IMA NEWS

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INSTITUTE OF MARINE AFFAIRS

Coral Spawning Observations key to Resilience Initiatives

Mountainous star coral releasing gamete (sperm/ egg) bundles

As the Marine Resilience Initiative (MARIN) Tobago project progresses, the focus of the Institute of Marine Affairs (IMA) is safeguarding Tobago's coral reefs; one of the country's top tourist attractions. MARIN Tobago is an 18-month pilot programme to examine the most appropriate scientific methods to support the growth and resilience of sensitive marine ecosystems such as coral reefs and seagrasses, being conducted with the support of bpTT. Activities included a health assessment of pilot sites that assessed the project site for coral disease, the amount of coral cover and diversity of corals. The project also assessed the pilot coral site for spawning activity and the ease of recruitment or spread of new corals using artificial infrastructure. During their first month of observation, on July 23 2022, the IMA's research team headed by Dr. Anjani Ganase observed coral spawning at Mt Irvine Bay, Tobago. The team captured video of a mountainous star coral releasing bundles of sperm and egg or gametes into the surrounding waters. The activity is being monitored to determine whether the use of larvae-based restoration tactics is feasible. Dr. Ganase explained that coral sperm and eggs are collected and controlled fertilisation techniques are conducted in a bid to increase fertilisation success and then the coral larvae are released directly onto the reef. A better understanding of the corals' reproductive life cycles by charting when different coral species spawn, is a key output of the project

According to Dr. Ganase, annual monitoring of our reef health indicates no recovery of hard coral cover over the last 12 years following a 2010 coral bleaching event. This bleaching event resulted in the loss of approximately 50 % hard coral cover across many of Tobago's coral reefs. Coral cover is neither growing nor replenishing itself. That raises the question: What prevents our corals from successfully recovering after a disturbance?

Dr. Ganase is of the view that reef management is responsible for reef survival and resilience. "We are aware that management is a crucial element in reef rehabilitation." Additionally, we are aware of methods for coral restoration that play an active role in reef management and enhance reef recovery and build reef resilience against future disturbances.

Since this is only a pilot, the IMA team is focussed on monitoring coral spawning patterns for Tobago, and will move on to trialling methods of fertilisation, coral settlement and out planting in the next phase of the project.

How crucial is spawning to the survival of the reef though?

Corals spawn annually to replenish coral populations on reefs. As corals provide a habitat for many other marine organisms, successful spawning, fertilisation and recruitment of new corals is vital to maintaining reef

Digitally mapping a dive

structure for other reef organisms. Therefore, the well-being of the reef is crucial for maintaining rich marine biodiversity as well as providing important ecosystem services for human communities. Lobster, grouper, and snapper are just a few examples of commercial species of fish and crustaceans that spend most of their life on coral reefs. Reefs have recreational value as well. Over 40% of tourists to Tobago visit the island for coral reef-related activities, such as snorkelling, glass-bottom boat tours, or simply unwinding at Pigeon Point's coral-based sand beach. Additionally, coral reefs safeguard our coastlines, create sand for beaches, and are a source of marine organisms that have pharmaceutical value. Sponges and other organisms produce chemical compounds useful for treatments for cancer, malaria, and many viruses.

Reef conservation and preserving reef function include both passive management of the marine environment and active restoration of corals. Furthermore, strategies for reef restoration are becoming increasingly important in reef conservation as the impacts of climate change continue to affect reef health. A coral bleaching event, for example, would require a quick recovery strategy in a bid to starve off other pressures such as coral disease when the reef is at a vulnerable point. Learning the intricacies of how corals reproduce can aid in the development of recovery strategies and management tactics.

The IMA will continue its observations in September and October on Charlotteville's reefs, the next observation site, in a bid to view more coral spawning activities and look for other species that spawn later on in the year. For the Caribbean, the warmer months of the year - June through October – is associated with the spawning season and the monthly cycles of spawning are timed with the phases of the moon.

