental degradation, biodiversity loss and unsustainable use of living aquatic resources.

The FAO BGI builds on the existing strong international legislative and policy framework centred around the FAO Code of Conduct for Responsible Fisheries and its related international agreements, guidelines and plans of action. The challenge is to provide incentives and adequate resources to adapt and implement this framework at the local, national and regional levels to secure political commitment and governance reform, including by building effective institutions that lead to the adoption of ecosystem approaches to fisheries and aquaculture with fair and responsible tenure systems. The FAO BGI aims at enabling the catalysis of policies, investment and innovation which would underpin sustained growth and give rise to new economic opportunities in ecosystem goods and services. It would integrate key aspects of economic performance, such as poverty reduction, job creation, social inclusion and community resilience, with those of environmental performance, such as mitigation of climate change, ecosystems and biodiversity restoration. It would mobilize financial and technical support and build local capacity for the design and implementation of Blue Growth Strategies and create action-oriented policy options and institutions tailored to the respective economic circumstances and constraints of countries. The FAO BGI also promotes partnerships among industry, governments and communities at all levels. The recognition of the fundamental role the private sector and public-private partnerships will play in changing current behaviors and technologies, and accepting that short-term economic impact will be superseded by long-term economic gain, is essential.

The BGI is structured around 4 streams of work:

### **3.1 Capture fisheries, both from marine and inland waters**

Strengthening and reforming the policy and legislative framework at the national and regional levels is the essential entry point for improving the institutions that manage the fisheries. This component aims to provide the 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, capacity building and dissemination of good practices to reduce the impact of fishing on the environment and to improve safety at sea.

The substantive work is based on the FAO Code of Conduct for Responsible Fisheries (CCRF), the related International Plans of Action (IPOAs) (e.g. IPOA for managing fishing capacity, for IUU fishing), International Agreements and Guidelines, the Eco-system Approach to Fisheries, the International Guidelines for Securing Sustainable Small Scale Fisheries, the Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, the FAO/ILO/IMO instruments on the safety of fishing vessels and fishers, especially in small scale fisheries (e.g. FAO/ILO/IMO Safety Recommendations for Decked Fishing Vessels of Less than 12 metres in Length and Undecked Fishing Vessels).

In particular, the support draws upon the guidance in the Code of Conduct for Responsible Fisheries, to recognize, respect and protect the various forms of legitimate tenure rights to aquatic resources enjoyed by small-scale fishing communities. Implementation is through cooperation with Regional Fisheries Bodies, other multilateral organizations, other Initiatives, Member Nations, academia, private sector, CSOs and other stakeholders. Advocacy and capacity building is an integral part and would be led by the Committee on Fisheries. Individual countries would be sought to show case new solutions in the regions where the project would be implemented.

The expected outcomes are improved fisheries management, reduced fishing capacity and proportion of overfished stocks, reduced by-catch and discards, improved aquatic eco-systems and habitats.

### **3.2. Responsible intensification of aquaculture**

Here the aim is to increase global aquaculture production to meet increased demand for fish as the demand and world population grow. The initiative supports this aim by providing technical and capacity building 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. In addition the support provided through this initiative targets improved technologies, including feed technologies through Public-Private Partnership, developing efficient resource driven farming systems, introducing new strains and breeds for production, advancing regulatory reforms for improved disease monitoring and enforcement, including proper siting, stocking

density as well as better water management. Practical measures to ensure biosecurity in aquaculture will draw on lessons learned from some key, well-documented epidemics with an emphasis on developing countries and with a specific focus on south-south cooperation to support political momentum for change. Again, the initiative promotes Public-Private partnerships that establish regional and sub-regional research centers as appropriate.

Such measures have particular relevance to those many developing countries where aquaculture is expanding rapidly, but where regulatory frameworks, including aquatic animal health services, are unfortunately weak. Opportunities that integrate aquaculture into agriculture and other resource users in the watershed would be encouraged. In general regional projects lead the work but global issues are dealt with in global projects. Results will be channelled through national projects in selected countries to demonstrate their efficacy.

