

## Blue Economy and the Prospect of Seaweed in Bangladesh

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### Introduction

Blue economy refers to resource extraction from the sea in a sustainable way and conservation of the ocean environment [1]. Marine and coastal resources fall under the blue economy. Gunter Pauli reported in his book about the blue economy that it will take 10 years for 100 innovations that will provide 10 million jobs. The blue economy and food security got an emphasis on the Rio+20 and Bali (Indonesia) conference [2].

The world economy is 88 trillion USD. Among this 88 trillion USD, 24 trillion USD comes from the sea. By 2050, the world population will be 900 cores and will feed largely from the sea. The ocean is considered as the life-blood of the earth that absorbs 32% CO<sub>2</sub> from the atmosphere. Ocean produces more than half of oxygen (O<sub>2</sub>) in the atmosphere. Aquaculture, mariculture, renewable energy, carbon sequestration (Removing of CO<sub>2</sub> from the atmosphere and long-term storage in a reservoir), coastal protection, waste disposal and the existence of biodiversity is also the important contribution of the ocean.

Ocean rank seven (7) among the world's top 10 economics. It provides 15% of protein, 30% of oil & gas, and 50% magnesium (Mg) worldwide. It provides a lot of life-saving medicines for the world population. For example, Indonesia's national economy largely dependent on the sea. Australia earns 44 billion USD from the ocean.

In Bangladesh, 81% of resources are existing in the ocean while only 19% of resources in land. Bangladesh achieved maritime victory over Myanmar in 2012 and with India in 2014. Bangladesh won

a total of 1, 18,813 km<sup>2</sup> maritime boundary. 200 nautical miles is the Exclusive Economic Zone (EEZ) and 354 nautical miles in the sea bed. At present, 500 varieties of fish found in the Bay of Bengal and 8 million tons of fish are available. Only 0.7 million ton of fish is catching every year. Myanmar discovered the large gas field in its Bay of Bengal area. The geographical location and the sediment pattern of Bangladesh and Myanmar are almost similar. Hence, there is a possibility of getting a gas field. Silt found in the Bay of Bengal is a good source of Uranium and Thorium. Clay found in the Bay of Bengal is used as the raw materials of cement. Wind and solar energy can be produced. A 45 billion USD trade is possible for Bangladesh. 5% of GDP can be acquired by 2030 using sea resources. By 2041, Bangladesh can be a developed country if the ocean resources can explore in a sustainable way.

### Prospect of Seaweed

Seaweed has no true roots, stems and leaves. They are found attached to rock, sand, mud, shells, and other plants [3, 4]. Seaweed was first cultivated in Japan in 1670. Commercially seaweed cultivation started in 1940. Today, the global demand for seaweed is 26 million tons (Source: FAO). Asian countries produce 80% of the total demand (China, Indonesia, Philippines, Japan, North and South Korea, Vietnam, Thailand). China alone produces half of the total demand (almost 40%). The total price of 26 million tons of seaweed is 6.5 billion dollars (Source: FAO).

Seaweed is a good source of agar-agar and carragenan. Agar-agar was first originated in South-East Asia. Agar used as a solid substrate for the growth of bacteria. It also used to produce jelly. The price of excellent agar is 5000 USD/kg whereas the price of normal agar is

18 USD/kg. Agar mainly extracted from *Gracilaria* and *Gelidium*. Argentina, Canada, China, India, Indonesia, Japan etc. are the main agar producing countries in the world.

Carragenan was first originated in Ireland. It is used as food additives, gel and emulsifying, chocolate milk (suspension), toothpaste, dairy products, meat, and poultry. *Condrus crispus*, *Eucheuma* sp., *Kappaphycus* sp., etc. are the producing species. US, Denmark, Philippines are the pioneer carragenan processing countries in the world.

Seaweed used as food in China, Japan, Indonesia, South Korea, North Korea, Thailand and many other countries of the world. In Japan, different seaweed used as food like *Porphyra* as Nori, *Laminaria* and *Saccharina* as Kombu, *Undaria pinnatifida* and *Palmaria palmata* as Wakame. The powder of *Ascophyllum nodosum* used for skin products. *Porphyra*, *Laminaria*, *Saccharina*, *Japonica*, *Ecklonia kurome*, and *Sargassum* used to produce medicine.

### Bangladesh Perspective

Almost 3 cores people in 19 coastal districts largely depend on the sea. About 177 species of seaweeds have been recorded in the coastal and estuarine areas of Bangladesh [5, 6]. The St. Martin's Island is the hotspot of seaweed. Seaweed also found in Teknaf, Bakkhali, Inani, Kuakata and Sundarbans. The environmental condition of the St. Martin's Island is very favorable for the growth of the seaweed. *Sargassum*, *Hypnea*, *Halymenia*, *Hydroclathrus*, and *Amphiora* are the common species found in the St. Martin's Island. *Hypnea* is the most available species that are rich in iodine. Seaweed is being cultivated in Nuniarchara and Moheshkhali Channel, Cox's Bazar.

Harvesting of seaweed can be done every 15 days interval. A farmer can earn 12000-14000 Tk/season investing only 1200 Tk. 12-14 kg/m<sup>2</sup> of seaweed produced in the cultivable area. The price of raw seaweed 2000 Tk/mound whereas the price of dry seaweed 6000-7000 Tk/mound (Source: Md. Mohidul Islam, Project Director of seaweed, Bangladesh Fisheries Research Institute, Cox's Bazar). A farmer named Karim earned 2.5 lakhs Tk in 4 months in Cox's Bazar. November-April is the best time for cultivation. Professor Dr. Aziz (Department of Botany), stated that "If you can culture 100 acres, you can run a food processing industry". Rakhine used seaweed as food and medicine. The extract of seaweed used as a natural coloring in cosmetics. Used as a stabilizer in ice cream, milk, shampoo and lotions. Seaweed extract also used as antibacterial, antifungal, antioxidant, and anticancer. The extract is widely being used in pharmaceuticals. Recently, BARI, BFRI, BORI, NIB, IDF are working on the seaweed.

### Conclusion

Bangladesh has a great prospect for seaweed cultivation. The vast coastline (about 710 km) and the favorable environmental condition suitable for seaweed growth. Huge demand and market value of seaweed at the national and international level make it essential to go with seaweed research. Seaweed promotion will help to attain the dream of a blue economy since it is an important component of a blue economy.

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