IMA NEWS

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Mangrove Forests of Trinidad and Tobago - Book launch

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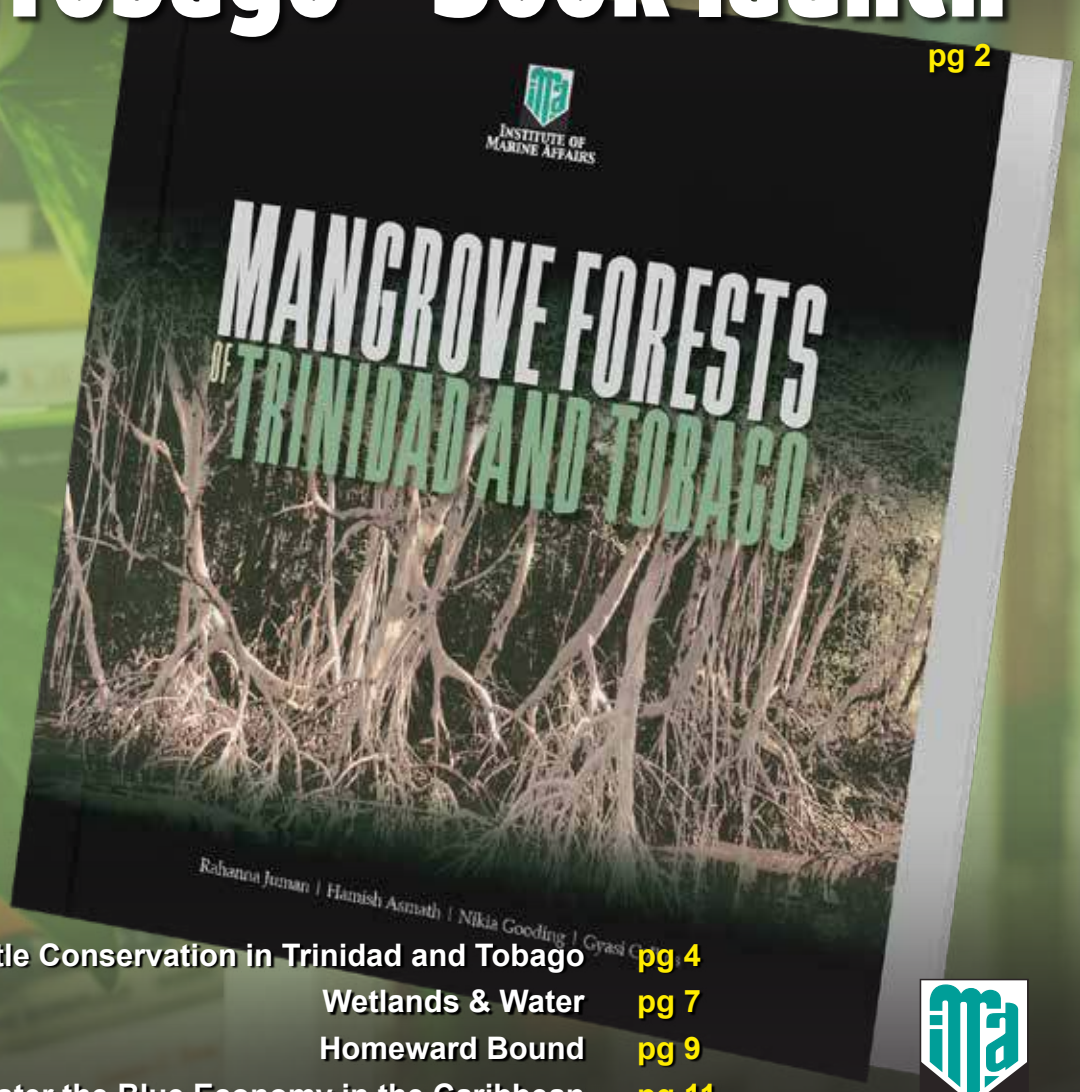