Global Heads unite to promote ocean health and sustainability at meet at the Second UN World Ocean Conference

Hon. Pennelope Beckles, Minister of Planning and Development, (L)Dr Rahanna Juman, Director (Ag.), Institute of Marine Affairs and Mr Vlad Vladimir Budhu, Second Secretary, Permanent Mission of the Republic of Trinidad and Tobago to the United Nations, New York

Green technology and innovative use of the ocean's resources hailed as the roadmap to a sustainably managed ocean. Global leaders and technocrats gathered at the second UN World Ocean Conference in Lisbon, Portugal from June 27 to July 1, 2022 to consider the issues surrounding declining ocean health and possible solutions. The theme "Scaling up Ocean Action Based Science and Innovation for the Implementation of Goal 14: Stocktaking, Partnerships and Solutions". Over 4,000 delegates, attended the Conference, which was co-hosted by the Governments of Kenya and Portugal and included a number of special events taking place across the city of Lisbon. Trinidad and Tobago was represented by the Honourable Pennelope Beckles, Minister of Planning and Development, Dr. Rahanna Juman, Director (Ag.), Institute of Marine Affairs and Mr Vlad Vladimir Budhu, Second Secretary, Permanent Mission of the Republic of Trinidad and Tobago to the United Nations, New York.

The Conference focused on addressing many of the deep-rooted issues with which many societies must grapple, laid bare by the COVID-19 pandemic. Major structural transformations and common shared solutions anchored in the UN Sustainable Development Goas (SDGs), specifically SDG 14- "Life Below Water" are required if solutions are to be found. To propel change, the Conference sought science-based innovative solutions aimed at starting a new chapter of coordinated global action. Solutions for a sustainably managed ocean must if necessity involve green technology and innovative uses of marine resources and address the threats to ocean health, ecology, economy and governance of the ocean - acidification, marine litter and pollution, illegal, unreported and unregulated fishing, and habitat and biodiversity loss.

The ocean is the Earth's largest ecosystem, covering over 70% of the planet. It is our life source, supporting humanity's existence and that of every other organism on the earth. It stabilises the climate absorbing about 30% of the carbon produced by humans, directly supports human well-being through food and energy resources, and through the by provision of cultural and recreational services. The ocean also nurtures unimaginable biodiversity. Globally, the oceans serve as the world's largest source of protein, with more than three billion people depending on the oceans as their primary source of protein and over three billion people depending on marine and coastal biodiversity for their livelihoods **(https://oceanic.global/projects/united-nations-world-oceans-day-2021)**.

The Conference featured both a general debate and interactive dialogues on:

- marine pollution;
- strengthening ocean-based economies;
- managing, protecting, conserving and restoring marine and coastal ecosystems;

- minimising and addressing ocean acidification, deoxygenation, and ocean warming;
- making fisheries sustainable and providing access for small-scale artisanal fishers to marine resources and markets;
- increasing scientific knowledge and developing research capacity and transfer of marine technology;
- enhancing the conservation and sustainable use of oceans and their resources by implementing international law, as reflected in the UN Convention on the Law of the Sea (UNCLOS); and
- leveraging interlinkages between SDG 14 and other Goals towards the implementation of the 2030 Agenda for Sustainable Development.

Delegates announced over 300 voluntary commitments, with approximately 50 high-level commitments and pledges, including an investment of at least USD 1 billion to support the creation, expansion and management of marine protected areas (MPAs) and Indigenous and locally governed marine and coastal areas by 2030, made by the Protecting Our Planet Challenge. Beyond the new commitments, delegates attending the conference reflected on the progress made since the first UN Ocean Conference in 2017. Since then, the world has taken concrete steps towards addressing plastic pollution, including in the marine environment, by establishing an intergovernmental negotiating committee to hammer out a new international treaty to end plastic pollution. Delegates also measured progress on the new agreement to conserve and sustainably use biodiversity in the high seas, with many very hopeful that the process will conclude in 2022, and several called for a moratorium on mining of the deep seabed. Looking ahead, France and Costa Rica announced their offer to co-host the third UN Ocean Conference in 2025.

The Second UN Ocean Conference adopted the declaration entitled "Our Ocean, Our Future, Our Responsibility" (A/CONF.230/2022/L.1), as the communique document, and recommended that the General Assembly endorse it, at its 76th session. The Heads of State and Government and technocrats, members of civil society and academia and stakeholders, reaffirmed their strong commitment to conserve and sustainably use the ocean, seas and marine resources. They called for all to act decisively and urgently to improve ocean health and productivity as well as promote the sustainable use and resilience of the ocean and its ecosystems.

