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MARITIME CAMPUS



A QUARTERLY MAGAZINE OF
BANGABANDHU SHEIKH MUJIBUR RAHMAN
MARITIME UNIVERSITY, BANGLADESH

Seaweeds -a promising resource for Blue Economy development in Bangladesh

Towards the sustainable
Coastal and Maritime Tourism

Ocean Decade:
Science we need for the ocean we want

A glimpse of the mountains

The geopolitical shift in the Bay of Bengal:
Russia-Ukraine conflict and their implications



Seaweed: food, fertiliser, feed, fuel

Can it be all these things - and tackle our emissions problem?

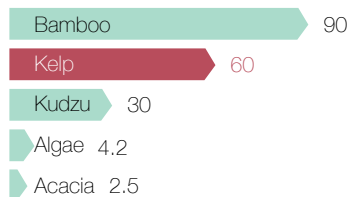
Sea Trees



Seaweed absorbs at least as much CO₂ as trees, but without taking up valuable land. A dry tonne of kelp absorbs about **a tonne of CO₂** in its lifetime.

Ultra Fast Growing

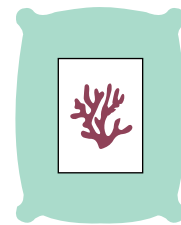
MAX GROWTH PER DAY (cm)



Kelp seaweed grows incredibly quickly and it is one of the fastest growing plants in nature.

So fast, it could be harvested for its various uses **every 90 days**.

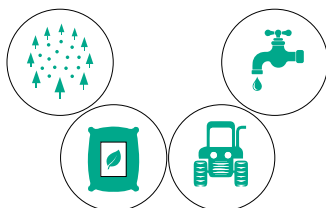
Biofertiliser



Seaweeds contain powerful, growth-stimulating hormones*. They stimulate seed germination and nutrient uptake while protecting plants from infections.

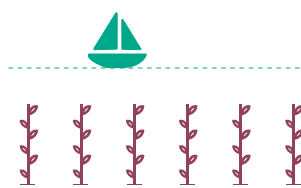
*auxins, cytokinins, gibberellins

100% Sustainable, Low-Carbon Crop



Ocean seaweed farms have none of the major downsides of land farming:

deforestation, over-use of fertilisers, fresh water and fuel-burning machinery.



Because they grow vertically, seaweed farms **use less space**, and attract aquatic life, boosting the ecosystem. They also sit 25m underwater so boats can pass above.



Harvesting is simple and often done by hand, using very little CO₂ burning fuel.

The first seaweed farms are in trials off the coast of Hawaii.

Seafood Diet



Norwegian Kelp
(Fibre, Calcium, Copper)



Grass Kelp
(Iron, Iodine)



Irish Moss
(Magnesium)



Oarweed
(Potassium)

Widespread seaweed farms could supply very high quality, high nutrient food. Great sources of **calcium, iron, magnesium, potassium & iodine**. Plus it's very tasty!

Fuel for Thought

About 50% of seaweed is oil, perfect for making biofuel.

It yields **30x more energy per acre** than other biofuel crops like soy or corn.

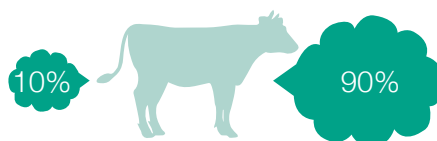
And there's no need to clear forests to grow it!

1,920,000 km²
Area of kelp needed to switch all the world's petrol to seaweed biofuel.

The diagram illustrates the process of seaweed biofuel production. It starts with a flask containing a green liquid, representing seaweed. An arrow points to a large green drop labeled 'Biofuel'. Another arrow points to a gas pump icon, indicating the use of biofuel.

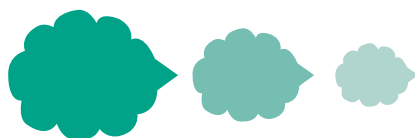
Livestock Feed

There's preliminary evidence that cattle feed made from seaweed reduces the methane expelled from both ends of the animal.

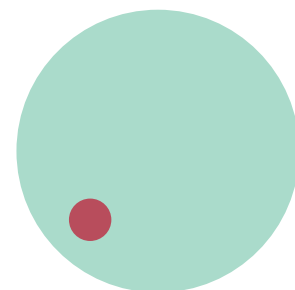


12% of the world's methane emissions come from the billions of cows sheep and goats around the world

In ongoing studies, cows fed **Limu Kohu** seaweed saw their methane emissions drop between **12-58%**. In sheep, it was **80%**.



Ocean Forest



Today's wild **kelp forests** cover just **76,000km²** - approximately the size of Austria. But that's only 2% of the fertile ocean. **Imagine if that was larger...**

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Editorial

Seaweeds are 'golds' of the coast for the Blue Economy

Bangladesh consumes 47,775 kg of seaweeds annually for food, 11,700 kg for feed and manure, 13,650 kg for cosmetics, and 24,375 kg for pharmaceuticals, according to a study conducted by the University of Chittagong and the Food and Agriculture Organisation (FAO). The report estimates that they will soon contribute BDT 55.87 million to Bangladesh's blue economy. In addition to saltwater fishing, seaweeds cultivation can be employed as an additional source of income. It may be financially rewarding, particularly for women. Industrial businesses in related industries could help Bangladesh's Blue Economy enter a new era if they take the initiative and cooperate with the government. The lead article in this issue largely focuses on comprehending the significance of various seaweed species so that readers may appreciate the size of this foreign currency earning industry.

According to the International Union for Conservation of Nature (IUCN), islands and coasts are a significant component of economic, social, cultural, and strategic heritage and are home to 20% of the world's biodiversity. A number of laws, regulations, and other legal documents have provided Bangladesh with "windows of opportunity." In the interests of the country, they permit and support the growth of the tourism sector in coastal and marine areas as a base for social, economic, environmental, and institutional development. We have included an essay in the "Focus" chapter of this publication that discusses the opportunities that exist for coastal and maritime tourism in Bangladesh.

There is not much longer for humanity to start managing the ocean responsibly. This gloomy truth raises the question of how our civilization can reverse the deterioration in ocean health while continuing reliant on the ocean for all of its needs in the face of a changing climate and a rapid loss of biodiversity. The United Nations General Assembly's declaration of the "Ocean Decade," also known as the UN Decade of Ocean Science for Sustainable Development, 2021–2030, is based on the informed conviction of UN Member States that, in fact, this opportunity still exists and that, furthermore, ocean science must play a crucial role in this process.

The situation in Ukraine is a turning moment for global security, the global economy, and our system of global energy supply because we live in a world where a war between Russia and Ukraine cannot be constrained to a single region. Consequently, the global economy has entered a new period of uncertainty since the conflict between Russia and Ukraine erupted on 24 February, 2022. The essay in the "Panorama" chapter of this issue of Maritime Campus discusses the consequences of the conflict and its geopolitical relevance in the Bay of Bengal.

Furthermore, the 'Campus Canvas,' 'Maritime Bangladesh,' and 'Around the World' sections will keep you up to date on all major maritime events and developments that occurred in the second quarter of 2022.

Finally, I'd like to thank the Chief Patron and Honourable Vice-Chancellor for his invaluable support in bringing this issue to light. I'd also like to thank all of the departments for their cooperation in providing information about their individual departments' activities.

Finally, I want to thank the members of the Editorial Board for their tireless efforts to get this magazine published.

Thanking you

Captain A T G M Sarker, (TAS), psc, BN (retd)

Editor and Controller of Examinations

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LEAD STORY

Seaweeds -a promising resource for Blue Economy development in Bangladesh

In recent years, seaweed farming has become more popular on the south-eastern and south-western coasts of Bangladesh. In places where seaweed can be grown, there are programmes to teach underprivileged farmers how to use technology that isn't too expensive. The article aims to help achieve the Blue Economy's sustainable development goals by providing a strong overview of the seaweeds industry in Bangladesh.

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FOCUS

Towards the sustainable Coastal and Maritime Tourism

Sustainable coastal and maritime tourism has the potential to contribute to conservation and management of natural resources and disaster risk reduction. Millions of dollars in foreign currency can be generated while local traditions and ways of life are protected thanks to this strategy for improving people's standard of living. This article proposes a framework for sustainable coastal tourism that is in line with a government push to help the industry thrive.

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THE LODESTAR

Ocean Decade: Science we need for the ocean we want

This article highlights the declaration of the United Nations General Assembly of the "Ocean Decade," also known as the UN Decade of Ocean Science for Sustainable Development, 2021–2030, which is based on the informed realisation of UN Member States that ocean science must play a crucial role for the ocean we want.

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The time has come to develop a workforce of maritime professional for the Blue Economy through Maritime education and training. In this context, the article highlights the activities on which professional marine officers can contribute directly.

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Which zone is preferable as a productive region of the Bay of Bengal for the fisheries?

Causes of beach erosion along the world's longest coastline

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PANORAMA

The geopolitical shift in the Bay of Bengal: Russia-Ukraine conflict and their implications

As China's Belt and Road Initiative and the US-led Free and Open Indo-Pacific Strategy continue to evolve, the geostrategic presence of major countries and their geopolitical posturing are expected to increase in the Bay of Bengal region. However, in the context of the Ukraine war, this article explored briefly the geopolitical shift in the Bay of Bengal region.



Seaweeds -a promising resource for Blue Economy development in Bangladesh

Dr Mohammad Nazir Hossain

Huge green mats extended as far as the eye can see is easily noticeable below the surface of the shallow water of St. Martin's Island during November to April. This green mat is a form of filamentous algae that resembles tangled clusters of green rope or fishing line. The green mat is one of the 200 species of seaweeds found in the coastal areas of Bangladesh. Largely unseen and unnoticed, these seaweeds possess enormous potential to contribute to the economic development of Bangladesh.

Seaweeds in Bangladesh

With a coastline that stretches for 710 kilometres and a coastal area that is 47,201 square kilometres, Bangladesh has both sandy and muddy beaches, estuaries, and mangrove swamps that serve as substrates and habitats for the growth of many kinds of seaweeds. There are approximately 250 species of seaweeds in Bangladesh, accounting 45% Rhodophyta, 31% Ochrophyta and 24% Chlorophyta. Of those, 32 species (8 species of Chlorophyta, 12 Ochrophyta and 12 Rhodophyta) are abundant in the coastal waters of Bangladesh. The potential cultivable seaweeds include 4 species of Chlorophyta (green seaweed) and 10 species of Rhodophyta (red seaweed). The upper intertidal zone of St. Martin's Island dominates Chlorophyta species, while the lower intertidal and subtidal zones are favourable to Phaeophyta and Rhodophyta species. Major habitats of seaweed are located in St. Martin's Island, Teknaf coast, Inany beach,

Rezukhal and Nuniarchara coast. Additionally, the Chowfoldondi coast, Sonadia khal, Moheshkhali and Kutubdia islands are also prospective for seaweed farming. Though mangrove areas are recognized as suitable habitats for some seaweeds (e.g. Catenella), their occurrence and socio-economic potential are less understood.

On Bangladesh's south-eastern and south-western shores, seaweed cultivation has become increasingly popular in recent years. In regions where seaweed can be grown, programs are being implemented to teach underprivileged farmers how to use affordable technology. 19 coastal districts are home to around three crore people, the majority of whom rely on the sea for their daily survival. Promoting seaweed growing methods among coastal dwellers can alter their standard of living.

Although more than 200 species of seaweeds found in Bangladesh, only 14 of them are identified as commercially viable.

Different commercially important Seaweeds of Bangladesh are:

1. *Caulerpa racemosa*



Frequently referred to as sea grapes and widely included in salads, *Caulerpa racemosa* is rich in fiber low in fat content. Other than fibers this algae contains proteins, minerals (calcium and magnesium), folic acid, ascorbic acid, vitamin A, and vitamin B1. It provides nutritional benefits in addition to being antibacterial and antioxidant. It can be found worldwide in various shallow marine locations.

2. *Enteromorpha sp.*

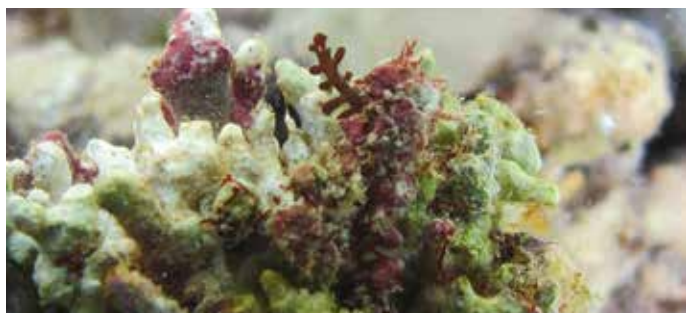
This type of green algae is often referred to as grass kelp, gutweed, and sea lettuce. Typically, lime green, in environments with lots of nutrients, this seaweed multiplies rapidly and forms clumps of 0.2 to 0.5 cm in diameter, flexible, transparent tubes that range in length from 3 to 8 to 10 cm. It is edible, and in some regions of China and



Japan and the fine mossy varieties are used to garnish food in different countries. Other uses include as fertiliser, animal feed, and medication as it has antimicrobial properties.

3. *Gelidiella tenuissima*

The *Gelidiella* family of red algae produces the highest-grade agar (seaweed industrial gum) and its derivative agarose. This component can be used in cakes, chocolates, candies, jellies, jams, juices, wafers, liquors, salad dressings, and other baked goods. It also functions as a stabilizer, solidifier, emulsifier, and laxative. It's also been



used to make photographic film, paint, batteries, graphite, and glue. Its uses in the treatment Alzheimer's disease is also reported.

4. *Gelidium pusillum*

Gelidium pusillum is a tiny macroalgae that grows to a height of 2-10 mm and is commonly found in dense mats on rocks. This red seaweed is mostly cartilaginous and turf-forming. The color of this sea weeds varies from blackish to purplish red but can also be brown or yellow green. The thallus has varied branches with spatula-shaped tips and is thin in diameter (0.3-1 mm). Colorless rhizoids hold the plant filaments to the rock. It is commonly utilized in the manufacturing of agar.



5. *Halymenia discoidea*

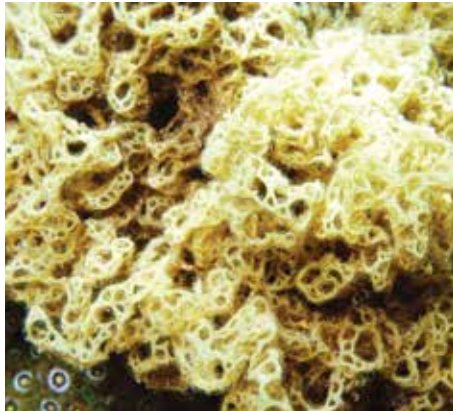
Some have flat, feathery edges and a slick feel. Some have branching shapes with a wide, flat core "stem" that gives rise to smaller branches. The seaweed's spots and lumps could be reproductive organs. Despite the size of the individual clumps, *Halymenia* red seaweed does not "bloom" and cover a huge area like some other varieties of seaweed. It is both palatable and useful as animal feed.