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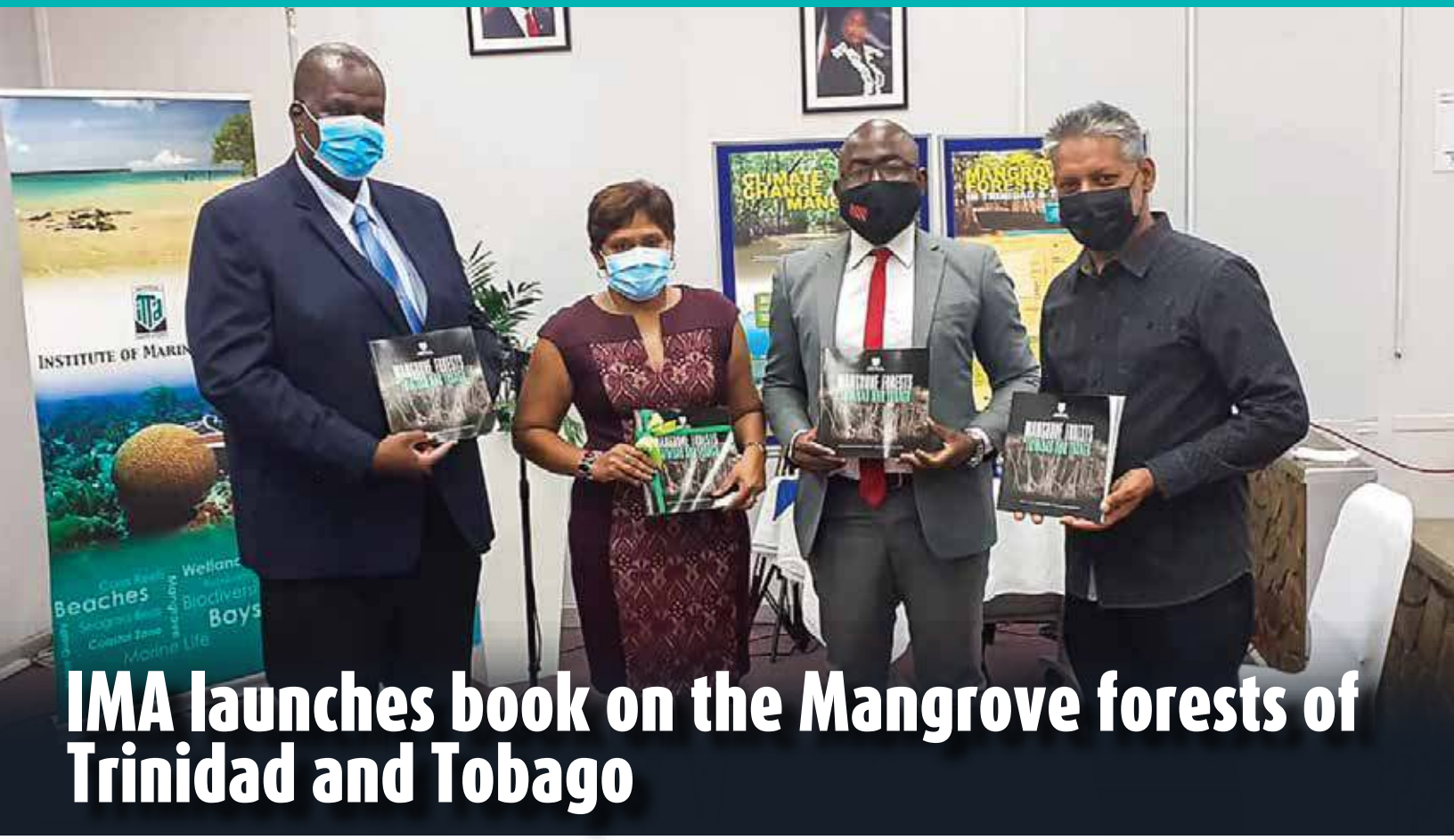
Institute of Marine Affairs