### **3.3 Secured food systems and improved livelihoods**

Significant inefficiencies still characterize the seafood value chains, particularly in coastal and island developing nations, often due to a lack of skills, technology and infrastructure. These inefficiencies reduce value addition, cause post-harvest losses (up to 35 percent in some African countries) and reduce market access opportunities. Additional issues are the necessity to balance between fish export and food security objectives, the inequitable distribution of the benefits accrued from the value chain making fisher folks involved in small scale fishing the most vulnerable and the poorest of the poor in many developing countries.

Within the context of the BGI, fish utilization and trade are no longer considered under the prism of technical and economic feasibility of processing, investment and trade promotion, but they are better integrated into the policies of governments and the corporate social responsibility policies of the private sector, encompassing sustainability, environmental and social protection.

With this component, the BGI assists members and small scale entrepreneurs to develop policies and strategies for value addition and trade promotion integrating economic performance, food security, sustainability and social protection. With the transition to more sustainable fisheries management, it would promote public/private partnerships that support investment in infrastructure, technology and practices to increase fisheries value addition and quality. The COFI Sub-Committee on Fish Trade fosters international consultation that promotes evidence-based, transparent and predictable market access requirements and trade regimes. Support is provided to CODEX to develop science based standards for fish and fishery products and to Members and private sector to adopt and implement these standards and other market standards on eco-labeling, sustainability and traceability to combat IUU. Advice is provided on prices and market trends. Capacity building to improve handling practices, reduce fish losses and improve quality is essential. For small scale fisheries, support targets policies and capacity to secure fishing but also social rights and welfare, access to microcredit and social programmes, reduce child labor and gender inequity. Improved livelihoods coupled with enforced secured user rights should reduce the risk of expansion of fishing efforts. Activities to support communities to promote eco-tourism and recreational fishing in coastal areas of SIDS and African countries are also targeted.

### **3.4 Economic growth from ecosystem services**

Given the value of oceans in the context of restoring/protecting the carbon sequestration capacities of the coastal habitat, there is a viable market for carbon trading much like the one on land, although significant efforts are required to turn this into reality. Blue carbon could be traded and handled in a similar way to green carbon (such as forest carbon under the UN collaborative initiative on Reducing Emissions from Deforestation and forest Degradation, UN-REDD) and entered into emission and climate mitigation protocols along with other carbon-binding ecosystems.

Restoration of habitat and biodiversity may require protection measures by creating new Marine Protected Areas (MPAs), and in other cases it will require a change of use to allow key values to be protected including sustainable use. In collaboration with other initiatives, the BGI aims to assist in developing national predictable regulatory regimes and approaches that include economic instruments (pollution taxes, payment for ecosystem services, etc.); creation and dissemination of research, tools, capacity building, buy-in from industry, and transition toward a BG. Ultimately however, despite the best efforts of the global community, responsibility for protection and restoration of vital coastal habitats will require implementation from member states, as these habitats generally fall within national jurisdictions.

The BGI would contribute expertise to conduct and disseminate national and regional studies on carbon binding possibilities in sea grass beds, mangroves as defence for coastal erosion and storm and wave damage, fish-crop (rice etc.) systems, seaweed cultivation as well as other possibilities. The information is used to assist communities to create income and livelihoods in coastal communities, reduce poverty, strengthen and improve social conditions.

### **3.5. Implementation**

FAO uses its expertise in headquarters and the field, its networks and strategic partners, to promote projects around these four streams of work that support actions with BG impact at the global, regional and national levels.

Several countries and RFMOs have formally applied to join the BGI and requested FAO to assist with the implementation of one or several of the four streams of work of the BGI. The initiative is a Corporate Area for Resource Mobilization (CARM) for FAO. Technical Cooperation projects (TCPs) help kick-start work, particularly in coastal countries of Africa and Asia. Additional resources are needed to address the increasing demand for piloting the BGI in other regions and countries and upscale successful experiences to benefit other communities and regions.