6. *Hypnea pannosa*



This greenish to purple color seaweed grows in dense clumps with intricate branching. Branches are 1.5 to 3 mm wide, terete to slightly compressed. Unusually branching alternately to the opposite, generating broad angles and rounded axils. The terminal portion of the branch is separated into short stubby spines, and the short ultimate branchlets are stout, stubby, and spinose. It is a good source of protein and carrageenan and is used as fertiliser, animal feed, medication, and food for humans.



7. *Hydroclathrus clathratus*

Thalli are typically light brown or yellowish brown in color, with numerous holes ranging in size from 0.5 to 12.0 mm in diameter. The fleshy strands between the holes have enrolled edges and range in thickness from 0.5 to 2.5 mm. It is edible and

being used in salads and contains iodine, mannitol, protein, vitamins, folic and folinic acids. It is also used as fertiliser and as animal feed because it has growth-regulating compounds that are similar to auxin, gibberellin, and cytokinin. It also contains alginic acid. A seasonal species that is only plentiful in the summer.

8. *Sargassum sp.*



Brown seaweed known as *Sargassum sp.* is a common species in the subtidal and intertidal zones of tropical and subtropical regions. It includes iodine and alginate, which are utilized in the textile, pharmaceutical, cosmetic, and food sectors.

9. *Enteromorpha monilifera*

It is one of the common seaweeds found all over the world. This type of seaweed is fairly edible and have many strains that are capable of surviving, growing, and reproducing in brackish, salty, or briny waters with salinity levels as low as 0.1 to 1. Every 100 grammes of *Enteromorpha monilifera* powder, which is used as a spice in the production of peanuts, melon seeds, and potato chips, may supply 17% of the calories and 85% of the protein needed by the human body in a day. It has the potential to be used in food, cosmetics, and slow-release and water-retention materials.



10. *Padina tetrastromatica*



Brown edible seaweed known as *Padina tetrastromatica* is frequently found along the Bay of Bengal's coastline. Some coastal people in Myanmar and Thailand use it as food. It is applicable to the treatment of diabetic individuals.

11. *Catenella spp.*

It has a long history of use as a source of pharmaceuticals and



components for nutritious, useful foods. They contain proteins, minerals, trace elements, vitamins, and vital fatty acids and are a source of antioxidants such polyphenols and phycobiliproteins. It is typically consumed raw and used in salads, soups, meals, and condiments.

12. *Porphyra spp.*



Widespread cultivation of *Porphyra spp.* (*nori*) is done as a significant marine crop. The only vitamin missing from dietary sources generated from plants is vitamin B12, which is present in dried

nori along with many other minerals. Several *Porphyra* species are also used medicinally, particularly in Chinese herbal medicine, where they are used to cure ailments like dropsy, cough, bronchitis, tonsillitis, and asthma as well as goitre and scrofula. Some *Porphyra* species are also used as a hypertension preventative medication.

13. *Gelidium amansii*

An economically significant species of red algae called *Gelidium amansii* is frequently found and harvested along the shallow coasts of many South Asian and East Asian nations, including the coastal regions of India, Bangladesh, Myanmar, North and South Korea,



China, Japan, Singapore, and northeast Taiwan. The depth of the water is between 3 and 10 metres (or 10 and 33 feet). It has been demonstrated that it has medical effects on diets and is a significant dietary source in East Asian nations. In the areas where it is produced, this alga is occasionally used in salads, puddings, jams, and other cuisines.

14. *Codium fragile*

It grows long, upright fronds that resemble fingers. These can reach a length of 40 cm or more and branch in two directions. Utricles, which are tiny cylindrical club-shaped structures created from a single cell up to 1200 µm (micrometre) long, are tightly packed together to form the cortex of the branches. It is a nutritionally useful kind of seaweed that has been used for its immunostimulatory, anti-inflammatory, anti-obesity, and anti-cancer properties.



Utilisation of naturally occurring seaweed

According to history, the first seaweed was cultivated in Tokyo, Japan, in 1670. Its commercial cultivation began in 1940. Along with Japan, many other Asian nations, including the Philippines, Vietnam, and Thailand, began cultivating it.

Conventional uses of seaweeds are seldom known in Bangladesh. Only the Mog or Rakhyine tribal population and the residents of St. Martin's Island have used seaweeds. Seaweeds have historically been revered by Mog since they are a marine plant. They refer to seaweed as "Hejla." Seaweeds are consumed by them in the same manner as other unconventional foods. St. Martin's Island makes the maximum use of seaweeds because this is the only place where they are harvested and prepared for export to Myanmar. Beyond this kind of use, seaweeds are occasionally used there as a healing meal by young girls and post-pregnant women. Adult females have historically occasionally consumed boiling seaweed for health reasons. There, rotten seaweed is utilized as plant fertiliser for the cultivation of vegetables. In 2020, 390 tons of seaweed was produced in Bangladesh by 300 households at Nuniarchara, Inani Beach, and Reju Khal of Cox's Bazar.

Seaweeds possess an invaluable economic impact in food and nutrition science, pharmaceutical industry, cosmetics and public health. Seaweed-based foods have significant nutritional advantages for humans such as, omega-3 fatty acid, omega-6 fatty acid, folic acid, iodine, calcium, magnesium, potassium, copper, iron, zinc, vitamins. Moreover, seaweed powder can increase dietary fiber and improve the quality of bakery products with nutrient content

and extend shelf life of stored bread. Seaweeds offer wide range of valuable bio-active compounds that have medicinal importance such as anti-inflammatory, antitumor, antioxidant, antibacterial, antifungal, antimicrobial, antidiabetic, anticancer, prevent heart disease, improve digestion, control obesity, brain tissue formation, and maintain bone health. It is important that different organisations (e.g. academic and research) and companies (e.g. food, pharmaceutical, textile) import hydrocolloids (agar-agar, carrageen and alginate), which can be replaced with locally produced seaweeds in Bangladesh. The anti-aging properties of seaweed-based creams and cosmetics maintain skin health and beauty, increase the rate of epidermal regeneration, reduce scars, moisturize, rejuvenate and restore firmness.

Seaweed farming employs both men and women. The majority of preparation work for seeding, seedling, seaweed harvest, and other seaweed-related tasks is done by women. Men participate in the gathering, sowing, harvesting, drying, and marketing of seeds. The majority of the women working in seaweed farming were previously employed in the fish processing industry. However, the majority of men were engaged in fishing. It is anticipated that the participation of women in the seaweed farming industry will result in beneficial developments for women's empowerment in society.

Different seasons different culture period

In coastal farms, the culture period runs from September to March; on Saint Martin's Island, it runs from December to February. Few farmers, however, cultivate during the entire year. From September through March, *Gelidium* is cultured. *Gelidium*, on the other hand, is typically cultured from October to March. *Enteromorpha* can be grown from January to March, whilst *Halymenia* can be grown from December to February. While December to February offers favourable environmental conditions for *Caulerpa* culture, November to February offers favourable conditions for *Padina* farming. It has been determined that *Sargassum* can be grown from November to March, and *Porphyra* can be grown from December to March. *Hypnea*, however, is grown year-round.

Methods of seaweed farming in Bangladesh

Commercial ventures collect wild seeds from depths of up to 15 metres. After gathering the seeds, they cut the seaweed into pieces (about six inches apiece) and wash it in pure seawater to remove the various components (i.e., mud, sand, barnacles etc.) affixed to it. Typically, farmers plant the seaweed in three days after collecting it. For commercial production, a culture can be as deep as 1 to 5 metres. They use a rope that is about 15 metres long and space the seeds apart by 6 to 8 inches. Seaweed is also grown by farmers using nets with a mesh size of 8 m by 8 m or 4 m by 4 m. The intertidal region is currently home to the majority of farms. They often set up the farm in a place with low wave energy, no pollution, and a supply of natural seaweed. Local farmers who are not involved in extensive commercial endeavours, hand-pick the seed from the wild. Additionally, a number of research institutions are also experimenting with seaweed culture.

Economic prospect of seaweeds in Bangladesh

One of the aquaculture sectors with one of the highest growth rates globally is seaweed farming, which has an annual production of about 33 billion tons valued at USD 11.8 billion. According to FAO, the top five countries – China, Indonesia, Korea, Philippines, Japan – produced USD 11.69 billion worth of seaweed. This production is expected to increase by 2024. Seaweed products are consumed by the local indigenous populations in Cox's Bazar and the neighbouring

hill tracts, despite the fact that their acceptance and appeal among mass customers have not yet reached appropriate levels. The price of dried seaweed varies depending on its application, but 390 tons of wet seaweed may now be purchased for BDT 23.4 million at BDT 60 per kg. For instance, dried seaweed is sold at BDT 300 per kg for food and feed composition, but it costs BDT 1,000 per kg for cosmetic and pharmaceutical uses. To maintain higher prices, vacuum packaging and quality control when drying seaweed are essential.

According to a study by Chattogram University and FAO, our country uses 47,775kg of seaweed annually for food, 11,700kg for feed and manure, 13,650kg for cosmetics, and 24,375kg for pharmaceuticals. According to the study, they might perhaps contribute BDT 55.87 million to Bangladesh's Blue Economy in the near future. Bangladesh has a ready seaweed market with a potential value of close to \$20 million, according to Omar Hasan, CEO of Falcon International, one of the few local exporters of seaweed. Millions of jobs might be created for inhabitants of coastal communities like Cox's Bazar, Chattogram, Noakhali, Patuakhali, and Satkhira if the full potential of this crop is realised.

Existing problems in seaweed farming

Globally, seaweed production is undergoing rapid expansion but its status in Bangladesh is still only rudimentary. Major challenges for seaweed farming and marketing in Bangladesh include monsoonal climate with tropical cyclone, traditional culture practices with poor post-harvesting processing, land/water use conflict with limited technical support to the farmer, lower farm gate price with weak supply chain, and limited value-added products with short production season. There are 300 households engaged in seaweed farming at Nuniarchara, Inany beach and Rezukhal of Cox's Bazar coast. Following 'line and post' method the cultivation takes place between November and April, with 4–6 harvesting cycles. Estimated annual seaweed production, mostly composed of *Hypnea*, *Gracilaria* and *Ulva*, is 390 MT wet weights (= 97.5 tonnes dry weight) that has applications in food, feed, cosmetics and pharmaceuticals sectors, although globally 34 species are suitable for aquaculture, 145 species for human consumption and 101 for hydrocolloids extraction. The line and post method are the most preferred way of seaweed farming to the farmers, with bottom net method is less preferred. However, integrated multi-trophic aquaculture (IMTA) has been suggested as suitable approach by the respondents/stakeholders that can provide more environmentally sustainable way of farming, economic diversification, and social acceptance. The current seaweeds production can be increased yearly at ~50% rate, which is 50 million tons (dry weight) from ~5,000 km² farming area when extrapolated to the year 2050. This may bring a positive change to issues regarding food security, gender equality, economic growth, nutrients removal, carbon sequestration, employment, and aquatic environmental health. Seaweed harvesting is done by hand without push net or mechanical devices. Post-harvest processing generally includes sun drying in open space; however, limited facilities of solar dryer under hygienic condition are also operated at Cox's Bazar.

Since there aren't any good seeds available during the culture stage, seed banks are crucial for seaweeds production. In Bangladesh, interest in seaweeds as a food item has not grown much. Seaweeds are therefore in short supply on the local market. Additional barriers to the development of a seaweed business in Bangladesh include the low farm gate price of seaweeds, the lack of value-added goods, a very shoddy supply chain, inadequate financial support, and insufficient research support.

Policy aspects

A National Framework for Establishing and Managing Marine Protected Area in Bangladesh has been prepared with support from BoBLIME (Bay of Bengal Large Ecosystem) Project and identified 47 potentials areas for

establishing MPAs in the Bay of Bengal. BoBLIME is a trans-boundary Project is to support the Bangladesh and other stake countries to manage the marine fisheries, other aquatic resources, and its habitats. The Ministry of Environment and Forest and Climate Change (MoEFCC) has already declared two MPAs in the Bay of Bengal with a view to conserve the marine biodiversity and increase fisheries productions. It is expected that Government of Bangladesh (GoB) will continue to establish more and more MPAs in the Bay of Bengal to achieve the Aichi target of 10% (112000 km² of Bangladesh's EEZ) MPAs but Bangladesh is yet to formulate an MSP (Marine Spatial Planning). Many fishermen may lose their favorite fishing spots because of this. So, one of the best possibilities for a living may be the cultivation of seaweed. Besides thorough research is necessary to support this business. Setting up a seaweed tissue culture laboratory has now become an urgent necessity since Bangladesh does not have any. To develop this business low or zero tax should be imposed for 20 years to attract more and more investors in this green business. Moreover, a robust value chain is required to guarantee the right economic returns from Bangladesh's seaweed business.

Conclusive thoughts

Seaweed could easily be a new item on the country's limited export basket and would contribute greatly to reducing poverty and persistent unemployment problem. Partnership among the universities, research institutions and policy makers are necessary to establish priorities for all disciplines of seaweed research and extension. Geospatial technology needs to use for spatial modeling of suitable seaweed zones in the coastal waters. Ecosystem health management needs to focus with standard indicators for enhancing trophic interactions and biodiversity conservation. Formation of seaweed farmer's association is needed. Government agencies with support from NGOs needs to ramp up efforts on establishing local-level cooperatives. "National Seaweed Cell" needs to establish at appropriate Ministry/Department (e.g. Ministry of Fisheries and Livestock, Ministry of Agriculture) with specific roles and responsibilities to ensure closer alignment with national programs. Seaweed-focused research, extension, livelihoods, resilience, value addition, marketing, and industrial uses need to publish regularly. Thus, scientific journal or magazine or bulletin or newsletter can be the appropriate platform. As part of regional level partnership, Bangladesh should consider strategic science partnerships with the institutions of East Asian countries including China, Indonesia, Japan, South Korea, Philippines, and Malaysia. The development of seaweed cultivation is also market-driven. If demand is low and natural resources are adequate, artificial cultivation is unnecessary. As demand increases, however, attempts may be made to increase production using resource management techniques. Cultivating seaweed can be an alternative employment source along with catching sea fish. Especially for women, it can be a profitable sector. Along with the government, if industrial entrepreneurs of related fields come forward, they can open a possible door of a new world in blue economy which will enrich our national economy.

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Towards the sustainable Coastal and Maritime Tourism

Maritime Campus Desk



A beach in Cox's Bazar where the sea meets tourists

Prologue

Bangladesh, a nation in South Asia, is a floodplain delta with thousands of rivers and canals crisscrossing the whole country. The nation has a gentle slant from the north to the south, where it ends at the Bay of Bengal. The entire coast, which has a 710-kilometer length, goes parallel to the Bay of Bengal. These coastal regions are known as zones of vulnerability and opportunity because of their unique characteristics.

The country is now able to exercise its sovereign rights on its sea territory, including the inland waters and water column above the seabed, in accordance with the Territorial Waters and Maritime Zones Act (Amended) 2021. It will also be able to extend the contiguous continental shelf beyond 200 nautical miles and explore the sea resources on the continent for up to 354 nautical miles. For Bangladesh's political, economic, and security concerns, these regions are essential.