IMA launches book on the Mangrove forests of Trinidad and Tobago

Virtual book launch, Mangrove Forest of Trinidad & Tobago (L-R) (Mr. Fitzroy Harewood, President of Point Lisas Nitrogen Limited) (Dr. Rahanna Juman (Director Ag. of the Institute of Marine Affairs), (Mr. Hayden Alexander, Chairman of the Board of Governors at the IMA) (Senator the Honourable Clarence Rambharat, Minister of Agriculture, Land and Fisheries)

The Institute of Marine Affairs (IMA) unveiled its book, titled "Mangrove Forest of Trinidad" via a virtual launch on February 2nd 2021. February 2nd also marks the celebration of World Wetlands Day. Senator the Honourable Clarence Rambharat, Minister of Agriculture, Land and Fisheries, gave remarks at the event with the admonition that the conservation of our natural resources is critical in the wake of the ongoing coronavirus pandemic. He explained that the emergence of the coronavirus has demonstrated the need to protect our physical environment and noted that the research efforts of the IMA are crucial for him as Minister with responsibility for policy formulation and legislation. Explaining further that the onus in on citizens supported by government legislation and policy to conserve the country's natural resources, lest we destroy the very system that supports human life.

"Mangrove Forest of Trinidad" describes the various types of mangrove trees that are indigenous to Trinidad and Tobago and provides a comprehensive description of the geographical distribution of the wetland ecosystem on the twin-island Republic. Co-authored by the Director (Ag.) of the Institute of Marine Affairs, Dr. Rahanna Juman and a team of researchers from the IMA, Mr. Hamish Asmath, Ms. Nikia Gooding and Mr. Gyasi Collins; the publication explores the unique flora and fauna associated with mangroves inclusive of the special adaptations that mangrove trees develop within their environment. The publication also explains how carbon is sequestered in mangroves, explores the relationship between mangroves and their environment and concludes with strategies for conservation of the mangrove forests.

During the virtual book launch, Ms. Marie Hinds, Deputy Permanent Secretary of the Ministry of Planning and Development congratulated the authors on the production and release of the publication stating that it was the most appropriate medium to highlight the need for conservation efforts of mangroves, which at present, face several threats arising from unplanned development.

Other speakers included the Chairman of the Board of Governors of the IMA, Mr. Hayden Alexander who

IMA presents "Mangroves of Trinidad & Tobago" to NALIS
(L-R) (Krystal Ganaselal Information Officer/ Public Relations IMA) (Dr Rahanna Juman Director (Ag.) of the IMA) (Paula Greene, executive director (ag.) (Primati Persad, Director Educational Library Services Division (ag.) and Cherylann Quamina –Baptiste, Director Heritage Library Division (ag.) of NALIS.

briefly explained the relationship between mangroves and freshwater stating that mangroves "remain the more powerful nature-based solutions to provide us with fresh water as he touched on this year's theme for World Wetlands Day 2021 – Wetlands and Water." Funded by Point Lisas Nitrogen Limited (PLNL), President of the company, Mr. Fitzroy Harewood expressed the company's continued interest in safeguarding and conserving the environment. Providing a "sneak peep" into the details of the book, co-author Dr. Rahanna Juman delivered a brief power point presentation, which included a video demonstrating the geographic distribution of mangrove species throughout Trinidad and Tobago and the degradation of this important wetland ecosystem due to unplanned development. She also outlined how mangroves adapt and evolve with time.

One hundred and sixty-two copies of the book were presented to NALIS on 23 February 2021. As the National Authority on all libraries and information centres, NALIS would process the 162 copies and distribute to the 132 school library media centres (SLMCs) and 33 NALIS public libraries throughout Trinidad and Tobago. Committed to public education, Executive Director, Ms. Paula Greene was very enthusiastic not only to receive this publication for dissemination to the public, but also for a well-researched publication that has been authored by nationals of Trinidad and Tobago. NALIS is also the national repository of all publications written on Trinidad and Tobago and by citizens of our blessed twin-island republic.