The declaration also recognised the importance of the UN Decade of Ocean Science for Sustainable Development (2021-2030) and stressed that science-based and innovative actions and international cooperation and partnerships based in science, technology and innovation, in line with the precautionary approach and ecosystem-based approaches, contribute to the solutions necessary to overcome challenges in achieving Goal 14. IMA, as the primary marine research institute in Trinidad and Tobago, will work with all stakeholders towards sustainably managing our ocean resources, and creating sustainable livelihood opportunities for our citizens through innovation and partnerships.

Acid Oceans

Attish Kanhai,
Research Officer

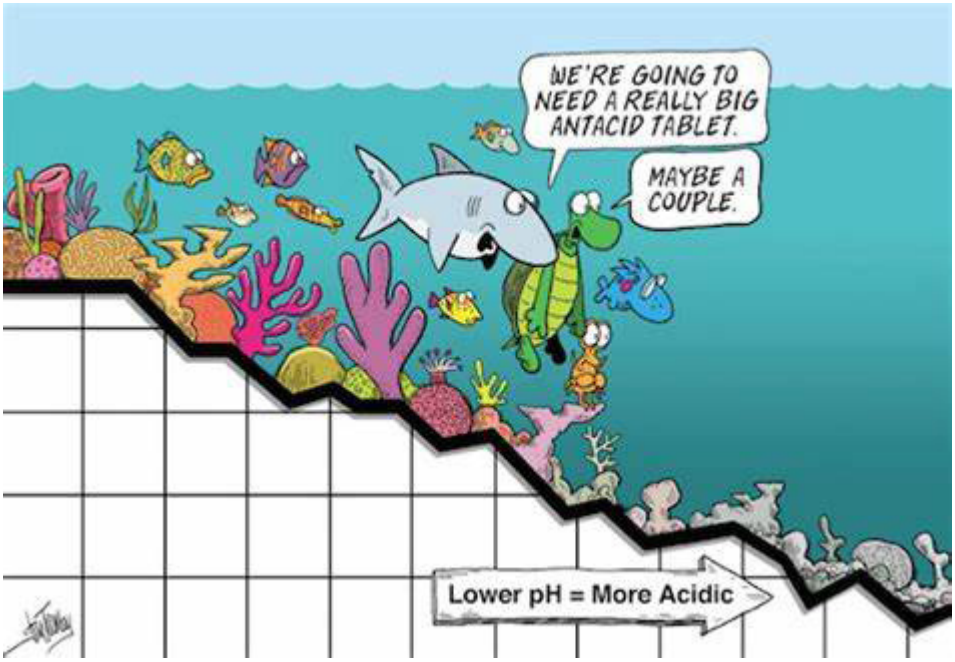
"Sometimes our strengths lie beneath the surface … Far beneath, in some cases" (The Ocean, 2016). Well not exactly a quote by the ocean itself. I am intentionally being a bit cryptic, because these words make more sense in the context of the movie they were taken from, Moana. Moana is the Maori word for ocean. The Maori being the native peoples of Aotearoa New Zealand.

The belief system of the Maori holds nature in very high regard. The kinship between humans and the environment in Maori culture is expressed through kaitiakitanga, a way in which the environment is respected and managed, something that is being echoed and championed in an attempt to preserve nature's resources.

The Maori believes the health of a community is reflected in its environment and vice versa. For example, if waterways were unclear or polluted, something was amiss with the local people. This is a brilliant way to look at it. Peering through the lens of the surrounding world we can judge what is happening to those whose actions most impact it. By this token, it is not a stretch to infer that the health of the global human population is on a downward spiral, pandemic aside.

While there is a myriad of problems that come with climate change, ocean acidification is one that requires our immediate attention. Compounding stressors, such as ocean warming, pollutants, increased storm run-off, and overfishing all combine to accelerate the problems associated with ocean acidification. Since anthropogenic carbon dioxide (CO_2) emissions are the primary cause of ocean acidification, action to address ocean acidification should be considered one pillar of climate change efforts.

Just in case you needed a reminder, ocean acidification is the long-term decrease in seawater pH that results from the absorption of excess CO_2 released into the atmosphere by human activities. These activities take the form of the burning of fossil fuels, deforestation, and cement production.



Over the past 250 years, 30% of greenhouse gas emissions have been absorbed by the ocean. This has helped to slow down the already accelerated effects of human-induced climate change. However, this CO_2 absorption does not come without side effects as it reacts with seawater to form carbonic acid. Increased acidity means organisms that possess or reside in calcium carbonate shells are now at increased risk of losing their structure or their homes.