Maritime boundary delimitation and windows of opportunity

The discussions on Bangladesh's blue economy really took off once the maritime boundary delimitation issues with the neighbouring countries were resolved. Due to maritime delimitations, Bangladesh gains 118,813 square kilometres of the territorial sea, which is nearly the size of the entire country (147,570 square kilometres). It has opened up numerous new and existing prospects for Bangladesh, especially those related to coastal and maritime tourism.

Millions of tourists visit the islands and coasts every year as a key destination for coastal and maritime tourism because of their geographic location and territorial resources. Islands and coasts support 20% of the world's biodiversity, according to the International Union for Conservation of Nature (IUCN), and they are an important part of economic, social, cultural, and strategic heritage.

For Bangladesh, certain acts, policies, and other legal documents have opened up "windows of opportunity". They are allowing and encouraging the development of the tourism industry in the coastal and marine areas in the nation's best interests as a foundation for sociocultural, economic, environmental, and institutional development.

A country with various tourist destinations

Bangladesh is endowed with amazing natural beauty that includes verdant woods, mountains, a diversity of farming techniques, and a variety of water bodies, including ponds, haors, baors, canals, rivers, and the sea, in addition to a diverse cultural wealth and a wide range of historical and archaeological sites that can readily draw tourists. Coastal and maritime tourism has not yet developed significantly, with the exception of beach and mangrove tourism (primarily focusing on the Sundarbans) at some locations of the Bay of Bengal, even though nature-based tourism, particularly relating to forests, mountains, and rivers, has been popular in Bangladesh.

The tourism infrastructure that the nation has created at these coastal and maritime tourism hotspots so far is quite well-liked, especially by domestic travellers. However, given the resources available, there

is still a ton of untapped potential for coastal and maritime tourism. Environmental concerns in these locations have set Coastal and Maritime Tourism apart from other subsectors, particularly in light of the overabundance of tourists at some beaches, recent government priorities for Coastal and Maritime Tourism development, and other factors. This is evident from the resources that are currently available and those that could be developed in the future, especially after delimiting maritime boundary with neighbouring countries.

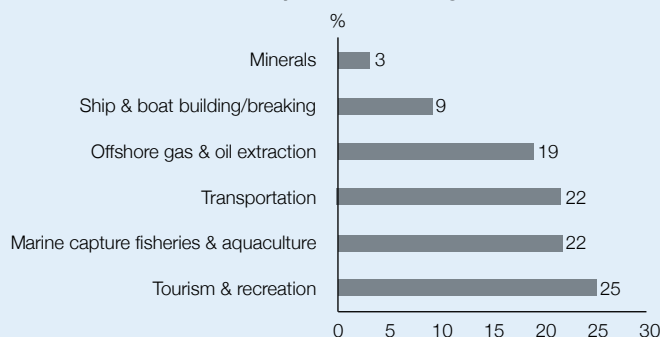
Economic contribution of Coastal and Maritime Tourism

Five percent of the global GDP is made up of the coastal and maritime tourism industries. Through Coastal and Maritime Tourism, it is anticipated that it will create job possibilities for over 8.5 million people within next 8 years. It is estimated that Coastal and Maritime Tourism will likely account for 26% of the value added in the entire maritime sector by 2030, making it the greatest contributor to the Blue Economy.

With a projected 1.8 billion tourists annually, the growth of overall international tourist arrivals (ITAs) is overwhelming and is likely to climb by 65% in 2030 compared to 2010, and will likely be higher in developing nations than in established economies. However, compared to the prior year, COVID-19 decreased ITAs by 84% between March and December 2020. Nevertheless, many developing economies saw such ITAs decline even more (90% in 2020).

Beginning in 2021, a similar pattern emerged, with an average global ITA reduction of 88%. According to projections from UNCTAD and UNWTO, there might be economic losses of \$1.7 trillion to \$2.4 trillion and a possible loss of millions direct tourist employment in 2021. Effective tourist recovery strategies are anticipated to aid in the short-term recovery of the loss.

Blue Economy Sectors of Bangladesh



Source: BSS & World Bank

The tourism and recreation (25%) make up the majority of Bangladesh's blue economy today and are followed by marine capture fisheries and aquaculture (22%) and transportation (22%) as well as offshore gas and oil extraction (19%), ship and boat building/breaking (9%), and minerals (3%). The blue economy of Bangladesh supports about 30 million people, including workers and those who are dependent on them at home.

However, the tourism industry in Bangladesh is largely driven by micro, small, and medium-sized businesses, including restaurants, hotels located in certain regions, tour operators, and leisure activities. According to World Bank estimate, investment in the coastal and maritime tourism industry will increase by more than 9% annually.



Surfing is becoming popular among the young tourists in Cox's Bazar

The contributions of tourism and recreation to the national GDP amounted to over \$10 billion in 2016, and they created more than 2 million direct and indirect jobs.

The report on Voluntary National Reviews of Bangladesh 2020 (focused on SDG 2030 achievement) reported the accomplishments of different industries, including tourism (Government of Bangladesh 2020). The report states that 1.3 million people are employed directly by the tourism sector, while 2.4 million people are employed indirectly.

Features of Coastal and Maritime Tourism in Bangladesh

Cox's Bazar, one of Bangladesh's most well-known tourist sites, is home to the world's longest (120 km) uninterrupted and natural sea beach, where the majority of the country's coastal tourism is concentrated.

Tourists can practically see the traditional fishing and fishermen's community in all coastal areas of Bangladesh



The development of numerous other sea beaches, including Patenga, Himchari, Inani, and its surrounding areas, which serve as a marine drive; Kuakata; Saint Martin; Char Kukri-Mukri; and several beaches in the Sundarbans, including Jamtala, Kochikhali, Dublar Char, Trikona Char, Bangabandhu Char, and Mandarbaria, has helped the subsector gradually flourish. To grow and promote maritime tourism in the nation, both the government and the industry-based private sector are undertaking a number of initiatives.

The majority of coastal and maritime tourism is concentrated on beaches, where visitors enjoy a variety of activities like walking, running, playing, swimming, sunbathing, taking in the beach atmosphere, relaxing on lounge chairs under beach umbrellas, shopping, dining, taking pictures, horseback riding, surfing, and others. There are several lodging options, restaurants, shopping malls, and entertainment venues, especially in the Cox's Bazar and Chattogram districts, which greatly benefit the national economy by boosting the GDP and creating a variety of job opportunities.

Sustainable Coastal and Maritime Tourism to promote sustainable development

The conservation and management of natural resources as well as the reduction of the danger of natural disasters can both benefit from sustainable coastal and maritime tourism. By enhancing people's livelihoods, it can also raise millions of dollars in foreign exchange while preserving the local culture and customs. Bangladeshi citizens are generally uninformed and unaware of environmental issues. One of the major difficulties facing the nation is environmental pollution, which can be reduced through the practise of sustainable coastal and maritime tourism.

By increasing opportunities, particularly for women and other underrepresented groups like tribal people and other minorities, reducing poverty through the creation of new livelihoods and jobs, promoting environmental awareness and education, promoting biodiversity conservation both in water and on land, enhancing governance, and promoting telecommunications, the expansion of the various forms of coastal and maritime tourism is likely to help the blue economy achieve the 2030 Agenda for Sustainable Development. Once ADB has funded the South Asia Tourism Infrastructure Development Project (Bangladesh Portion), which aims to improve culture-based tourism and strengthen ties between the tourism industry and local people by enhancing communities' capacity to reap greater benefits from the tourism sector (SDG 11), it is anticipated that the implementation of the Tourism Master Plan (SDG 8) will result in the creation of more than 6 million jobs by 2030.

SUSTAINABLE DEVELOPMENT GOALS



The government has prioritised sustainable tourism as an important area of focus for addressing sustainable consumption (SDG 12). Tools to track the effects of tourism from the sociocultural, economic, and environmental viewpoints must be developed and put into use by the Ministry of Civil Aviation and Tourism (MoCAT). To accomplish the goals of sustainable tourism, the ministry has created short-, medium-, and long-term action plans. The Bangabandhu Sheikh Mujibur Rahman Maritime University, the third maritime university in South Asia and the twelfth maritime university overall, was founded by the government of Bangladesh in 2013. This institution places a lot of emphasis on SDG 14, and it intends to offer academic and research courses at the undergraduate and graduate levels in a variety of coastal and maritime sectors, including coastal and maritime tourism. To ensure the protection and conservation of the coastal and maritime environment and its biodiversity, the Ministry of Foreign Affairs (MoFA) has developed the legal framework in accordance with the provisions of the United Nations Convention on the Law of the Sea. An integrated strategy for tourism growth is required to protect the life below the water in these delicate marine and coastal habitats, which will help hasten the development of the blue economy.

Due to its operational nature, coastal and maritime tourism can have a direct impact on the life below the water (SDG 14). By reducing environmental pollution, it can help to preserve coastal and marine biodiversity. This can be done by spreading environmental awareness and education, generating new employment opportunities, enhancing multi-stakeholder engagement, and strengthening governance. Additionally, recreational fishing is one of the attractions of coastal and maritime tourism, which can provide local coastal populations



in Bangladesh with significant economic benefits, employment opportunities, and a means of subsistence. The coastal and marine fishery subsector is seen as being facilitated by coastal and maritime tourism, according to a number of stakeholders. The introduction of various service-oriented economic activities, such as the provision of diversified lodging, restaurant facilities, handicraft manufacturing and marketing, transportation services, tour guiding, and amusement facilities, has a significant impact on the generation of various livelihoods for coastal communities. However, there is a particular research deficit about how coastal and maritime tourism affects Bangladesh's fisheries and other industries that provide jobs and income. Additionally, the diversity of terrestrial habitats is a significant draw for tourists. Such attractions have the potential to bring in steady income and provide locals with alternate means of subsistence, thus advancing both the preservation of the life on the land (SDG 15) and the destinations' cultural legacy.

Upcoming institutional development for Coastal and Maritime Tourism in Bangladesh

The Bangladesh Investment Development Authority has identified the tourism industry as a viable sector for the country's overall development, and the Bangladesh Tourism Board is now working on a master plan for it. Additionally, among the noteworthy examples of ongoing activities to promote sustainable tourism in Bangladesh, which will also improve the sustainability of Coastal and Maritime Tourism, are the development of the Bangladesh Tour Operators and Tour Guides (Registration and Operation) Act 2021, the Community-Based Tourism Policy and the Ecotourism Policy, the upgrading of the National Tourism Policy 2010, and the review of the master plan for airports. Additionally, MoCAT has taken steps to develop a "Marine Aquarium" at Cox's Bazar.

The structure of coastal and maritime tourism is complex, multi-stakeholder, multi-sectoral, and multilayered given its nature and features. Small businesses to large corporations operate in the tourism industry on various scales. The governance framework of Coastal and Maritime Tourism also involves national, regional, and international organisations from the public and private sectors, which necessitates close cooperation between the different relevant ministries and stakeholders. The establishment of such inter- and intra-ministerial as well as multi-stakeholder coordination through their

proactive leadership roles, which are also crucial for compliance with the existing institutional arrangements (both national and international) related to Coastal and Maritime Tourism, is furthermore necessitated by strong political commitment and governance.

The Government of Bangladesh is addressing the effects of climate change through a number of programmes. Additionally, it is making investments in clean energy fields, which can help to lower greenhouse gas emissions (SDG 13). However, it has not made significant tourism-related actions. A regional office was opened in Dhaka by the recently founded Global Centre on Adaptation for South Asia. It is anticipated that this will serve as a regional centre of excellence for climate change adaptation strategies.

In accordance with Vision 2041, there are a number of ways to promote coastal and maritime tourism, including successful and consistent marketing campaigns for both domestic and foreign tourists, coordination to establish joint Coastal and Maritime Tourism initiatives with neighbouring countries (intercountry and interregional partnerships and networks), development of an all-season boat fleet for tourism, and marketing of tour packages for watching dolphins, sea turtles, and other wildlife.

End thoughts

According to Lonely Planet, a leader in the publication of travel guidebooks, Bangladesh was placed seventh among the top 10 best-value vacation locations for 2019 in the world. As a result, the nation is steadily growing in popularity with foreign visitors, who place a high value on Coastal and Maritime Tourism.

Therefore, in order to maximise its beneficial effects and minimise its unfavourable effects, the development and promotion of coastal and maritime tourism need serious consideration.

In summary, given the current circumstances, Bangladesh has a significant opportunity to develop and promote coastal and maritime tourism, which can help the nation become a developed country by 2041.

Para-sailing adds excitement to coastal and maritime tourism



Which zone is preferable as a productive region of the Bay of Bengal for the fisheries?

Mohammad Azharul Islam

The Bay of Bengal (BOB) shows an inverse 'V' shape profile on the map, which has three sided boundaries. On the east side, it's covered by the Andaman's, Myanmar; Bangladesh and West Bengal on the north; and India and Sri Lanka on the west.

Recently, because of La Nina, there has been a greater impact on the environment of the BoB. It's getting warmer and cooler than the normal periods. Even the monsoon winds have been affected by this change. Heavy rainfall in the tropical region like Bangladesh has skipped and started at a level of 150-900 mm rainfall. So, this drastic change in the monsoon and the weather has changed the aquatic body too. The coastal regions of the BoB are mostly productive zones. The reasons behind this are the nutrients from the sedimentation, debris and especially the mangrove in the northern part.

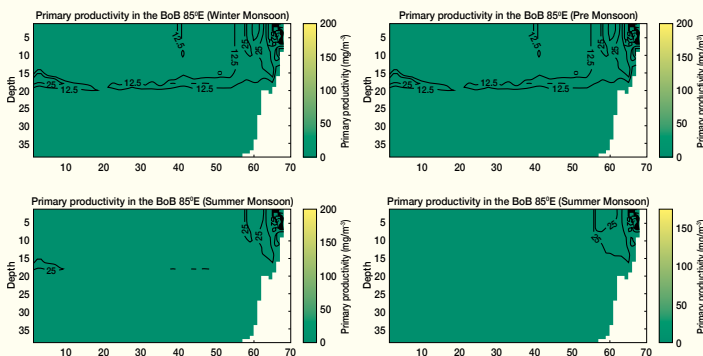


Figure 1 Vertical section of the BoB on 85N with monsoonal variability

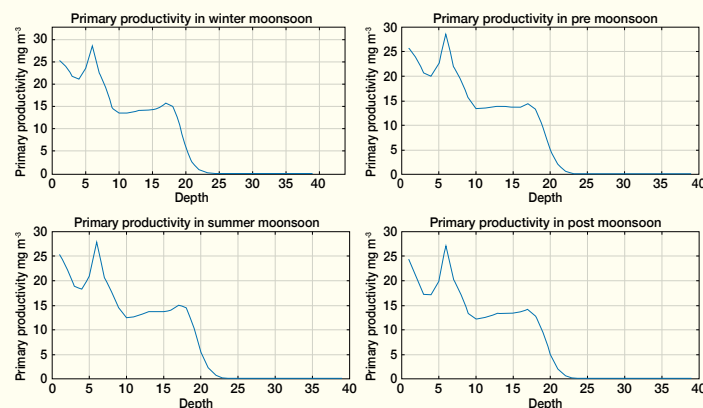


Figure 2 Vertical profile of the BoB for the primary productivity in 4 different monsoons.