The Great Conservation Story of the Leatherback Turtle in Trinidad and Tobago: Collaboration, Community and Conservation

Alana Jute
Institute of Marine Affairs

Photo: © Shane P. White/Minden

It is 10 pm and the moonlight is beaming in the horizon and the waves are crashing onto the shores of the North East Coast of Trinidad. There in the distance, what looks like a rock in the water, is not a rock at all but an ancient gentle giant of the sea – a female leatherback turtle (Dermochelys coriacea)- slowly making her way up the beach to begin digging a hole to lay her eggs. As this majestic creature lays her eggs, I will continue the great conservation story about the leatherback turtle in Trinidad and Tobago. The history of the leatherback turtle is one of our greatest conservation stories which started in the 1960s with one of Trinidad and Tobago's oldest clubs - the Trinidad and Tobago Field Naturalist Club (T&TFNC) - which will celebrate its 130 years anniversary in July 2021.

The year was 1963 and the Club received its first report about a leatherback turtle that was killed and poached for its meat, and its carcass was thrown and fed to the sharks out at sea. Leatherback turtle eggs were also taken by poachers during the nesting season. This report motivated one of the Club's members, the late Professor Peter Bacon, a former Senior Lecturer in the Zoology Department at The University of the West Indies (UWI) St Augustine, to organize some of the club members together with some of his UWI students to go to Matura Beach in 1964. With the help of villagers from Matura, they were able to finally see their first leatherback turtle making its way onto the beach to lay eggs.

In the following years, Professor Bacon and the club members started to patrol the beaches in the North East, collecting data on leatherback populations and their nesting times. They also collaborated with the Fisheries Division to collect data on turtles that were beached at the Toco and Mayaro Fishing Depots, which unfortunately, were offered for sale at various markets. This data had never been collected before and proved to be vital information in subsequent years.

During the turtle nesting season of 1970, the Club embarked on a turtle tagging project with assistance from the University of Florida, which saw 330 leatherback turtles tagged within a ten-year period ending in 1980. The Club was able to collect data from Matura, Fishing Pond, Las Cuevas, Big Bay at Toco, Grande Riviere, Tacarib in Trinidad and Grafton Turtle

Beach in Tobago. This motivated Professor Bacon to publish the very first academic paper on the leatherback turtles for Trinidad and Tobago entitled, **"Studies of the Leatherback Turtle, *Dermochelys coriacea* (L.) in Trinidad, West Indies"**

The T&TFNC, then having a great deal of data on the nesting numbers of the leatherback turtle on the North East Coast of Trinidad, decided to use this data to prepare a document in 1973 entitled **"The Status of Sea Turtles in Trinidad and Tobago"** for the Minister of Agriculture, Lands and Fisheries. The document contained recommendations that would be used to amend the existing Turtle Conservation Laws to better protect the nesting turtles on our beaches. These recommendations, which contained informative articles and photographs depicting the slaughter of turtles on Matura Beach, helped to formulate policy and legislation and publicise the leatherback turtle conservation. This was an unforgettable achievement for the T&TFNC.

The great work that was initiated by the T&TFNC led by Professor Bacon inspired and influenced a number of young people within and outside the North East Coastal Communities. Several other persons at various

Sir David Attenborough observes a Leatherback Turtle at the beach in Grand Riviere, Trinidad while filiming BBC's documentary series, Blue Planet II. Photo: BBC

government and non-government institutions started to conduct research on the leatherbacks and raised awareness on the importance of protecting this amazing marine reptile. Persons such as Ms. Molly Gaskin and Mrs. Karilyn Shephard well-known environmental activists and the founders of the Pointe-a-Pierre Wildfowl Trust (PaPWFT), a 53 year old non-governmental organization (NGO). Both ladies together with volunteers and members of the PaPWFT continued with the turtle patrols after the Club stopped patrolling in the 1980s.