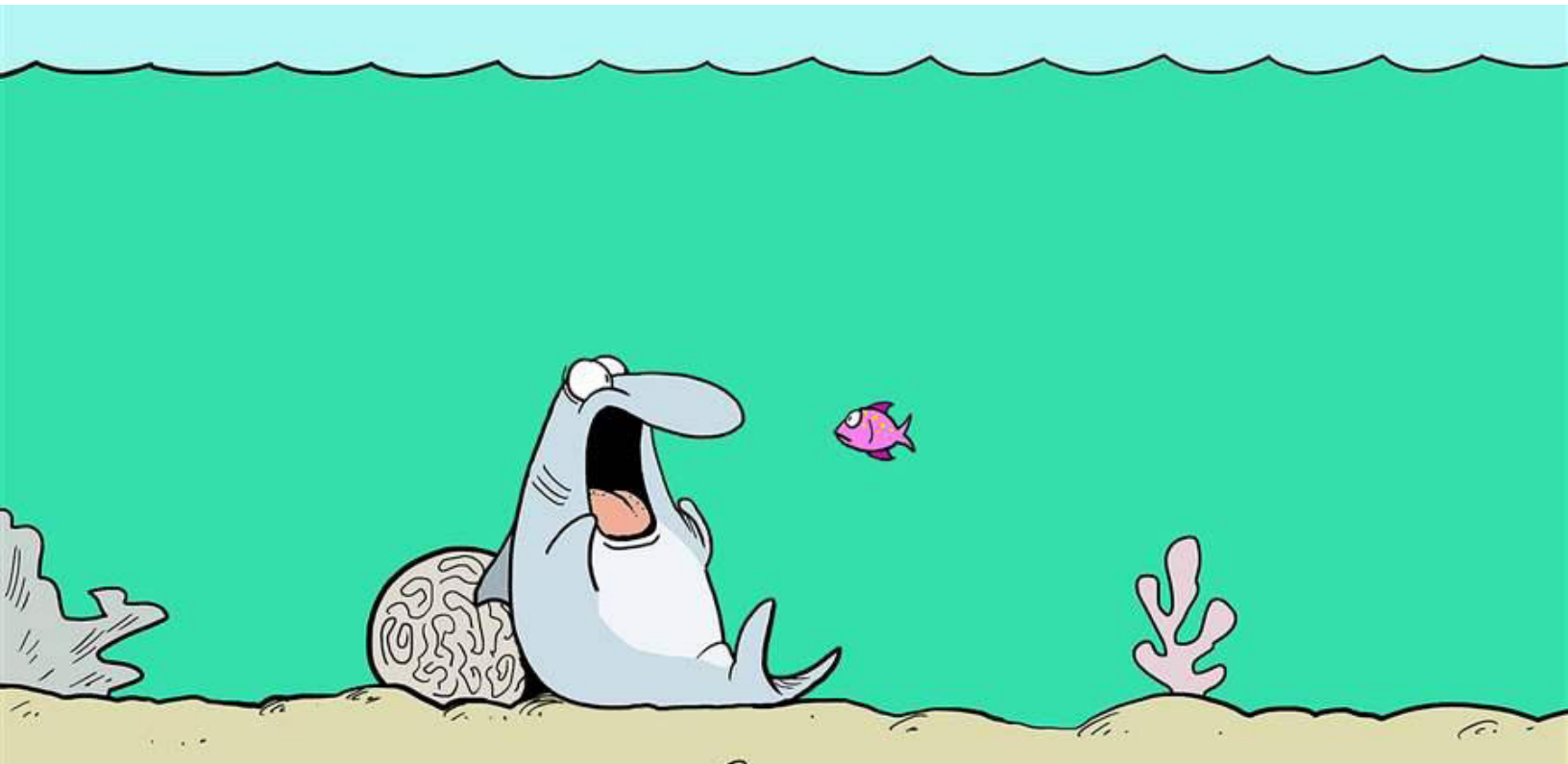
Globally, the average surface seawater has already increased in acidity by 30% (or a decrease in pH from 8.2 to 8.1 if we're being specific). If the current rate of CO_2 emissions continues, then global ocean pH can be expected to reach as low as 7.8 by the year 2100.