In figure 1, we can see the huge productivity in the right part of the profiles (in all monsoons). That's because it's near the coastline area which provides a huge amount of nutrients and debris to the sea. That's why the surface region is always a productive zone for the bay.

We have noticed that there is a layer (Figure 1) in between 15-20m depth moving from the coast to the deep sea. That could be an

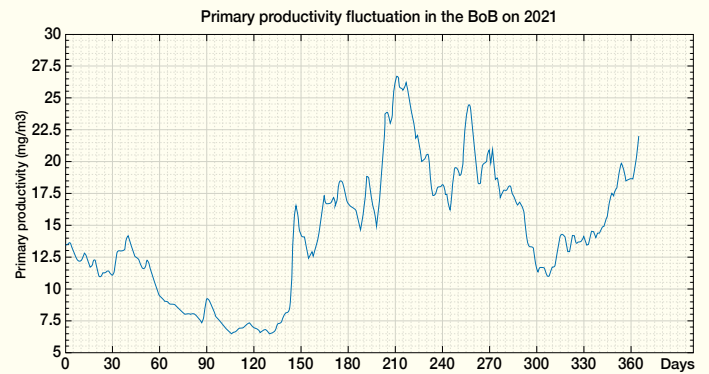


Figure 3 Time series plot of the Primary productivity of the BoB in 2021

indication of a productive zone or a layer. This spike follows in the vertical profile of the Bay (Figure 2). From 15-20m depth, there is an increase (figure 2) of productivity in the deep sea. But below 20m depth, productivity rate decreases to Zero (0) to the bottom of the sea. This could have several reasons, but the most important one is the high sedimentation rate, especially during summer season.

We have observed a spike around 5-10m (Figure 2), which could be an indication of mixed layer depth in the BoB. Mixed layer depths are the most productive regions below the surface water. It's higher in the winter monsoon and lower in the post monsoon. Fresh water discharge is one of the reasons behind this. Even more precipitation comparing to the other years (as 2021 had La Nina event), the surface water had less Chlorophyll a concentration than the sub-surface region.

We had observed the time series of 2021 for the production rate in the Bay of Bengal. It shows a gradual increase in the post monsoon period, because of the interphase between time and spatial data. Winter monsoon was at between 10-15 mg/m³. In summer monsoon, it ranges from 16.25-26.3 mg/m³.

So, in conclusion we can predict that 15-20m depth region has a unique property which may lead to huge amount of fisheries product. And the summer monsoon is good for farming and fishing in those regions. As we have also noticed some upwelling by the latitude of 85N (Figure 1), those regions could be selected as productive zones up to a certain depth.

Data source: Copernicus, Landsat 8, Sentinel, Modis aqua

Data analysis: MatLab

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Why is the world's longest beach at risk of erosion?

Md. Bayzid Mahmud

Vast areas of Cox's Bazar beach are disappearing due to sea erosion. Many public and private establishments in the tourism area have become vulnerable. But why is the beach breaking like this?

Cox's Bazar beach is collapsing due to unplanned development and climate change, which is destroying the natural biological defence system of the beach. A sustainable plan needs to be formulated through a long-term study in this regard.

Several factors can primarily be attributed to the destruction of vast areas of the shoreline that are destroying the natural defence system, unplanned developments and climate change impact. Scientists and researchers primarily visited the beach area and found that where the natural sand dunes are present, having grasses and shrubs, erosion has not occurred. Instead, sand and garbage trapped in the plants have raised sand dunes. And where there are Australian Pine forests, artificial blocks, and embankments present, beach soil has been eroded there. This proves that unplanned initiatives destroyed the natural biological defence system. Beach soil erodes where the normal tidal wave is intercepted on the beach.

Usually, sand dunes are the natural barriers against coastal surges. Jhau or Casuarina (Australian Pine) is a plant that prevents the growth of sand dunes. Sand dunes are raised gradually as sand

comes to the shore with the waves. Over the last three decades, Bangladesh has been planting Jhau or Australian Pine trees along the coastal area as part of a coastal afforestation initiative funded by foreign donors. But the shallow roots of the Jhau make it much more susceptible to high winds, leading to increased beach and dune erosion. Jhau also cannot hold the sediments, but beach shrubs or grasses on sand dunes have the ability to retain sediment.

Moreover, sand dunes can naturally attenuate the energy of waves. But sand dunes have been destroyed due to the forestation of Jhau trees over a long time. When these trees were planted and they grew, they stopped the natural growth of the sand dunes. Winds that flow unimpeded hundreds of miles from the deep sea to the beach are suddenly obstructed by these tall trees, causing downward pressure and erosion of the sand dunes. As a result, the seashore broke. Therefore, these sand dunes, which are a natural embankment to protect against tidal surges, have been destroyed and have made the coastal area vulnerable.

Governments in the developed world are very active in protecting their beaches. That's why they don't allow any kind of infrastructure development in the beach area. The beach is kept unhurt. But what are we doing? Although the construction of all types of structures is prohibited in the government-declared environment-critical areas,

these instructions have not been implemented yet. Influential people are illegally constructing high-rise buildings one after another, disregarding the laws and regulations of the country.

The land on which more than a thousand hotels have been built on the coast of Cox's Bazar was once a flood plain, where once the ocean's tidal influence was present. And now the flood plain has been destroyed due to the construction of infrastructure destroying the natural environment on that land. Hence, the natural tides of the ocean are adversely affected, and the shore is subject to erosion. Global warming causes sea-level rise as the ocean expands and makes storm patterns more energetic, changing the wave and current patterns.

Consequently, it will affect most of the world's coastlines through inundation and increased erosion. Bangladesh is a low-lying country. So, our coastal beaches are at risk of climate hazards. There is no denying the fact that cyclones and storms have become and will continue to become stronger due to the effects of climate change on our oceans. This means the waves hitting our shores from storm surges and during other weather events will cause more damage and erosion of the coastline. The effects are multiplying and will be devastating. Those stronger waves and current patterns also lead to the erosion of our coastal beaches.

We need a proper scientific analysis of the risk of beach erosion in our entire coastal region. Instead of applying the artificial embankment system, we need to focus on the natural barrier in the beach area. Natural defence systems should be restored by reclaiming occupied areas. New development works should be planned in a way that does not destroy the natural environment. The policymakers have to work with these things in mind added with the advice of the environmentalists. All development work should be planned without destroying the natural environment as much as is humanly possible.



Hundreds of Tamarisk Trees are disappearing; Cox's Bazar Sea beach is losing its Beauty day by day

Sources:

1. National and International Scientific Journals
2. Newspaper
3. News on Electronic Media

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Erosion at the beach of Cox's Bazar



Is mariculture the way to sustain our coastal economy and biodiversity in Bangladesh?

Masiat Alam Zubair

Mariculture is the farming of marine organisms in a confined marine area with special measures and precautions to have maximum yielding of that farming species. It is the farming of marine organisms for food and other products such as pharmaceuticals, food additives, jewellery (e.g., cultured pearls), nutraceuticals and cosmetics, either in the natural marine environment or in confined spaces on land or sea, e.g., cages, ponds or paddocks.

To put it simply, mariculture is the breeding of aquatic plants and animals in salt water. It is also important from the perspective of the conservation of biodiversity. The main categories of mariculture species are seaweed, molluscs, crustaceans, and finfish. More than 20% of the total comes from aquatic plants (mostly seaweed).

Fisheries potentials and challenges by mariculture in Bangladesh

The fisheries section of Bangladesh has been divided into four sub-sectors. They are:

1. In-land capture
2. In-land culture
3. Mariculture
4. Marine industrial fishes

Fishermen take a particular space in the coastal area and then give a boundary and spawn fishes and breed them. This allows them to monitor the fish species and collect the accurate fish at the mature time and avoid catching immature sizes of fish this also decreases the fishing vessels' cost to go to the deep sea.

Effect of mariculture on marine and coastal biodiversity

Mariculture has seen a drastic increase worldwide with a range of species from giant clams, mussels, oysters, carp, salmon, grouper, milkfish, catfish, pompano, and tuna grown in different environments. The diversity was observed from filter feeders, and herbivores to highly carnivorous groups.

Two main sub-sectors have emerged in the mariculture sector: family and cooperative farms are mainly extensive and semi-intensive practices, while commercial farms follow intensive and semi-intensive practices to produce highly valued products for the global market. Mariculture production can reduce capture pressure production and may reduce investment in fishing fleets and effort. The primarily farmed fishes are common carp, tilapia, milkfish, cod, haddock and pollock.

Potential of mariculture of seaweed impact on the Bay of Bengal coastal areas

Naturally growing seaweeds can be seen in the littoral and sub-littoral zones of St. Martin's Island to the Sundarbans Mangrove Forest and are available from October to April throughout the whole southern



coast. As a diversification activity in mariculture, the cultivation of seaweed has huge potential all along the Bangladesh coast.

Seaweeds such as *Gracilaria* sp., *Hypnea* sp., *Enteromorpha* sp., and *Kappaphycus* sp. can be effectively cultivated by vegetative propagation methods in long-line ropes and nets. Besides production for human consumption, seaweed is being utilised in phycocolloid or hydrocolloid, cosmetic, biofuel, biotechnology, pharmaceutical, wastewater treatment, and bioplastic industry.



4. To avoid catching unwanted species
5. Aquatic plants like seaweed can be grown and have good economic value
6. Shrimp and arthropods can be farmed and produced in a huge amount
7. To avoid the cost of fishing vessels and fishing instruments
8. To conserve the extinct species by farming with appropriate conditions
9. To conserve the fisheries species from their predators
10. To increase the economic conditions of the coastal people. Millions of dollars of fish and aquatic species are exported to foreign countries.

The negative side of mariculture

Mariculture has expanded rapidly over the past two decades due to new technology, improvements in formulated feeds, better biological understanding of farmed species, increased water quality in closed farming systems, greater demand for seafood products, expansion of facilities, and government interest. As a result, mariculture has been the subject of some controversy regarding its social and environmental impacts. Commonly identified environmental impacts of marine farms are:

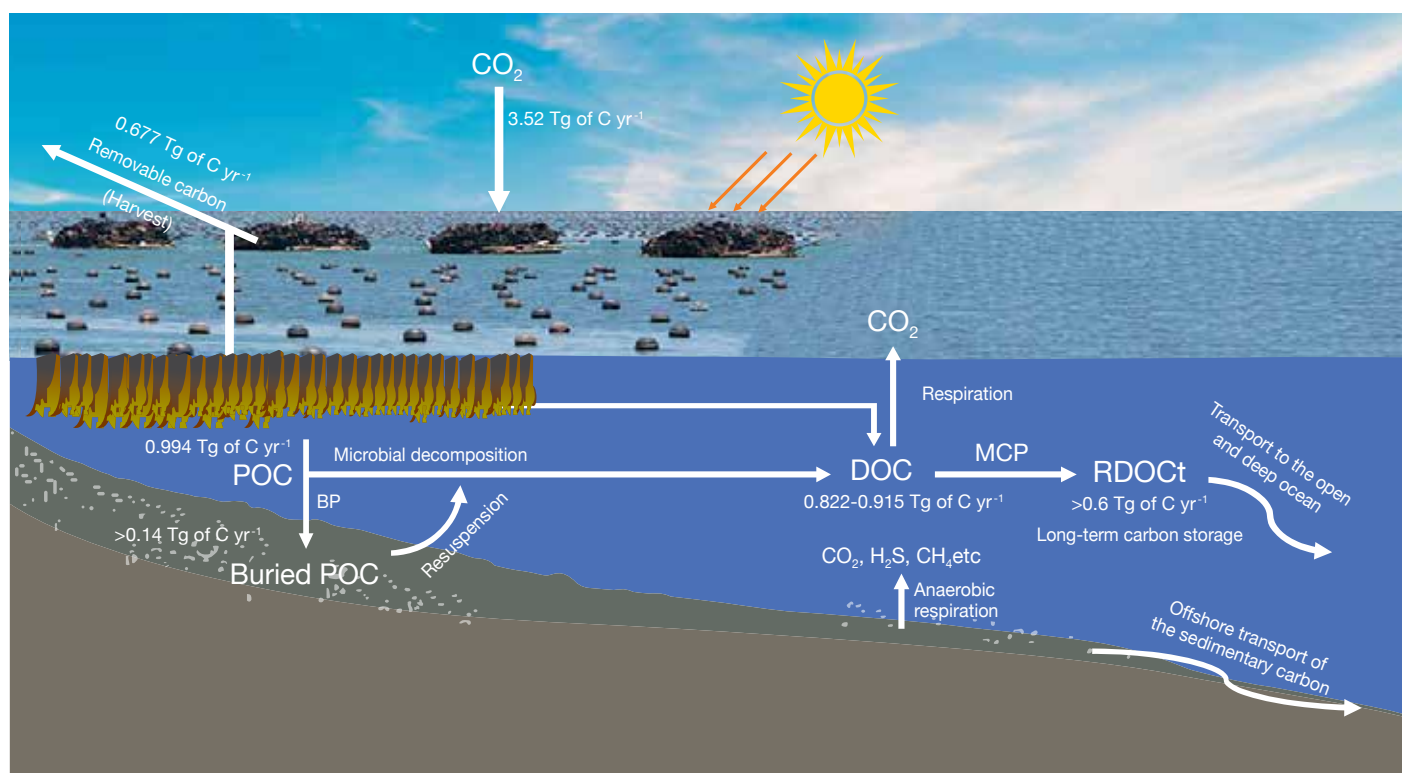
- o Waste from cage cultures
- o Farm runaways and raiders
- o Genetic pollution and transmission of diseases and parasites
- o Habitat modification

The positive side of mariculture:

1. To produce and farm specific species of organisms
2. To produce as per requirement and need of the fishermen
3. To get the accurate size and shape of organisms

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The latest facts on Marine Biodiversity

60% of the world's major marine ecosystems that underpin livelihoods have been degraded or are being used unsustainably.

Between **30 to 35%** of the global extent of critical marine habitats such as seagrass, mangroves and coral reefs are estimated to have been destroyed.

All species of **sea turtles**, **66%** of marine mammals and **50%** of seabirds have been affected by plastic pollution.





There are now close to 500 dead zones covering more than **245,000 km²** globally, equivalent to the surface of the United Kingdom, largely caused by fertilisers entering coastal ecosystems.

If **carbon emissions** continue to increase at the current rate, the ocean will corrode the shells of many marine organisms by the end of the century.

By **2100**, without significant change, more than half the world's marine species may face extinction.

Source: UNESCO, UNEP

BSMRMU conducts admission test for undergraduate enrollment



First year Undergraduate (Honours) Admission Test of Academic Session 2021-22 of Bangabandhu Sheikh Mujibur Rahman Maritime University, Bangladesh was held on 27 and 28 May 2022. This year 19,298 candidates applied for a total of 200 seats in 5 programmes under 4 faculties. The

admission test was conducted in six locations across Dhaka, Chattogram, Khulna, and Rangpur Divisions while taking appropriate safety and health measures.