### **3.6. Data collection, monitoring and evaluation**

A key challenge for the promotion of the Blue Growth concept and approach is the collection of data and information, their sharing across a range of scientific domains, and the development of analytical methodologies on a range of criteria of the three dimensions of sustainability. Current methodologies on food security and fisheries and aquaculture economics will remain useful, although require some refinement. The new frontier deals with environmental aspects, such as fish

stock restoration, fisheries and aquaculture productivity in the context of ecosystem assessments, carbon footprints and sequestration, volume and types of certified fisheries and products, and mangrove and coral reef restoration, that can advance natural capital and ecosystem accounting in national economies. Such information and methodologies are needed in order to better account for the economic contributions of renewable aquatic resources and ecosystem services and to assess the long-term sustainability of national economies and investment models.

This growing momentum has led to the emergence of global initiatives to develop methodological guidance for demonstrating the value of ecosystem services as an input into policy and economic decision-making (e.g. the UN System of Environmental-Economic Accounting [SEEA]). FAO brings to SEEA its expertise on fisheries and aquaculture.

Acknowledging that no organization in isolation can meet this demand, FAO has called for a global partnership/alliance on forging a global data framework for Blue Growth. Such a framework would provide a mechanism to enable collection and integrated use of data from diverse initiatives. This can be achieved through collaborative data infrastructures (distributed e-infrastructure) with harmonization of concepts and references, improved data-sharing capacities, collaborative analysis through virtual research environments (VREs), and open data and information dissemination policies.

More specifically in support of BG and food security, a Global Action Network (GAN) was launched in March 2015 in Grenada. The GAN identified three Action Groups to address respectively i) the fundamentals of BG and food security, facilitated by the Netherlands, FAO, Portugal and World Fish, ii) Investment Readiness Facility facilitated by Grenada, World Bank and WorldFish, iii) Knowledge and Technology facilitated by Cabo Verde, FAO and the NGO Rare. These three Action Groups would work towards defining the fundamentals, scope, principles, guidelines and indicators for Best practices of BG, promotion of investment and an exchange platform to monitor and evaluate progress and impact.

#### **4. CHALLENGES AND OPPORTUNITIES FOR AFRICA**

African coastal waters contain some of the richest fisheries. The Gulf of Guinea, the Indian Ocean and the coastal waters of East Africa include some of the world's richest tuna fishing grounds. The potential for aquaculture in Africa is enormous. Egypt, for example has experienced a spectacular aquaculture growth and tilapia is now the least expensive animal source food available and an important element of the diets of many Egyptians.

In West Africa, up to a quarter of jobs are linked to fisheries, and the sector provides essential proteins, minerals and other nutrients to the diets of the region's people. Up to two-thirds of all animal protein eaten by people in coastal West African states is fish. Meanwhile, artisanal fishers are linked to consumers through a vast intra-regional trading network, of fresh, salted, dried or smoked fish, in which women play a central role.

For example, In Senegal, fisheries are of major economic and social importance. Fisheries contribute 13.5 percent to the GDP of which post-harvest contributes 17 percent. Senegal is

considered a LIFDC. Production is estimated at around 500,000 tons per year, comprised mainly of small pelagic, demersal fish, crustaceans and cephalopods. Fish consumption (around 23.5 kg/capita/year) is a major contributor to protein supply, marine fish representing 43 percent of protein consumption on average and reaching up to 80 percent in some coastal populations. At the same time, the fisheries sector is one of the main pillars for supporting coastal livelihoods, providing more than 61,000 direct and 540,000 indirect employment opportunities, mainly in the small scale sector. Senegal's harbors host one of the largest small scale fleets in Africa, operating in Senegal and other countries of the sub-region. Access to resources in Senegal is largely unregulated for the small scale sector. Today many of the most important resources are overexploited, including some of the important small pelagic species such as sardinella. These species are shared between neighbouring states and require concerted actions for their management. Traditionally women have been involved in the fisheries sector particularly in the post-harvest sector, although this has been changing in recent years with a growing external interest in the small scale sector. Fisheries activities in estuarian and mangrove areas are of great importance to women, in particular in relation to the harvest and use of crustaceans (cymbium, oysters and shrimps). Senegal is also an exporter of fish to other countries in Africa and globally, although the unsuitable infrastructure and sub optimal practices undermine significantly the capacity of coastal communities to effectively benefit from these opportunities.