Not all species will be negatively affected however. Increased ocean acidity may prove to be beneficial to many phytoplankton species but this is by no means something to celebrate. The zooplankton species that feed on these phytoplankton, equally important parts of the marine food web, will be negatively affected by ocean acidification (Wang et al., 2018). In simple terms, while there might be more food available for the zooplankton, there will be less mouths to feed on them. These can spark many changes to the global ocean food chain as we know it (Doney et al., 2020).

The first step in addressing the potential impacts of ocean acidification is conducting a vulnerability assessment. In simple terms, a vulnerability assessment identifies the direct and indirect effect of ocean acidification on food security, economic development and livelihoods under existing policies or "business as usual" scenario. Findings from vulnerability assessments can then be used to outline adaptation strategies and future research that can lead to recommended actions.

Actions are unique to each country especially to Small Island Developing States (SIDS) such as Trinidad and Tobago. SIDS sit on the frontline of ocean acidification. Research driven and scientifically sound action are needed in order to mitigate against the potentially debilitating effects of climate change and ocean acidification. We stand to lose a significant amount if we do not address these problems with some manner of urgency.

As we walk along the beach, enjoying nature's serenity or looking for seashells, where are our steps going to take us? This is the point where our paths diverge. On one hand we can continue much as we have now, where nothing much changes, or we can walk with a purpose, one that actively pursues conservation and protection of our treasured Moana. Our Moana is sick, but the prescription is there waiting to be filled. It is time to stop treading lightly and to start treading boldly, with a purpose and in the right direction. We have long since passed the point of timidity, the time for temerity has come.



Regional bodies meet to address Land-Based Sources of Pollution of the marine environment in the Caribbean

Credit: GEF IWEco. Photo of Thrift Harbour, Grand Bahama, 2018

A hybrid two-day regional workshop was held from July 25–26, 2022, at the Institute of Marine Affairs (IMA), which serves as the Regional Activity Centre (RAC) for the Cartagena Convention's Protocol Addressing Pollution from Land-Based Sources and Activities (LBS). Facilitators from the IMA, the Cartagena Convention Secretariat, Cuba's Centre of Research and Environmental Management of Transport (CIMAB RAC), the RAC for the Specially Protected Areas and Wildlife (SPAW) Protocol, and the OSPAR Commission (The Convention for the Protection of the Marine Environment of the North – East Atlantic Commission) participated in the workshop titled "Index of Coastal Eutrophication & Harmful Algal Blooms". The Cartagena Convention's national and technical focal points attended.

To assist with the implementation of the Protocol on Land-Based Sources of Pollution at the regional level, IMA was designated the RAC for the English-speaking Caribbean islands in April 2018. The LBS Protocol is a series of guidelines designed to safeguard human health and the marine environment against nutrient and other land-based point sources of marine pollution. It also lays out a plan for dealing with pollution that takes into account local, national, and regional needs and goals.

Goal 14.1 of the United Nations Sustainable Development Goals, "Life Below Water" calls for the prevention and significant reduction of marine pollution, particularly that caused by land-based activities. Eutrophication is the term used when too much nutrients in coastal areas cause too much algae and phytoplankton growth and oxygen depletion. Agricultural runoff, domestic sewage, and industrial discharges all contribute to coastal eutrophication, which has a negative effect on marine ecosystems and can lead to toxic algal blooms. The workshop's goal was to increase regional and national institutions' capacity and provide guidance for the implementation of the Sustainable Development Goals indicators at the country level. One such indicator was the idea of the Index of Coastal Eutrophication Potential (ICEP) and Harmful Algal Blooms (HABs). Technical lectures and panel discussions on methods to reduce nutrient pollution were part of the workshop. The presenters and panellists met with the Deputy Director of Research (Ag.), Dr. Darryl Banjoo, to discuss the development and implementation of a strategic work plan that can be used in the region to reduce the occurrence of nutrients pollution and HABs.

(l-r) ICEP Panelists: Darryl Banjoo-IMA, Hans Ruiter-OSPAR, Christophe Blazy-SPAW RAC, Yamiris Gómez - RAC CIMAB, Christopher Corbin - CEP Secretariat, Marlen Perez - RAC CIMAB and Maurice Narcis, IMA.

Caribbean scientists learn negotiation tactics to aid their advocacy for the conservation of biodiversity

Participants, Instructors and Organisers at the close of the Second Workshop of the Training Programme on Environmental Diplomacy.