Important decisions at 30th Syndicate Meeting



On 4 April 2022, the 30th Syndicate Meeting of BSMRMU was held at the university's temporary campus in Mirpur, Dhaka. Rear Admiral M Khaled Iqbal (retd), the Vice-Chancellor

and the president of the BSMRMU Syndicate, presided over the meeting. In the meeting, a decision was made regarding the appointment of an expert academician to the university's Quality Assurance Committee (QAC). Besides, the approval for the signing of MoUs with STC International, IHE Delft in the Netherlands, and the Bangladesh Institute of International and Strategic Studies (BIISS) with BSMRMU, and several other academic and administrative decisions were taken.

Seminar held to mark the World Ocean Day



BSMRMU organised a seminar to mark the 'World Ocean Day-2022' on 08 June 2022. The Vice-Chancellor of the university Rear Admiral M Khaled Iqbal (retd) graced the occasion as the Chief Guest. He emphasised the importance of maritime domain awareness among new generation in order to restore the Bengali civilization's former grandeur of coexisting and prospering with the ocean. During the seminar, Professor Aftab Alam Khan, Head of the Department of Oceanography and Hydrography, and Professor Mohammad Nazir Hossain, Head of the Department of Genetic Engineering and Biotechnology, both delivered insightful papers related to ocean science. With the participation of key personalities, faculty members and students, the seminar was jointly organised by the Faculty of Earth and Ocean Science of BSMRMU and Nirmal Bangladesh. The seminar was streamed live on BSMRMU official Facebook page.

35th Academic Council Meeting



The 35th Academic Council Meeting of BSMRMU was held at the temporary campus at Mirpur, Dhaka on 9 June 2022. The Vice-Chancellor Rear Admiral M Khaled Iqbal (retd) presided over the meeting, in which various academic decisions on a number of important matters were made. The meeting approved the affiliation of newly established 4 marine academies in Barishal, Pabna, Rangpur and Sylhet. Additionally, discussions and decisions about the academic calendar and examination results of BSMRMU as well as related institutes were held during the meeting. Besides, the meeting approved the curricula for the Bachelor of Nautical Science and the Bachelor of Science in Marine Engineering.

Exploration from the deep sea by the mariners

Capt. I.K. Taimur

There is no denial of the fact that merchant marine officers, as well as engineers, play a vital role in enhancing the immense potential of the Blue Economy. Since early 1946 Bangladeshi mariners started gathering sufficient knowledge concerning marine resources, its whereabouts as well as placement through their ocean voyages throughout the world.

These are the mariners who initiated bringing foreign remittances to this country even before its birth. This is how they started to contribute to developing the economy of this country which is being continued till today. The time has come to develop a workforce having maritime professional knowledge of the blue economy through Maritime Training Institutes.

Activities on which professional marine officers can contribute directly are stated as below:

- i) In the field of gas and oil rig maintenance, maintenance & operation, and it is possible to make the best use of the treasure reserved deep down the sea that can fulfil the demand nationally and internationally.
- ii) By increasing the number of ships (at least 60 more sea-going ships). In the government sector (BSC) as well as in the private sector, it can contribute to earning foreign currency payable to government tax, including making contributions to the state economy. It can also open up the career of a huge number of professional mariners that can even exceed the afloat and shore-based career, in comparison to neighbourhood countries like Singapore, in course of time.
- iii) Power plants can be established to initiate power utilising the wind force and ocean waves near the coastal areas. It will not only fulfil our national demand but also lessen our dependence on foreign countries for power supply.
- iv) In the perspective of the present scenario of the tourism industry, quality cruise ship trading is a source of great potential for Bangladesh and at present, it is also an attractive demand of time in the country.
- v) A great probability of flourishing the tourism industry with prospective countries like Singapore, Myanmar, Malaysia, Thailand, Indonesia, India, Maldives, and Sri Lanka is knocking at the door. At the initial stage, at least two sea-going ships having the capacity of 1,200 passengers can be operated and, in this aspect, Bangladeshi mariners can play an active and important role so far as on logistic support, operation, care and maintenance, repair, management, crew manning and navigation are concerned. Consequently, it will create a big source of earning tax, payable to the government, besides creating a huge number of employments in the sector.
- vi) Establishing a deep sea port at Matarbari, Chattogram will open up a big window of sea trade opportunity with the Far-East, Middle-East, Europe and America which may even exceed the operation of Singapore Port due to our better privileges like suitable geographical condition, re-fuelling, ship handling, watchmen supply, emergency repairing, cheap cargo operation, crew repatriation, tourism in Cox's Bazar etc. Obviously, this requires a perfect, sufficient and continuous process of dredging to encounter the siltation for deep-draft vessels (like 15m above)
- vii) Due to achieving a new sea area (200NM EEZ) the massive mass of water area can be filled with brake-water by CC-blocks/sand/mud, gradually transforming into land-area through long term project (5/10 yrs.) starting from coastal slope until before the starting point of the continental shelf. Eventually, the land area of our country will increase geographically and hence it will be a worthwhile development to achieve a successful SDG for Bangladesh. And thus, we can make it a 'worthy & successful win of 200NM EEZ.'
- viii) Introducing high technological fishing vessels and increasing fishing manpower for fishing (by Ministry of Fisheries, BD) in deep sea area and EEZ (200 NM) area in a view to exporting a huge number of fishes, generating revenue for our economy.

Jabel Ali Port (UAE) can be a burning example of a luxurious city like 'Palm City' which was established in the middle of the ocean by dredging and CC-blocks with brake water (2004~2009).

Introducing high technological fishing vessels and increasing fishing manpower for fishing (by Ministry of Fisheries, BD) in deep sea area and EEZ (200 NM) area in a view to exporting a huge number of fishes, generating revenue for our economy.

Capt. I.K. Taimur

Master Mariner, AFNI (UK), MSc, LLB
Independent Marine Surveyor & Consultant
Commandant, BMAS



Do you know the difference?

Editorial Board desk

What is the weather, and how does it differ from the climate? People frequently assume that these two words have the same meaning. But there are a lot of significant distinctions between weather and climate.

Initial Thoughts

Since the beginning of time, humans have attempted to predict the weather, which is one of the most essential aspects of the natural world with enormous importance for humanity in both short- and long-term situations.

Understanding the weather and how it can change has influenced several aspects of human civilization, ranging from influencing our farming methods to determining our religious festivals and other important cultural events and phenomena.

We'll examine how the weather and the climate differ in this article, along with some other important details and information concerning the two phenomena.

Let's first discuss the fundamental distinction between weather and climate before moving on to specifics.

Odd to Weather

The atmosphere's short-term, day-to-day condition as it changes from minute to minute out over several weeks is what is generally

referred to as the weather. It might be the rain turning into sunshine over the course of a day or it might be the dreadful storm that is predicted for next week. This kind of short-term, largely predictable analysis is what is referred to as "weather."

There are many stories of people employing odd methods to predict the weather, such as believing that a crimson sky at night is a sign of good weather ahead or that cows lying down on their bellies is a sign of impending rain.

However, utilising a variety of meteorological techniques, the weather can now be predicted with astounding accuracy, giving us a better understanding of it than ever before.

We analyze a variety of parameters, including pressure, humidity, wind direction, and temperature, and we utilise all of this data, as well as a lot more, to model and predict the weather in the short and long term.

Knowing Climate

The climate, on the other hand, is something entirely different and refers to the typical weather patterns of a region over a considerably longer time span, with several decades or 30 years being the normal range.

The climate of a place is also studied in great detail and changes similarly to the weather, but these changes are very gradual and are influenced by a variety of factors, the most well-known and contentious of which is how humanity is affecting the global climate through our industry and technology.

Climates can be hot and dry, cold and wet, and depending on the year and how the climate is playing out, these conditions have a significant impact on the prevailing weather conditions.

Although these two notions are essentially different and have quite different meanings, they are nevertheless inextricably linked and have a symbiotic relationship.

What are the Different Types of Climate?

There are 5 main types of climate, and each one is completely unique and has unique traits.

1. Dry: True to their name, dry places receive relatively little rainfall, and the rainwater that does fall here evaporates fast, giving little possibility for precipitation to build water supplies to remain steady. The earth is home to various dry climates, many of which are found around the equator where temperatures are the highest.

2. Temperate: Winters in temperate regions are relatively moderate and pleasant compared to other places, with summers that are warm, wet, and humid and frequently accompanied by thunderstorms.

3. Tropical: The average temperature in tropical areas is high year-round, typically exceeding 18 degrees Celsius even in the winter, and there is a lot of precipitation, typically more than 59 inches annually. Since the conditions are ideal for plant life to flourish, these areas are often exceedingly biodiverse and densely vegetated.

4. Continental: In addition to experiencing severe extremes like high winds, below-freezing temperatures, and snowstorms, some places also have pleasant summers and severely frigid winters.

5. Polar: The polar climate zones are among the world's most extreme and are very frigid all year long. These areas never see summer temperatures higher than 10 degrees Celsius.

Final Thoughts


You ought to be aware of the distinction between weather and climate by now. Do you have a preferred weather pattern or climate?

WEATHER


WHAT YOU GET

CONDITIONS OF THE
ATMOSPHERE OVER A SHORT
PERIOD OF TIME

CAN CHANGE WITHIN
MINUTES OR HOURS



Saturday



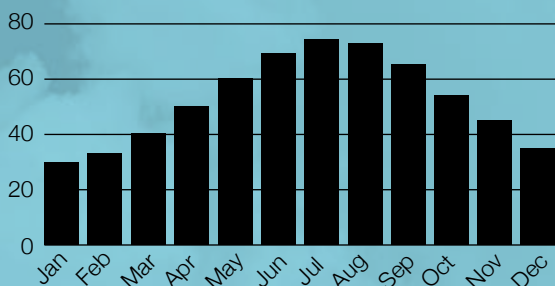
Sunday

CLIMATE

WHAT YOU EXPECT

HOW THE ATMOSPHERE BEHAVES
OVER A LONG PERIOD OF TIME
AND SPACE

AVERAGE REGIONAL WEATHER
PATTERN OVER DECADES



30 Year Normal Average Temperature (F)

Ocean Decade: Science we need for the ocean we want

Maritime Campus desk



The UN Ocean Conference, jointly hosted by the governments of Kenya and Portugal, took place in Lisbon, Portugal, from June 27 to July 1, 2022. The conference's main focus was "Scaling up ocean action based on research and innovation for the implementation of Goal 14: stocktaking, partnerships, and solutions."

By holding significant events and offering chances to access the information required to realise the vision of the Ocean We Want, the Ocean Decade played a major part in the Conference.

More than ever before, society depends on the ocean. 71% of the surface of the world is covered by water. It provides us with food, shields us from harm, and absorbs more than 90% of the extra heat caused by global warming. There are 3 billion people that rely on the marine and coastal biodiversity for their lives, making it an incalculable source of economic, social, and cultural riches. Many industries with significant economic significance, including fisheries, transportation, biotechnologies, energy generation, the exploration of seabed resources, tourism, and many more, profit from the ocean economies, which are among the most quickly expanding and promising in the world.

According to the United Nations' inaugural World Ocean Assessment, humanity has run out of time to begin managing the ocean sustainably. With a changing climate and a rapid loss of biodiversity, this depressing conclusion begs the question of how our civilization can reverse the decline in ocean health while still relying on the ocean for all of its requirements. The declaration of the UN Decade of Ocean Science for Sustainable Development, 2021–2030, or the "Ocean Decade," by the United Nations General Assembly in December 2017 is based on the informed conviction of UN Member States that, in fact, this opportunity still exists and that, furthermore, ocean science must play a crucial role in this process.

The Ocean Decade's approach to Ocean Science

Through interdisciplinary research, the Decade will fill in knowledge gaps. The Decade would develop missing or strengthen weak ties of science to marine applications of direct societal benefits, ensuring

Decade Vision

Ocean Science that is fit for purpose

The Decade will encourage the science community, the policy-makers, the private sector and the civil society to think beyond business as usual and aspire for real change.

Decade Objectives

- Generate the scientific knowledge and underpinning infrastructures and partnerships needed for sustainable development of the ocean.
- Provide ocean science, data and information to inform policies for a well-functioning ocean in support of all sustainable development goals of 2030 Agenda.

that the knowledge we need to guide the first measures to be done in terms of removing, adapting, and minimising recognised consequences (adaptation to climate change or marine spatial planning). These global priority research and development fields will be combined with the regional scientific priorities in the Science Plan of the Decade, creating research programmes with global objectives that can be duplicated when necessary. The Decade will enhance worldwide cooperation to advancing scientific research and creative

technologies, building on existing research and projects, integrating ocean science with societal needs.

As it will give the UN system a coordinating framework for identifying science-based answers to the 2030 Agenda priority concerns, it will enable action at all levels. By coordinating science priorities with national commitments to the sustainable development agenda, the Decade will both stimulate national research agendas and catalyse significant investments in ocean science (the Global Ocean Science Report found that ocean science accounts for less than 4% of the total research and development expenditures worldwide). The Decade will increase public awareness of the ocean's true global significance, its economic services, and how its health affects people both locally and worldwide.

The Decade will launch a coordinated framework in response to priorities set by the region to expand the body of scientific knowledge through building capacity among states and organisations that currently have few resources, especially SIDS and LDCs.

Research and development priority areas

- Comprehensive digital atlas of the ocean;
- Comprehensive ocean observing system for all major basins;
- Quantitative understanding of ocean ecosystems and their functioning as the basis for their management and adaptation;
- Data and information portal;
- Integrated multi-hazard warning system;
- Ocean in earth-system observation, research and prediction, supported by social and human sciences and economic valuation;
- Capacity-building and accelerated technology transfer, training and education, Ocean literacy.
- Provide ocean science, data and information to inform policies for a well-functioning ocean in support of all sustainable development goals of 2030 Agenda

Ocean Decade outcomes

The Decade will translate scientific knowledge and understanding into effective actions to support improved ocean management, stewardship, and sustainable development. The Ocean Decade will therefore aim to achieve the following seven outcomes utilising ocean science.

1. A clean Ocean whereby sources of pollution are identified, quantified and reduced, and pollutants removed from the Ocean.
2. A healthy and resilient Ocean whereby marine ecosystems are mapped and protected, multiple impacts (including climate change) are measured and reduced, and provision of ocean ecosystem services is maintained.
3. A predicted Ocean whereby society has the capacity to understand current and future ocean conditions, forecast their change and impact on human wellbeing and livelihoods.
4. A safe Ocean whereby human communities are protected from ocean hazards and where safety of operations at sea and on the coast is ensured.
5. A sustainably harvested and productive Ocean ensuring the provision of food supply and alternative livelihoods.
6. A transparent and accessible Ocean whereby all nations, stakeholders and citizens have access to Ocean data and information, technologies, and have the capacities to inform their decisions.
7. An Inspiring and Engaging Ocean

To enable the regional or even local defining of these results and objectives, a bottom-up method is being built (with the formulation of scientific products, activities and partnerships proposed in the context of the Decade).