Cabo Verde is a SIDS that recently graduated from the Least Developed Country status. The country is highly vulnerable to climate variability and change as a small island and dry Sahelian country, with more than 80percent of the population (estimated at 0.5 million) living in coastal areas. Fisheries in Cabo Verde comprise migratory species such as large pelagic (e.g. tuna) with a maximum sustainable catch of 25,000 tons; small pelagic with an estimated maximum potential of 9300 tonnes; demersal species with a maximum estimated potential of 6800 tons; and other lobsters with a potential of 120 tons. High value species are seriously endangered by overfishing and by illegal fishing gears. Tuna fisheries require an effective plan to manage sharks. Artisanal fishing had strong socio-economic impact and represents more than 60percent of the total allowable catch. The Cabo Verdean economy is dominated by the service sector—which represents 75percent of GDP—and in particular tourism. The tourism sector is an excellent vehicle for the promotion of Cabo Verde seafood as a national food delicacy. Fisheries contribute 4percent of GDP, with an important share from post-harvest activities (67.5 percent). At the same time, fish and seafood are a major component of the national diet, providing up to 80 percent of animal protein to the Cabo Verde population, highlighting the importance of fisheries for national food security. Recent fisheries statistics indicate a significant growth, in particular of seafood destined for export. Export was estimated in 2013 at 84percent of the total merchandise export. However, there is further need to introduce improved practices to increase competitiveness and value addition, while safeguarding the economic and social cohesion in communities largely dependent upon the fisheries sector. Of particular interest are actions that promote innovation in the sector, quality improvement value-added products, safer and more energy efficient fishing operations, increased markets shares, in particular for sustainably sourced seafood.

These two examples illustrate clearly the dilemma of Sub Saharan African fisheries: a great potential, but weak governance arrangements and limited capacity of institutions to drive the

necessary changes. This in turns hampers progress in achieving sustainable resource use. Resource users feel marginalized from the decision-making process and lack social protection and incentives to comply with conservation and management measures. As a consequence, over-fishing has caused over-exploitation of the major fish stocks undermining their potential to provide economic benefits to the region and to fisheries dependent communities. About half of the fish stocks off the west coast of Africa are overexploited, with IUU activity being one of the primary drivers of overexploitation. Several experts argue that subsidies to distant water fishing vessels end up reinforcing the pressures on African fish stocks. Apart from draining the region of revenue, overfishing is reducing fish stocks, lowering artisanal catches, harming the marine environment. It also is putting the livelihoods and food and nutrition security of millions of people in West Africa at risk. At the same time, unsustainable practices, in particular in the post- harvest sector, cause important wastage along the value chain. Fish smoking has led to pressure on coastal habitat (e.g. through mangrove cutting for fuel). Aquaculture, which is filling the gap between demand and supply in other regions is practiced, mainly as a household livelihood activity in several sub-Saharan countries such as Nigeria, Uganda and Ghana. Consequently, its contribution to the continent's fish needs remains marginal.

The future of fish supply in Sub-Saharan Africa is even more alarming. The Fish 2030 report<sup>6</sup> on future supply and demand for fish explores how the economics of fish supply and demand interact and how increasing incomes and population growth may drive change. According to this report, the future for sub-Saharan Africa is especially disturbing. Under baseline assumptions, African production growth is projected to be only 4.5percent compared to the world average of 23.6percent, making sub-Saharan Africa rely more on imports and vulnerable to shocks in global markets. Per capita supply in Africa is predicted to fall from a current 6.8 kg per person per year to 5.6 kg in 2030. In contrast, the global average will rise from 17.2 kg to 18.3 kg per person per year and the guideline for fish consumption is about 14.5 kg per person per year. So the simple fact is that, if fish is to be an adequate part of a balanced, nutritious diet for Sub Saharan Africans, even the current 6.8 kg per person per year is inadequate. The prospect of a decline would have tragic consequences.