The Second Workshop of the Training Programme on Environmental Diplomacy in the Insular Caribbean was held over the period June 7-8, 2022, in Santo Domingo, Dominican Republic. The programme was jointly implemented by the Muséum national d'Histoire naturelle, a French public institution deeply involved in international negotiations on environmental issues and Caribaea Initiative, an international association dedicated to reinforcing capacities for the scientific study and conservation of biodiversity in the insular Caribbean.

The objective of the training was to provide participants with practical training on international negotiations on biodiversity. There were nine (9) participants from the following Caribbean States: Bahamas, Barbados, Cuba, Dominican Republic, Haiti, Jamaica, St Kitts and Nevis and Trinidad and Tobago. The Institute of Marine Affairs' Ms. Ruqayyah Thompson (Research Officer) represented Trinidad and Tobago, through the invitation of the Ministry of Planning and Development, the National Focal Point for the Convention on Biological Diversity.

Over the training period, several mock negotiation sessions were conducted with the aim of adopting a programme of five (5) priority actions for implementing the post-2020 Global Biodiversity Framework (GBF) at the Caribbean level. Mock negotiation sessions included the following:

- Two (2) Plenary sessions
- One (1) Contact Group session
- One (1) Friends of the Chair session

Throughout the negotiation sessions, the workshop instructors shared insights on the negotiation process as well as the rules and procedures of the different sessions. Specific strategies for Island States and for States with much bigger delegations were included. A programme of five priority actions for implementing the post-2020 GBF at the Caribbean level was successfully adopted at the close of the negotiations. The adopted programme included the following five (5) priority targets:

- Target 1 - addressing land and sea use change and promoting integrated spatial planning
- Target 7- reducing pollution from all sources including nutrients, chemical and plastic waste
- Target 8 - minimising the impact of climate change on biodiversity, contribute to mitigation and adaptation through ecosystem based approaches
- Target 19.1 - increasing financing particularly to developing countries

Target 19.2 - strengthening capacity building and development, access to and transfer of technology, particularly in developing countries.

Despite lamenting on the short and intense duration of the training, participants successfully developed their negotiation skills to advocate for both national and regional priorities for the preservation of the region's biodiversity at international fora.

Shifts Along Our Sandy Shores

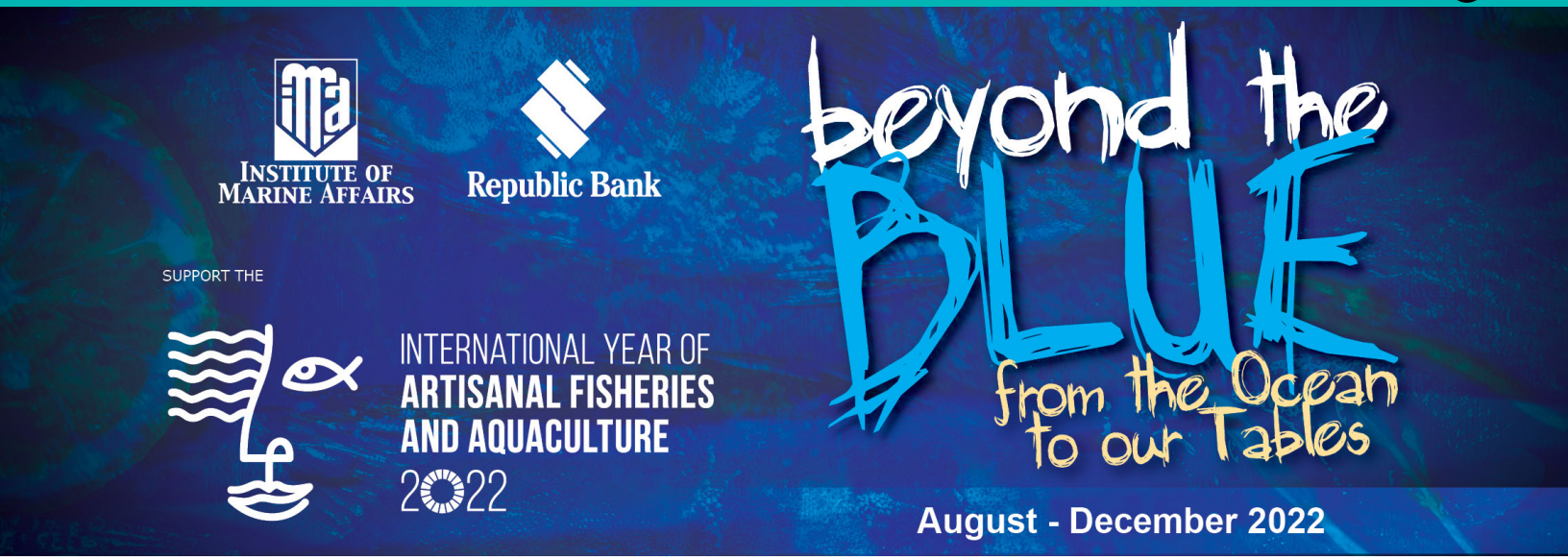
Beaches remain the main attraction of tourists to the Greater Caribbean. For small island nation states, tourism accounts for an average of 25% of their Gross Domestic Product (GDP) and is the fastest growing sector of their economies. About 115 million people live around the Caribbean Sea's coastline, and every year, another 20 million people come to visit.