Bangladesh, which borders the Bay of Bengal, needs to step up its Blue Economy activities to keep pace with the growing worldwide concern over the condition of the oceans. Currently, more than 30 government and non-government organisations are working separately to use ocean science for a sustainable ocean economy that strives to protect the biodiversity of the ocean and the coast. It is imperative that Bangladesh recognise the value of the Ocean Decade for the country's future safety and use global opportunities for knowledge exchange to reduce crises endangering the health of the ocean.

End thoughts

The initial round of Decade Actions is already starting to thrive and develop. These include ground-breaking programmes for cutting-edge ocean science research on a wide range of issues that will act as the Decade's first building blocks, inspiring action among ocean actors to produce more and better ocean science and translate that knowledge into game-changing solutions for sustainable development. Additional Decade Actions are in the works, and the Decade will be punctuated by frequent Calls for Action.

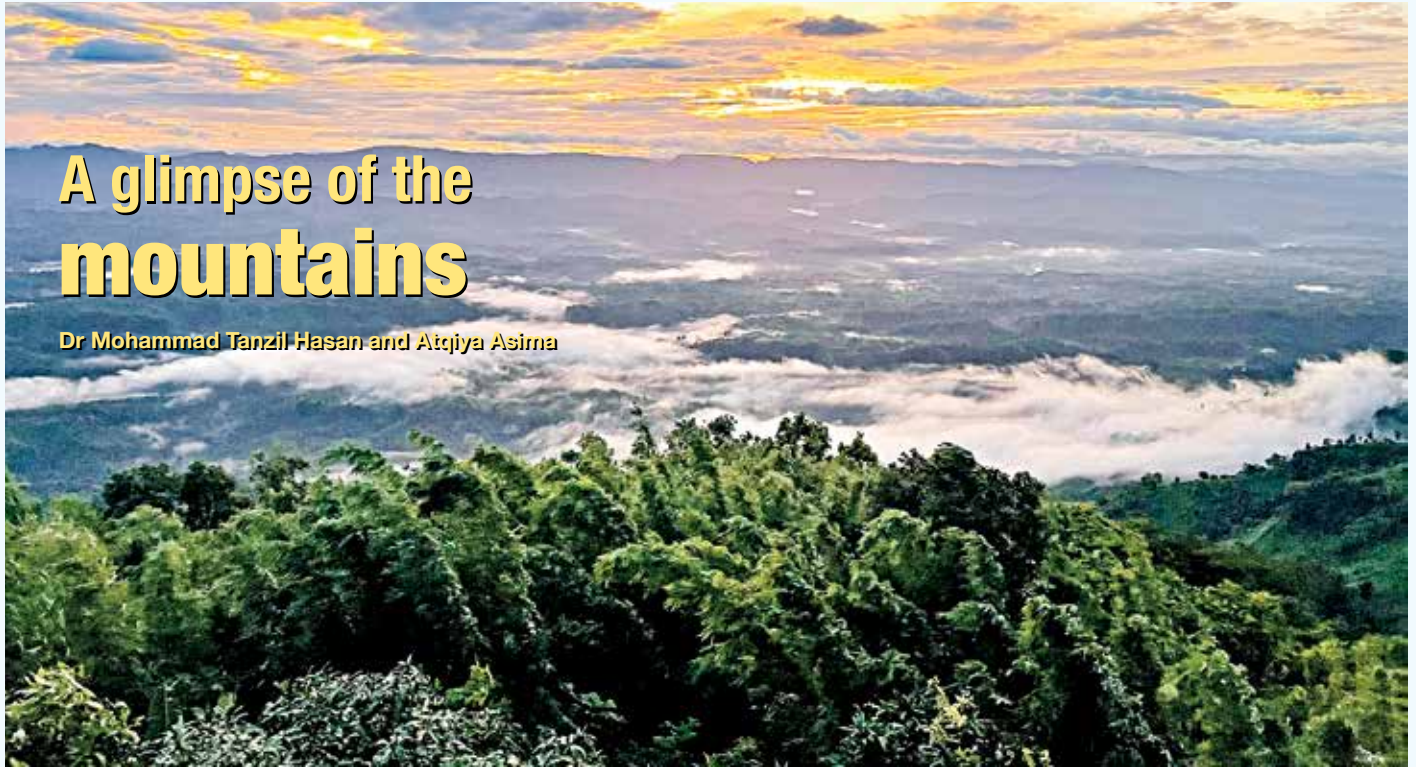
Countries have started forming National Decade Committees and marking the beginning of national Decade Actions. For example, in Canada, Colombia, Japan, and the United States, national stakeholders - including UN entities, local governments, private sector leaders, and the NGO community - have been brought together to introduce the Decade vision and to identify and engage a diverse range of national key players interested in contributing to the achievement of one or more Decade Challenges.

Scientists, policy makers, managers, and service users can work together to ensure that ocean science delivers greater benefits for both the ocean ecosystem and for society.

This Decade will be designed to facilitate global communication and mutual learning across research and stakeholder communities. It will work to meet the needs of scientists, policy makers, industry, civil society and the wider public, but it will also support new, collaborative partnerships that can deliver more effective science-based management of our ocean space and resources.

Climate change, a rising global population, and more environmental stresses will all have a significant—yet extremely uncertain—impact on food security and human well-being during the ensuing decades. Therefore, from a perspective from Bangladesh, there is an urgent need for adaptation plans and science-based policy responses to climate change.

The UN Ocean Decade is important and timely, and BSRRMU aims to organise several programmes to raise awareness of it among policymakers and future generations. It has taken a unique initiative of arranging the country's first international maritime seminar on the UN Ocean Decade along with the publication of an Illustrative Journal titled "Ocean Science: Sailing Toward Sustainable Development".



A glimpse of the mountains

Dr Mohammad Tanzil Hasan and Atqiya Asirna

Clouds covered Nilgiri

Mother Earth is full of beauty and tranquillity. At times, nature is soothing and sometimes fierce. So, as citizens of Bangladesh, we love to explore spectacular nature.

Every year Hiking Club of Bangabandhu Sheikh Mujibur Rahman Maritime University arranges a visit to the attractive hilly areas of Bangladesh for the students of Naval Architecture and Offshore Engineering as a part of their course assignment. We, Batch-03, got an opportunity to spend four magical days in the serene speculation of the Bandarban hill tracts, proof that the Almighty has poured all His treasure into making the mountains this much eye comforting. Though the mission of the visit was to fulfil the requirements of the academic course Co-Curricular (COCR-2202), we all got an excellent scope to sink our tired souls into the beauty of nature and forget all our sorrows.



Wild Chitra deers

The trip took place between 17 and 20 August 2022. During the trip, we visited Nilgiri, Chimbuk, Nilachol, Shoilopropat and Debotakhum. We observed that each location had a speciality after reaching out there through hiking or trekking. The proverb seemed accurate “You have to give off something to gain something,” We had to work hard to reach the places and enjoy the scenery that made us forget all the challenges we faced to get there.



Bamboo Chicken preparation for dinner

And, what's even worth a trip if we don't try the traditional dish of that place! We tried the bamboo chicken, a marinated chicken curry cooked inside bamboo burnt in coals. It was spicy and had an average taste. The centre of attraction was the tender bamboo stem sautéed with baby shrimps. It was crunchy to chew and tasted



Nilachol's scenic beauty



Debotakhum



A group photo of the study tour arranged by Hiking Club of BSMRMU

somewhat like an uncooked carrot. We can say it was like flavorful bean sprouts. But, indeed, it's not feasible for our tummies to digest that easily as we're not habituated to that diet. The dinner time, that restaurant had the prettiest view of the night sky of Nilachol. The starry constellations overhead, a window view of the firefly-lighted small Bandarban city, a misty smell of the woods, as if pleading us to stay back to the calmness. There was the melody of wind simultaneously when air passed through thousands of leaves - the song of the forest soul.

The city was quite far from where we had our dinner. We realized that some places are better without the touch of modern civilization, and Bandarban city is the perfect testament to that. On the last day, we visited Debotakhum. That day we all had the most incredible

adventure on the whole trip. Debotakhum isn't any registered tourist spot in Bandarban, but the level of charm it has in its existence makes one forget all the miseries one has in their life. There's a two-step boat trip to see the place. We had to walk up to the place where the mountain walls are steep and impossible to climb, so we took a short trip in a boat to reach where people make queues to ride the boat

or a bamboo raft, self-rowed. We chose the boat trip as it was safer. Until we got to the place where no one's chaos had reached, we had no idea that area would be so peaceful and refreshing.

The chirping of crickets and the water-flowing sound added more delicacy to that place. There was a strange peace in that silence of the site, and it was hard to decide whether to close my eyes and feel the silence or bless the eyes by looking at the mountains and thinking that mountains also can be this relieving! Those who rode the raft freed their body to the water and let the current make them flow with the stream. Other than Nilachol and Debotakhum, a visit to Nilgiri, Chimbuk and Shoilopropat was also fantastic and enjoyable. Though the Shoilopropat was

slippery to stand, it was worth taking the risk.

The words will always feel short of describing what we felt and perceived at that moment. This tour will remain ever in our memories as golden days. A part of NAOE-03 left their symbol on the soil of Bandarban.

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Atqiya Asima

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PM stresses on more connectivity with India



The Honourable Prime Minister Sheikh Hasina underscored the need for increased connectivity between Bangladesh and India for mutual benefits. She said India's North Eastern provinces - Assam and Tripura – could get access to

Chittagong Port if the connectivity between the countries was increased. The Prime Minister made the remarks when visiting Indian external affairs minister S Jaishankar paid a courtesy visit at her official residence Ganabhaban on 28 April 2022.

The Prime Minister said initiatives were taken to resume various cross-border routes between Bangladesh and India that remained unused since 1965 for enhancing connectivity between the two countries for mutual benefits.

'We have to increase connectivity. If the connectivity between the countries is increased, India's North Eastern provinces - Assam and Tripura - can have access to the Chittagong Port,' she said.

During the discussion, they talked about a variety of topics, including the effects of the Russia-Ukraine war on the world economy and the sharing of water between the common rivers Kushiara and Feni.

Bangladesh reaffirms commitment to achieve SDG-14: Foreign Minister



Foreign Minister Dr AK Abdul Momen has reaffirmed Bangladesh's commitment to achieve all targets of Sustainable Development Goal (SDG) 14 that aims to "conserve and sustainably use the oceans, seas and marine resources for sustainable development".

"To eliminate Illegal, Unreported and Unregulated

(IUU) fishing, the government of Bangladesh declared an area totaling about 8.8% of its Exclusive Economic Zone as the Marine Protected Areas and implemented in its National Plan of Action in 2019," he said.

The foreign minister made the remarks while representing Bangladesh at the plenary session of the 2nd UN Ocean Conference in Lisbon on 30 June 2022.

Rear Admiral Md. Khurshed Alam (ret'd), Secretary, Maritime Affairs Unit, Ministry of Foreign Affairs and Tarik Ahsan, ambassador of Bangladesh to Portugal, accompanied the foreign minister at the conference among other officials in the delegation.

Foreign Minister also said that Bangladesh is ready to cooperate in keeping with its capabilities to actively engage with the developed countries willing to transfer marine science and marine technology on fair and reasonable terms and conditions in accordance with the provisions of part XIV of the United Nations Convention on the Law of the Sea.

Two Korean firms appointed for the Bay Terminal

The Bay Terminal, a long-awaited project of the Chittagong Port Authority (CPA), has gained momentum with the appointment of two Korean consulting firms to prepare a detailed design and supervise construction.

According to the Shipping Ministry, the Korean firms Kunhwa Engineering and Consulting Company Limited and Dian Yang Construction and Engineering Company Limited are expected to submit the detailed design within three months. The government aims to start construction by January next year.

The CPA signed a deal with the Korean firms on the Bay Terminal project in Dhaka on 31 May 2022. State Minister for Shipping Khalid Mahmud Chowdhury and senior officials of the ministry were present at the signing ceremony.

Khalid Mahmud Chowdhury said: "We are optimistic about implementing the Chittagong Bay terminal project by December 2024, as the construction work will probably start at the beginning of next year, likely in January."

He added that the Bay Terminal would operate at all hours, widening the scope of business operations.

According to the Shipping Ministry, the government will spend BDT 1.265 billion on the preparation of the detailed design and for consultancy purposes. The cost of the entire Bay Terminal project is estimated to be around \$2.1 billion.

According to officials, there are no bends in the Bay Terminal Channel and it will be possible to berth ships with a maximum carrying capacity of 6,000 TEUs in 10-12 m drafts.

A virtual meeting of the Public Procurement that approved the consulting firms was chaired by Finance Minister AHM Mustafa Kamal.

Kunhwa Engineering and Consulting Company of Korea and Korean Dianyang Engineering Company Limited have jointly secured the job as international consulting firms for the 'Bay Terminal Construction Project' at Chittagong Port which is under the Ministry of Shipping.



Parliament passed Chittagong Port Authority Bill



On 5 April 2022, Parliament passed the Chittagong Port Authority Bill incorporating tougher penalty for polluting environment in the port area. State Minister for Shipping Khalid Mahmud Chowdhury moved the bill in the

House and it was passed by voice vote. The legislation also abolished the Chittagong Port Authority Ordinance, 1976 as it was promulgated during a military regime.

As per the legislation, the punishment for harming the environment by polluting water, land and coast will be fixed as per the environment conservation law. It also says if any rule under the law is breached and punishment for which is not stated in the environment conservation law, the fine will be six months of imprisonment or BDT 200,000 fine or both.

According to a new provision incorporated in the bill, the punishment for dodging toll, fee and other charges of the port will invite a one-month jail or fine of BDT 100,000 or both.

For rent and toll the Authority will formulate a chart and seek clearance from the government. But for below BDT 5,000 rent or toll, no clearance will be required.

The draft law also proposed creation of a fund for the development of the port. As per the legislation, there will be a chairman and a seven-member board for Chittagong Port Authority. In the existing law, there is a four-member board. The Board will hold at least one meeting in every two months.

Additionally, it has been made possible for offences covered by this bill to be tried in mobile courts. No court may rule on any infringement of this Bill without a formal complaint from the Port Authority.

Bangladesh Bank formed shipbuilding industry refinancing scheme of BDT 20 billion



Bangladesh Bank has formed a BDT 20 billion refinance scheme to ensure sustainable development of the shipping industry, increase export earnings and employment and gradually reduce import dependence.

The refinance scheme was formed under the Shipbuilding Industry Development Policy 2021, according to a circular of the banking regulator on 26 May 2022. Under

the scheme, a customer can get loans at 4.5 per cent interest. A customer can get term-loans for a maximum of 12 years, where the grace period will be 3 years.

The loan application deadline is set for June 30, 2024, according to the circular. However, no loan will be given for the construction of dockyard, land purchase or lease and the loan taken from this scheme cannot be used to repay any other loan. Working capital loan is also eligible under the scheme for one year and loans can be renewed if the business is good.