The Africa Panel Report 2014<sup>7</sup> reiterated the importance of the above mentioned constraints to fisheries development in Africa, targeting mainly overcapacity and IUU. In this regard, it proposed a plan of action around 10 priorities to improve international and regional cooperation, transparency in fishing agreements with distant water fleets, flag state, port state and market state measures.

African governments have primary responsibility for policies that maintain fish stocks while enabling their people to benefit from them. But Africa's capacity constraints mean it is crucial to strengthen international cooperation in defense of marine ecology and sustainable fisheries, which are vital global public goods. As presented earlier, there is no shortage of credible frameworks for

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<sup>6</sup> <http://documents.worldbank.org/curated/en/2013/12/18882045/fish-2030-prospects-fisheries-aquaculture>

<sup>7</sup> <http://www.africaprogresspanel.org/publications/policy-papers/2014-africa-progress-report/>

action. Much of the institutional architecture required for effective multilateral action is in place. Dozens of UN organizations, regional bodies and commissions are operating in Fisheries in Africa. There is however an urgent need for coordination and coherence.

There is also evidence of a more robust approach in Africa itself. Efforts are being made to improve policy and legal frameworks and increase enforcement capacity. National action is also driven by civil society and local communities. There is political will to reform fisheries as well as investment in governance, infrastructure and value chains. The importance of small pelagic for domestic and regional markets and of demersal fish harvested from small-scale fisheries and destined for processing and export create conducive conditions for market driven improvements in fisheries management.

At the regional level, there is strong support for policy reform from the African Union (AU). A policy framework and reform strategy for fisheries and aquaculture in Africa was adopted by African ministers in May 2014 providing the basis for improved fisheries governance<sup>8</sup>, referring specifically to, among other things, improving governance and institutional arrangements, developing sustainable small-scale fisheries, promoting responsible and equitable fish trade and marketing and developing coordinated mechanisms among Regional Economic Communities (RECs), RFBs and Large Marine Ecosystem (LME) based commissions. The fisheries issues are also referred to in the AU 2050 Africa's Integrated Maritime Strategy, which was adopted at the AU Summit in January 2014. This policy framework and reform strategy is being promoted by AU-IBAR, in collaboration with FAO, NEPAD and African national institutions. There are several RFBs promoting inter-governmental collaboration. Many of these RFBs are also working with the Abidjan Convention, which is the regional seas programme covering the Atlantic coast of West, Central and Southern Africa, through existing and planned Memoranda of Understanding. Targeted international support is growing, through funding, training and the provision of infrastructure to combat IUU. NEPAD, the African Union and the FAO are cooperating to support the development of stronger regulatory frameworks. Several projects are implemented by FAO, UNDP, the World Bank, the African Development Bank, the EU and other bilateral donors.

Despite all these efforts, long lasting improvements and impact on the ground are the exception. Weak governance arrangements and limited capacity of institutions hamper effective implementation of management measures, regulation of fishing, control access, and strengthening value chains. There is limited integration among the different approaches that are promoted by governments in their partnerships with development partners on the one hand, and environmental agencies and organizations on the other, when addressing use and management of fisheries and aquaculture. There is a need for a much stronger international and regional cooperation, with a strong emphasis on coherence in development aid and fisheries development.

Adoption of a Blue Economy/ Blue Growth strategy can provide a platform for collaboration among these agencies in support of African countries, strengthening information and promoting common Blue Growth reforms, low carbon technologies and best practices, which reconcile economic development, community resilience and decent livelihoods with environmental protection and conservation.

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<sup>8</sup> [www.africanfisheries.org](http://www.africanfisheries.org)