This rapid growth in the tourism sector and its associated activity on beaches together with climate change impacts are leading to greater erosion on Caribbean beaches and shorelines. This is damaging the infrastructure and shorelines of coastal communities, depleting important tourism resources, and negatively impacting the economy.

At the first symposium of the Association of Caribbean States (ACS)'s Caribbean Sea Commission (CSC), held in 2015 in Port of Spain, Trinidad and Tobago, the CSC and its member nations decided to address this issue at the regional level. A partnership agreement between the Korea International Cooperation Agency (KOICA) and the ACS was signed on April 28, 2017, in Trinidad and Tobago to launch a project that would help preserve and conserve the Caribbean Sea for the benefit of the member states. "Impact Assessment of Climate Change on the Sandy Shorelines of the Caribbean: Alternatives for its Control and Resilience" is the project's name, otherwise known as the Sandy Shorelines Project.

The goal of this project is to support the sustainable use of Caribbean beaches and resources, first by enhancing an understanding of the causes of erosion and then by implementing particular local mitigation strategies for the effects of climate change and other threats to the sandy shorelines.

As part of the mitigative strategy, the Institute of Marine Affairs facilitated a training workshop in collaboration with the Cuban Ministry of Science, Technology and Environment and ACS during the period April 25 to June 10, 2022. The workshop covered key components for beach recovery and sedimentology which included discussions on standards of practice that aid in the more accurate determination of what causes erosion on beaches. Participants were introduced to and allowed to familiarize themselves with laboratory techniques for granulometric analysis and sediment composition. Other components included examining the range of morphological and sedimentological markers used to calculate net littoral drift, as well as direct and indirect approaches for estimating coastal transport. The target area was the Bonasse and Cedros Bay region. In Cedros Bay and south of Galfa Beach, surveys were conducted and sediment was identified and sampled.



Beyond the Blue: From the Ocean to our Tables

The Institute of Marine Affairs' radio broadcast continues for a fourth season beginning the week of August 15, 2022. This year the programme has been extended to include a social media campaign, online puzzles and games where our nation's youngsters between the ages of nine to nineteen have a chance to win many prizes including electronic devices. The initiative is made possible with the kind sponsorship of the Republic Bank Limited under their Power to Make a Difference programme. This year's theme: Beyond the Blue: From the Ocean to our Tables, celebrates and explores the contribution of artisanal fishers and those involved on aquaculture to the nation's food security, income and livelihoods of coastal communities, economic development, and marine resource management. This as 2022, have been declared by the United Nations General Assembly the International Year of Artisanal Fisheries and Aquaculture (IYAFA 2022). The radio broadcasts and social media campaign will also examine the contributions of semi and industrial fishers to the sector.

The fishery sub-sector is essentially one of the oldest activities within the Blue Economy, providing healthy and nutritious food and livelihoods for many and foreign-exchange earnings for ocean-based nation states. Persons involved in fishing, from a subsistence to semi-industrial level, are considered small-scale or artisanal fishers. Each group experience their own unique challenges. Here in Trinidad and Tobago, the Fisheries sub-sector comprises mainly artisanal fishers, with large scale fishery (registered) accounting for 102 vessels with 418 associated fishers in 2019. Commercial small-scale (artisanal) fishing vessels are estimated to be around 2,525 with an associated 5,050 fishers according to the Ministry of Finance's Review of the Economy for 2021. In aquaculture, there are 42 registered commercial fish farmers (Ministry of Finance, Review of the Economy 2021). Fish brought ashore for the purpose of retail and wholesale, account for approximately 90% of the total landings in Trinidad and Tobago and This accounts for roughly 15% of agricultural production (Ministry of Finance, Review of the Economy 2021)

Season IV of the Beyond the Blue Experience will explore how the various layers of the value chain can be utilised to generate blue growth and analyse how the sector might be encouraged to contribute more to the Blue Economy. The campaign will look at how overfishing and under fishing affect marine ecosystems and how to fish in a way that is good for the environment.