However, the loan (working capital) cannot be renewed for more than 3 years, the circular reads. Bangladesh has more than 100 shipbuilding yards, most of which serve the local market worth more than BDT 30 billion.

Direct container shipping to the United Kingdom following Europe

Direct container shipping service between Chittagong Port and the United Kingdom started on 20 May 2022, following the opening of a direct shipping route to Europe in February this year.

DKT Allseas Global Logistics, a UK-based company started to operate the inaugural shipment with the ship MV AMO that left Chittagong Port for the Port of Liverpool with goods from Bangladeshi exporters.

Md Zafar Alam, member (administration and planning) of the Chittagong Port Authority (CPA) said that the DKT Allseas's Mongolian flagship MV AMO sailed directly to Northern Europe for the first time with 300 TEUs of garments products from Bangladeshi exporters. It takes a ship 22-23 days to reach the port of Liverpool in the United Kingdom.

Captain Syed Sohel Hasnat, CEO of Phoenix Shipping Ltd, a local representative of Allseas Global Logistics, said, "Currently, the condition of the Colombo port in Sri Lanka is bad. It takes about 35-40 days for an export shipment from Bangladesh to reach the UK via Singapore port. In this situation, European buyers want to get products directly from Bangladesh. That is why we have undertaken this initiative."

Initially, the shipment of goods will start with three ships – MV AMO, MV BBC FINLAND, and MV San Alfonso.

Earlier, on 7 February, container shipping service started for the first time with Italy from Chattogram port. The service was launched by Italian company RIF Line and its subsidiary Calypso Companya de Navigazione.

FDI in Bangladesh jumped 13% after two years: UNCTAD

Foreign direct investment (FDI) in Bangladesh rose by 12.9% to USD 2.9 billion – around the pre-pandemic level – in the last calendar year (2021).

In the same year, the number of international project finance deals in Bangladesh tripled to 14, reaching USD 4.7 billion.

The largest project was the construction of a container terminal in Ananda Bazar in Haliashahar, Chattogram for USD 2 billion, according to the World Investment Report 2022 prepared by the United Nations Conference on Trade and Development (UNCTAD) released on 9 June 2022.

Despite waves of COVID-19, FDI flows to the developing countries in Asia grew for the third consecutive year, with developing economies in Asia receiving 40% of global foreign investment inflows, said the report.

FDI flows to developing countries in Asia rose by 19% to an all-time high of USD 619 billion in 2021. This marked the third consecutive year that investment flows to developing Asia grew despite the Covid-19 pandemic, which led to a 35% plunge in global FDI in 2020.

Blue Economy initiatives can contribute to increase 4% GDP in Bangladesh: Experts



Despite huge potential, the opportunity to move the economy forward through the development of the Blue Economy is not being used due to a lack of proper initiatives and coordination, experts

say. During a consultative policy dialogue organised by the General Economics Department of the Planning Commission on 14 May 2022, they also pointed out that one out of every six new works created in the United States is centred on the sea. Bangladesh's competitors in the world market, Thailand, Indonesia and Vietnam, depend on the sea for more than a quarter of their economies. Neighbouring India and Myanmar have also come a long way in using maritime resources.

They pointed out that there is an opportunity to increase the size of the blue economy in Bangladesh to 4% of the GDP.

Although the Blue Economy Cell was formed in 2017 under the Department of Energy and Mineral Resources, it did not establish coordination between the 17 ministries and 12 agencies involved.

In this situation, experts called for the formation of a separate ministry or authority to utilise the potential of the economy around the sea.

Presenting an article at the event, Aminul Arifeen, of UNDP Dhaka Office, said that 30% of Thailand's economy, 28% of Indonesia and 23% of Malaysia come from the sea. Even 4% of India's economy is dependent on the sea. Neighbouring Myanmar's maritime economy is about 2% of GDP. It is also possible to increase the GDP of Bangladesh from sea resources by 4%. He said that it is possible to increase the marine fisheries sector by 22%, tourism by 25%, shipbuilding and shipbreaking industry by 9%, transport sector by 22%, energy sector by 19% and mineral resources by 3%.

Dr Ahmed Kaikaus, Principal Secretary to the Prime Minister, Zuena Aziz, Chief Coordinator (SDG Affairs), Prime Minister's Office was present at the event.

MoS signs two agreements to increase the capacity of Chattogram-Dhaka-Ashuganj corridor

The Ministry of Shipping (MoS) has signed two deals for dredging of the river routes on the Chattogram-Dhaka-Ashuganj corridor.

The signing ceremony for the dredging program on the connected river routes and for establishing new terminals in the area took place on 14 May 2022 in Dhaka.

State Minister for Shipping, Khalid Mahmud Chowdhury, was present at the programme as the chief guest while Project Director and Additional Chief Engineer of Bangladesh Inland Water Transport Authority, Md Ayub Ali, signed the deal with Gulf Cobla-Karnaphuli joint venture and Dharti-Banga joint venture's representatives.

According to the deal, the contractors will carry out excavation for development and protection of 13 river routes.

Under the project, 900 kilometers waterways will be excavated, cyclone shelters will be constructed for vessels in six places, dredging work will be conducted in three ferry crossing zones, four passenger and cargo terminals, 15 landing stations will be established and two multipurpose vessels will be procured.



Tax exemptions for Bangladeshi flagged ocean going vessels till 2030



In the proposed budget for FY2022-23, the government has decided to give tax exemption on foreign currency income by Bangladeshi flagged oceangoing ships from the upcoming fiscal year in a bid to earn USD 3 billion to USD 4 billion a year. Currently, these local ships have to pay 10% tax on their incomes.

"I propose to exempt the income earned in foreign exchange by ocean going vessels carrying Bangladeshi flag from paying tax until 2030 if the income is brought into Bangladesh through banking channel. By adopting these proposals, we will be able to establish the service export sector as a potential industry for earning foreign currency for the country," Finance Minister AHM Mustafa Kamal said while placing the budget.

The finance minister has placed the BDT 6780.64 billion national budget for FY23 at National Parliament according top priority to safeguarding marginal people from inflation fuelled by the Russia-Ukraine conflict.

Maritime students send special SOS to the UN Ocean Conference



At first, they look like bright spots of white casting shadows on a lush green lawn. As the drone camera swoops into the sky, it becomes clear that these are people – more than 200 students from half a dozen different countries – lining up to spell out a clear message to the world: SAVE OUR OCEANS. These future maritime leaders, studying at the Arab Academy for Science, Technology & Maritime Transport, based in the Egyptian coastal city of

Alexandria, also used two powerful symbols in their video: an anchor, immediately recognizable in any language, and Semaphore, another universal way to communicate on the high seas, using flags.

The message is not a matter of theory for these future seafarers; it is central to their personal journeys starting at an institution committed to helping the world realize the Sustainable Development Goals (SDGs) especially on climate action (Goal 13) and life below water (Goal 14).

Hailing from Egypt, Djibouti, Sudan, Saudi Arabia, Libya and Mauritania, the students created their video message to the UN Ocean Conference, which will put the issue at the top of the international agenda when it convenes in Lisbon from 27 June to 1 July.

Indonesia taps coastal communities in war on illegal fishing



Indonesia's marine area covers 5.8 million square kilometres (2.2 million square miles) and is home to the highest coral reef fish diversity in the world. However, it does not have enough personnel to patrol and monitor for illegal and destructive fishing. Methods such as blast fishing and cyanide fishing flourished in the waters of Raja Ampat since the 1980s in response to rising commercial seafood demand.

The Raja Ampat islands are peppered across a 46,000-km² (17,800-mi²) expanse of water in the Pacific Coral Triangle, a

global epicentre of marine biodiversity that covers parts of Indonesia, Malaysia, the Philippines, Papua New Guinea, Timor-Leste and the Solomon Islands. The official patrol staff for the archipelago number 47 individuals, according to Raja Ampat authorities.

In Raja Ampat, the Indonesia Climate Change Trust Fund (ICCTF) has created nine Pokmaswas groups (community-run monitoring groups) on five islands, with each group comprised of 10-20 fishers, both men and women. Their task is to "see, hear and report" to authorities on potential illegal and destructive fishing activities.

The reports are submitted to a WhatsApp group that also includes representatives from the marine police, the park agency, and the Navy. These authorities can then respond immediately to the reports for further investigation and potential arrests.

The Pokmaswas groups carry out scheduled patrols at least twice a week, covering the fishing waters around their home island and a few neighboring islands. They leave at around 8 in the morning and return by noon, covering areas not covered by the official Raja Ampat patrol teams.

The fisher groups typically use their own boat for the patrols, but they're provided with equipment such as binoculars, walkie-talkies, camera phones, and logbooks. They also have onshore monitoring towers that allow them to observe the coast outside the scheduled patrolling days.

The nine Pokmaswas groups in Raja Ampat are currently in the process of being registered with the fisheries ministry. This effort is expected to help sustain their patrols and cover expenses such as fuel and boat maintenance. Indonesia currently has 2,945 government-registered Pokmaswas groups across its 34 provinces, according to data from the fisheries ministry. Seventeen of them are in West Papua province, where Raja Ampat is located.

The fisheries ministry says it encourages more fishers across the country to be part of their local Pokmaswas, and has promised more funding to provide monitoring facilities and equipment for these groups. The ministry also says it has given special awards to members for outstanding work.

New opportunities for local seafarers in South Africa

In South Africa, new employment opportunities for local seafarers have arisen, while a most welcome maritime training course for school-leavers wishing to embark on seagoing careers is in place. Due to the introduction of the maritime training course, several international academies and institutes came forward for partnering with local academies. In this regard, a new partnership has been built between Samtra and Northern Marine. Through its newly established partnership with the SA Maritime Training Academy (Samtra) in Simon's Town, Glasgow-based Northern Marine is embarking on a hopefully long-term sustainable programme of employing South African cadets and experienced officers.

This important development enhances the prospects of seagoing careers for South Africans who have noted with despair the demise of the locally flagged fleet, a process that has impacted greatly on long-term careers for local seafarers.

Established in 2003 through far-sighted co-operation between Simon's Town School and the Western Cape Education Department on the one hand, and Safmarine and the AP Moller Group on the other, Samtra already provides specialised training courses for numerous local and foreign seafarers, many of whom are involved in the offshore oil and gas industry.



Chinese firm wins contract to build manufacturing facility at King Salman International Complex

SEPCO3, a Chinese construction and engineering company, has won a contract to build a manufacturing facility at the King Salman International Complex for Maritime Industries and Services at Saudi Arabia's Ras Al-Khair port.

The project, led by Saudi Aramco, will manufacture two and four-stroke marine and electric power plant engines, in addition to marine pumps for ships, auxiliary equipment, generators and propulsion systems.

The engines and pumps manufactured by the plant will also be used in commercial vessel propulsion, electrical power generation, oil cargo vessels and offshore rigs.

Bids for the project were initially offered in April last year. Meanwhile, Saudi Aramco, Hyundai and Saudi Arabian Industrial Investments Co., known as Dussur, built a joint venture for the project in July 2019. Aramco owns the majority stake of 55% in the joint venture, while Hyundai owns 30% and Dussur 15%.

Norwegian clean tech startup to launch a hydrogen tanker with Shell's Maritime Division



The Oslo-based TECO 2030 company describes itself as a specialist in innovative engineering and equipment, with the main focus on clean technology. It's been supporting hydrogen fuel cell-related projects

through various partnerships and programs. One of its major projects, the TECO 2030 Innovation Centre, was meant to be an innovative fuel cell factory that would double as a research and education hub.

The Norwegian company believes that fuel cells can be considered "the engines of tomorrow," which is why their applications in the maritime transportation industry should be extended, especially with the International Maritime Organisation (IMO) starting to impose harsher restrictions and emission standards on shipping operators.

Last year, TECO 2030 also announced that its fuel cells will power one of the world's pioneering high-speed hydrogen boats. The Port of Narvik planned to replace one of its existing boats with this innovative vessel. While this fuel cell boat was built from scratch as a zero-emission model, TECO 2030 is also gearing up to launch a tanker that's converted to a hydrogen-electric propulsion system.

Called Hy-Ekotank, the future vessel will be based on the current fleet operated by Ektank AB. But, through the retrofit installation of a fuel cell system (with either compressed or liquid hydrogen storage), the Hy-Ekotank will be able to reduce up to 100% of the GHG (greenhouse gas) emissions while operating. Plus, it will completely eliminate emissions in ports.

Shell Shipping and Maritime and DNV are also partners in this project. TECO 2030 will supply the fuel cells, while the Ektank AB tankers will be the ones to be retrofitted. The Hy-Ekotank will become one of the first hydrogen-powered vessels of its kind – a necessary development for achieving the goal of cutting GHG emissions by 55% by the end of this decade.

More green offerings in store for marine engineering students in ITE



Students taking marine engineering courses at the Institute of Technical Education (ITE), Singapore will soon see more content on decarbonisation and sustainability in their curriculum. They will learn about industries' strategies to reduce their carbon footprint, as well as new sustainability standards.

Giving this update at a seminar on green innovation in marine decarbonisation at ITE College Central on June 15, ITE CEO Low Khah Gek said: "We are keen that our staff and students keep abreast of developments in the industry on decarbonisation strategies."

The topic also ranks high on the minds of the youth, as they are concerned about global warming and rising sea levels impacting their future, she added. ITE and automation company ABB also signed a memorandum of understanding to collaborate in decarbonisation in robotics and automation.

They will jointly develop a means for energy monitoring and optimisation of an existing industrial robot located in the Automation Hub at ITE College Central, which will help better explain concepts to students.

The robot being deployed in the hub is an industrial robot called the FlexArc, (Arc Welding Robot). A solution like this can be used in welding sheet metals for the marine industry and the metal industry. It has several benefits when it comes to sustainability, such as consuming less power as compared to traditional methods.

There is also no need for the robots to operate in a lighted or air-conditioned environment so this lowers the operation's carbon footprint. ITE and ABB will also develop and offer continuing education and training courses for the public and adult learners as part of a three-year partnership.

FuelEU Maritime regulation can improve the climate

The FuelEU Maritime proposal has been designed to accelerate the maritime industry's decarbonisation through the adoption of renewable and low-carbon fuels and technologies, by applying goal-based reduction of Greenhouse Gas (GHG) energy intensity from 2025. The draft Regulation includes ambitious reduction targets for the GHG intensity of marine fuels.

The maritime sector is global by nature, so the introduction of substantial changes to the carbon density of marine fuels should be carried out at a global level through the International Maritime Organisation (IMO), which is the United Nations specialised agency for maritime transport.

The climate carbon neutrality objectives of the Green Deal and the ambitious Fit-for-55 package have been put forward as part of efforts to green and eventually decarbonise the maritime sector along with other sectors. However, within the scope of the Fit-for-55 package, the FuelEU initiative needs to provide synergies, coherence and consistency between supply, distribution and demand.

Shipping's energy transition to decarbonisation requires investment in developing new zero-carbon or low-carbon marine fuels and related propulsion technologies, without which the long-term goals of the agreed IMO Decarbonisation Strategy and ambitious objectives of the EU Green Deal cannot be achieved. In other words, without them the industry will remain "carbon-captive".