The 2022 Beyond the Blue campaign runs for 20 weeks, and makes use of different media areas:

i. Radio broadcasts (20 five minute broadcasts on I95.5 and Radio Tambrin);

ii. Social media (10 one minute and thirty second video vignettes & 20 photography posts); and

iii. An Anthology of Newspaper Articles published over the 45-year history of the IMA.

Join us beginning August 15, 2022 and learn more.

INSTITUTE OF MARINE AFFAIRS
Republic Bank
Food security,
income and livelihoods,
economic development,
over-exploitation of fish stock,
negative climate change impacts
and much more ...
TUNE IN TO
Gem Radio 195.5fm on Tuesday mornings from 7:20
Radio Tambrin Tobago on Thursday mornings from 10:30

The Sea & Me

Sea & Me is a project that started in 2003 as part of the IMA's observance of its twenty-fifth year of operations. The IMA reached out to the children of its fenceline community of Carenage through the Standard Five classes of the Carenage Boys' and Carenage Girls' Government Primary Schools. Students were introduced to marine conservation – during the post-SEA (Secondary Entrance Assessment) class period of the third term of the school year. The objective of the project was to provide students with a greater respect and understanding of how the marine environment affects them and how they in turn influence it.

From April to June, the program lasts about eight weeks and includes learning through multimedia presentations, posters, field trips, and craft projects. The students learn about oceanography, animal and plant life, ecosystems such as mangroves and coral reefs, the tides, and marine pollution. In 2004, the project added two more schools: the Point Cumana R.C. School and the Point Cumana Government School; and in 2018, Sangre Grande Seventh Day Adventist Primary School and St Francis Primary School were added.

In 2020, this programme was significantly impacted by the COVID-19 restrictions as facilitators could not utilise the face-to-face engagement of the students. This compelled the Information Officers to reconsider how to effectively reach out to and engage this group, as well as the rest of the nation's students in general. Virtual engagement platforms and social media provided that new interface, with Kahoot and digital environmental jeopardy being some of the key tools used.

Two years later, in 2022, with the restrictions lifted, face-to-face interactions have returned but elements of the virtual Sea and Me arrangements still remain. This includes the use of the school smart board with students using their tablets while interacting and learning about environmental topics. The Sea & Me 2022 Program lasted for four weeks. World Oceans Day on June 8, 2022 marked the end of the sessions, which began on May 11, respectively. Some of the topics covered included marine pollution, coral reefs, careers in marine science, and the watery world of wetlands.

Part of the Sea and Me Programme includes a field trip that familiarise students with the work of the IMA. Unfortunately that activity has not yet resumed and to bridge the gap, the IMA has created engaging videos that highlight the work in the day of a marine scientist, which according to some students, is the "next best thing."

Over the years, the effectiveness of the programme has been measured. Students are given a series of questions pertaining to the marine environment at the beginning of the first session. At the last session, the questions are rearranged and given to the students after the delivery of a plethora of environmental topics over the course of the programme. In each school, a 55–65% increase in knowledge, has been recorded over the years. The IMA will continue to expand the programme to schools in coastal communities as resources enable. Teachers and children of Standard 5, stay tuned, we may very well turn up at your school in 2023.

THE BLUE CORNER

Ghost in the Sand - Atlantic Ghost Crab

Ocypode quadrata Fabricius

Visitors to sandy beaches are no doubt familiar with the sand-coloured crab with the white claws that scampers about searching for food near the tideline. It makes its burrow by digging with its claws, and sweeping-up the sand and later discarding it. The Atlantic Ghost Crab lives in burrows on the seashore. It is nimble and timid and will quickly retreat down its burrow if one gets too close. Ghost crabs are both a scavenger and a predator of the sandy coast, and they are crucial for the exchange of energy in beach ecosystems.

https://c2.staticflickr.com/8/7098/7397820306_fa1ac8d594_z.jpg

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