UAE announces programme to offer medical care and maritime education to seafarers



The UAE's Ministry of Energy and Infrastructure on 25 June 2022 launched a new initiative to further support seafarers.

The 'Salmeen' initiative was announced on the Day of the

Seafarer, which is marked internationally on June 25 each year.

The programme is designed to provide quality medical care, maritime education, and training to people working on board marine vessels, the ministry said.

It also aims to identify and remove physical and social barriers through effective co-operation between the public and private sectors. The initiative is being carried out to improve quality of life for people employed in the industry and to help tackle challenges they are facing because of the pandemic and related travel restrictions. It will make companies and owners of ships responsible for supporting seafarers and providing them with full protection.

The UAE is a logistics hub. It connects global shipping lines and receives the largest number of ships heading to the region's ports with more than 21,000 ships annually. More than 27,000 local and international maritime companies operate in the UAE, with more than 17 million containers handled at the country's ports each year.

NOAA and partners launch high definition exploration of historic shipwrecks



Thousands of feet underneath the Atlantic Ocean lies relics of a bygone time multiple shipwrecks

that have transformed into homes to thousands of marine creatures.

The National Oceanic and Atmospheric Administration has teamed up with the Global Foundation for Ocean Exploration and the North Carolina Office of State Archaeology to allow viewers to explore notable shipwrecks off the North Carolina coast. The ships date from the Civil War to World War II and "represent our nation's naval innovation," according to NOAA.

One of the most noteworthy ships is the US Civil War-era USS Monitor, a 240-foot ironclad warship built for the Union Navy and completed in 1862. The former US President Abraham Lincoln commissioned the ship after he discovered the Confederate Navy was constructing its own ironclad warship in Hampton Roads, Virginia. American inventor John Ericsson constructed the plan for the vessel, which included a rotating gun turret, low draft, sleek profile and what Ericsson described as an "impregnable battery."

The ship, constructed in Brooklyn, New York, launched onto the East River on Jan. 30, 1862. After helping to win the Battle of Hampton Roads in Virginia later that March, the USS Monitor sailed farther south.

It was Mother Nature that eventually took out the powerful ship. On 29 December 1862, the USS Monitor was off the coast of Cape Hatteras, North Carolina, when unforgiving winds and waves ravaged the crew and the hull of the ship, causing leaks to develop, the ocean water flooding the engines and reducing steam pressure needed for propulsion. The crew lit a red lantern, a signal of distress, and the USS Rhode Island, the aid of tug, deployed their lifeboats. Sixteen members of the USS Monitor crew died in the wreckage.

More than 150 years after the USS Monitor fell victim to the mighty sea, a mission, titled "Valor in the Atlantic," will use state-of-the-art underwater drones and other technologies to allow land dwellers to explore the historic shipwreck and five others in the region, including the LV-71, the USS Virginia, the USS New Jersey, the USS YP-389 and the E.M. Clark. The equipment includes remotely operated vehicles with 4K cameras and lighting, which will give viewers an incredibly clear picture of the wreckage, Melissa Ryan, vice president of the nonprofit Global Foundation for Ocean Exploration said.

IMO adopts new guidelines to combat wildlife smuggling

On 13 May 2022, the 46th Meeting of the Facilitation Committee (FAL46) of the International Maritime Organisation (IMO) adopted new 'Guidelines for the Prevention and Suppression of the Smuggling of Wildlife on Ships Engaged in International Maritime Traffic'.

This endorsement by the United Nations' specialised agency sends a strong message on the growing international engagement against the illegal wildlife trade (IWT) and its impacts on global biodiversity, directly threatening the survival of many species in the wild.

The Guidelines were formally submitted to FAL46 by Brazil, Colombia, Germany, Kenya, Tanzania, the Intergovernmental Standing Committee on Shipping (ISCOS), the International Chamber of Shipping (ICS), the World Wide Fund for Nature (WWF), the International Fund for Animal Welfare (IFAW) and the International Organisation of Airports and Seaports Police (INTERPORTPOLICE). This is the first time the IMO has taken a bold step to combat IWT exploiting the maritime shipping industry. The Guidelines provide extensive recommendations for both government agencies and the private sector to increase due diligence over this criminal activity. Formal efforts started in FAL44 (44th Meeting of the Facilitation Committee in 2020) led by the Republic of Kenya with a working group composed of the United Nations Development Programme (UNDP), WWF, TRAFFIC and United for Wildlife Transport Taskforce.

Wildlife trafficking is a growing concern globally, threatening not only biodiversity but also ecosystems vital for climate change mitigation, domestic and international economies, and potentially human health. Organised criminal groups are increasingly taking part in this illegal activity which is still considered "low risk - high reward". Smugglers exploit the weaknesses in supply chains to illegally transport endangered species, including live animals, animal products, plants and timber. With 90% of the world trade being seaborne and an estimated 72-90% of illicit wildlife volumes being trafficked through maritime transport, the sector holds a responsibility to engage against this transnational organised crime.

The Guidelines highlight measures and procedures already available to the private sector and government agencies to combat wildlife trafficking within the industry. The document provides information on the nature and context of maritime smuggling of wildlife. It includes measures to prevent, detect and report wildlife trafficking within the maritime sector, with an emphasis on due diligence, responsibility-sharing and cooperation between all stakeholders along the supply chains.



A workshop on "Robotics in Marine & Maritime Environmental Monitoring" held



On April 29, 2022, the workshop on "Robotics in Marine & Maritime Environmental Monitoring" co-organised by Strategis Maritime ICT Cluster

and the European Maritime & Fisheries Fund (EMFF) project, BlueRoSES "Blue Robotics for Sustainable Eco-friendly Services for Innovative Marinas and leisure boats," was held with great success at the Piraeus Business Centre in Piraeus, Greece.

This workshop brought together professionals and executives from research institutes, academia, industry, and the regulatory field with the aim to draw a picture of the state-of-the-art in blue robotics with applications in the marine and maritime environmental monitoring; present cases of innovative product and service solutions; and identify opportunities for new business development in the marine and maritime sector.

The agenda of the workshop covered: the activities of the Blue RoSES project in underwater robotics; marine robotics in environmental monitoring applications; the use of robotics in the decarbonization of the shipping industry; and, enabling technologies in marine robotics.

The winner project of the 'Smart Maritime Land Operations Call' has been announced by MarRI-UK

A consortium of eight organisations (one port, two SMEs, three higher education institutes and two research technology organisations), along with other supporting organisations and led by the Port of London Authority, have been awarded £1.3m as part of the Smart Maritime Land Operations Call. The award comes as part of a Maritime Research and Innovation UK (MarRI-UK) initiative supported by the Department for Transport (DfT) to develop a national hydrogen highway network that incorporates land, sea and port networks.

The call was launched in November 2020, with organisations from across the UK able to apply for grants to develop mid TRL (TRL 3-7) technologies. The consortium proposal was selected by independent reviewers from a total of 19 high-quality submissions, with assessment criteria including establishing the benefits for the maritime sector, innovation, the technology's strategic fit with Maritime 2050 and alignment with MarRI-UK vision, and value for money.

This funding will support the development of technological innovations that will enable smart maritime and land operations for UK maritime, ensuring the sustainability and longevity of the sector through the collaborative development of technologies that will support a world-leading industry that is fit for the future.

The geopolitical shift in the Bay of Bengal: Russia-Ukraine conflict and their implications

Commodore Wahid Hasan Kutubuddin and Rubiat Saimum

Introduction

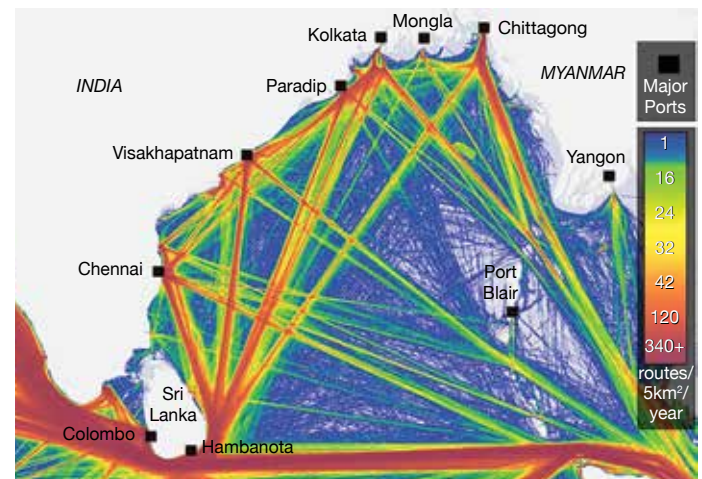
South Asia and the Bay of Bengal (BoB) are undergoing a tremendous geopolitical transition. The interaction in the Bay has shifted from competition to collaboration throughout time, owing in part to the realisation of the potential for mutual benefits on the one hand and the necessity of natural disasters on the other. Although the level of collaboration is still far below its potential due to strategic suspicion among powerful nations like China and India, it is encouraging to see exchanges focused on development and alleviation in the Bay. Most of China, Japan, and Korea's oil imports and many other raw materials must transit via the BoB, which is situated astride the sea lanes that connect those nations with suppliers in the Persian Gulf and Africa. India, one of the prominent stakeholders in the Indo-Pacific, depends heavily on the BoB in a wide range of fields, from energy to conventional security.

Geopolitical Shift in the Bay of Bengal

The Bay of Bengal connects the Indian and Pacific Oceans. It is positioned northeast of the Indian Ocean between two crucial sea lanes, the Malacca Straits and the Strait of Hormuz. It also connects South Asia with Southeast Asia, with Myanmar, Thailand, Malaysia, and Indonesia constituting its eastern littoral and India, Bangladesh, and Sri Lanka its western littoral. The Bay is vitally important for

powerful nations because of its geo-strategic location in the Indo-Pacific area. Myanmar has recently increased its engagement with regional and extra-regional countries in connectivity, regionalism, energy exploration, and naval operations.

Figure 1: Maritime trade routes in BoB



Geopolitical equations in the BoB are centred on safeguarding these economic and energy channels, which ties the BoB to the Free and Open Indo-Pacific (hereafter, FOIP) strategy supported by the United States and its allies. As part of the Belt and Road Initiative (BRI), China has recently increased its footprint in this area to circumvent the “Malacca Dilemma” and establish other overland routes to critical ports that would secure China’s supplies through the Indian Ocean. From a Chinese security standpoint, the BoB and its neighbouring countries make up a crucial region to which China needs substantial access. But this raises questions for the US and its friends and partners, particularly for India, about how to block a single actor from commanding the BoB, which would call for taking measures to ensure plurality. The geo-strategic presence of big powers and their geopolitical posturing in the BoB region is predicted to grow as China’s BRI and the US FOIP Strategy are constantly shifting.

Russia-Ukraine War and Its Impact

The War in Ukraine has created a substantial geo-strategic issue in the Bay of Bengal region. The most serious problems the world would face in recent years because of the war is energy and food insecurity. Global food markets have been severely impacted as Russia’s invasion of Ukraine nears its fourth month. Between 2017 and 2021, Russia and Ukraine collectively exported roughly 274 million tons (MT)

of wheat or nearly 30% of the world’s total exports. These two nations provide almost all wheat for countries like Egypt and Indonesia.

Ukraine and Russia jointly contribute over 50% and 20% of the world’s sunflower oil. This year, the price of sunflower oil in Asia has more than doubled; in some parts of Europe, it has climbed by 1,000%. Cooking oils are already restricted in stores in Europe and are incredibly scarce elsewhere, particularly in South Asia. As a result of shortages feeding other shortages, food prices in Asia have reached record highs. On April 28, Indonesia imposed an indefinite export restriction on palm oil after the domestic price nearly rose to 25,000 rupiahs per litre, sparking student protests. Indonesia provided 55% of the world’s palm oil to 134 countries in 2020.

A little over 75% of the world’s exports of sunflower oil come from Ukraine and Russia. Despite not importing sunflower oil, the conflict and sanctions against Russia have hiked the price throughout the entire vegetable oil industry. Almost all of Bangladesh’s vegetable oil requirements are met by imports, either in the form of raw or processed commodities (primarily palm and soybean oil) or imported oilseeds (rapeseed and soybeans), which are then processed domestically. Bangladesh’s vulnerability has worsened due to trade restrictions by important global vegetable oil suppliers. Bangladesh imports 80% of its palm oil from Indonesia. The worldwide market’s

Figure 1: Maritime trade routes in BoB



overall supply of palm oil and its derivatives may be constrained by Indonesia's implementation of a progressive export levy in March. About two-thirds of Bangladesh's imports of soybeans come from Argentina. However, the country imposed export restrictions on soybean oil and meal on March 13 before changing course on March 31 and allowing exports while increasing the export tariffs on those products from 31% to 33%. Vegetable oil prices have remained at record highs due to all of these causes, increasing import expenses for nations like Bangladesh.

Fertiliser use is crucial to Bangladeshi agriculture, especially for rice production. Bangladesh imports about 1.2 million tons of fertiliser yearly, including 31% of its demands for nitrogen, 57% for phosphate, and 95% potash. Average application rates are above 286 kg/hectare. Russia and Belarus are two of the biggest exporters of fertiliser worldwide, and the war, which includes export sanctions directed at Russia, has also impacted these markets. Nearly 75% of Bangladesh's potash requirements are imported from Belarus (41%) and Russia (34%).

Additionally, according to calculations based on the FAOSTAT food balance sheet, Bangladesh imports 44% of its supplies of corn and soybeans, which are also seeing rising global prices. It affects Bangladesh's feed industry, raising the cost of producing items made from chicken, cattle, and fish—sectoral weaknesses brought on by the pandemic. Reducing the supply of animal products in the upcoming months could exacerbate the effects on food security from interruptions in the major staples of rice, wheat, and vegetable oils.

The country's import cost rose 7% in January compared to the previous month. The actual fuel import by Bangladesh Petroleum Corporation dropped significantly in the first four months of the year. However, the cost of importing petroleum products is projected to increase to USD 4.5 billion by 2022. The war has also made shipping costly. The insurance premiums for shipping voyages to the region have also been increased by 100%, which would burden the country's limited resources and might play a role in the commodity price hikes.

Conclusion

This geo-strategic shift due to the war in Ukraine is affecting Bangladesh in significant ways. It is essential to understand the situation in the context of Bangladesh. The maritime dimension is the most significant factor in this emerging geo-strategic conundrum. Bangladesh's response to this issue must also be based on the maritime calculus of the country, which includes ensuring the proper extraction and management of maritime resources to offset the impacts of the Russia-Ukraine war. Bangladesh needs to focus more on awareness of the maritime sphere in the country. Bangladesh has been facing 'sea blindness' at the policy level. The Bangabandhu



Sheikh Mujibur Rahman Maritime University can play a prominent role in policy advocacy. The maritime security and strategic studies department at Bangabandhu Sheikh Mujibur Rahman Maritime University (BSMRMU), the country's first specialised university in maritime education, has been teaching maritime geopolitics and security threats. In the long run, Bangladesh can gain insights and evaluations from the university's faculty and analysts.

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