In the early 1980s a lot more interest was garnered on sea turtles as researchers from The Institute of Marine Affairs, most notably Ms. Lori Lee Lum (now retired), conducted an impressive amount of research on the leatherback turtle from 1981 to 1983 at Matura Beach, where it was estimated at the time to have 30 leatherbacks nesting per year. Also, in 1983, Ms. Gaskin, a member of the Wider Caribbean Sea Turtle Network (WIDECAST), designed and co-authored the first Sea-Turtle Recovery Plan of Trinidad and Tobago, and conducted regular weekly patrols for research, information and tagging purposes at Matura Beach. She also produced a comprehensive book on Sea Turtles. Additionally, The PaPWFT had discussions with the community and an audio-visual education programme with field trips were organized and carried out with secondary schools from Toco to Rampanalagas.

In 1984, Ms. Lori Lee Lum presented the first National Report for Trinidad and Tobago which was delivered a year earlier at a Symposium in Costa Rica. Simultaneously, that year, it was discovered that the turtle population had been declining for years on the North East Coast of the Island because of sand mining in their habitats, large scale turtle egg poaching and slaughtering of the turtles for their meat. Although, the Ministry of Agriculture managed to stop the sand mining, the game wardens attached to the Ministry were not equipped to protect the turtles from being poached. Ms. Nadra Nathai-Gyan, an Officer attached to the Wildlife Section of the Forestry Division at the time, published a report in 1984 titled, "Marine Turtle Management in Trinidad and Tobago with Specific Reference to the Leatherback Turtles". This report highlighted the dangers that turtles faced and the difficulties that the wardens encountered while protecting them.

Following, the release of this report, Dr. Carol James, the Head of the Wildlife Division at Forestry in 1990

Rare daylight sighting of nesting leatherback sea turtle at Grand Riviere
Photo: Bill Cancellare Jr

engaged the communities in the Matura area in discussions about protecting the turtles. Dr. James recognized the seriousness of the problem they were facing and knew that they would have to collaborate with the community if they were to be successful in protecting the turtles. They held several meetings with the village elders, local council, youth groups, and the school groups. The process enlisted their support in the conservation effort and sought ways to demonstrate how the community could benefit from ecotourism. The Wildlife staff organized a nature guide training course for 11 young persons the graduates of whom formed what we know today as the **Nature Seekers**.

In an attempt, to conserve the leatherback turtles, the Government restricted access to Matura Beach and the nearby Fishing Pond during the months March to August with the introduction of special permits to access the beach in March 1990. In 1993 Dr. James and Mr Fourniller published **"Marine Turtle Management in North East Trinidad – A Successful Community Based Approach Towards Endangered Species Conservation".**

As we begin to know the names of several persons who have played a significant role in protecting the great leatherback turtles, let us remember that change is possible once we are willing to be open-minded to learn. When we know better, we can do better.

Wetlands & Water

Rahanna Juman PhD
Institute of Marine Affairs

Rincon Lagoon

We are in a growing water crisis that threatens people and our planet. Water use has increased six-fold over the past century and is rising by about 1% a year. We use more water than nature can replenish, and we are destroying the very ecosystems that water and all life depend on -wetlands.

Water covers about 70% of our planet, so we can be forgiven if we think that water is plentiful. However, freshwater—the stuff we drink and irrigate our farms —is incredibly rare. Only 3% of the world's water is freshwater, and two-thirds of that is tucked away in frozen glaciers or otherwise unavailable for our use. What's more, some 1.1 billion people worldwide lack access to water, and another 2.7 billion experience water scarcity for at least one month of the year **(https://www.worldwildlife.org/threats/water-scarcity).** To make matters worse, climate change will affect the availability, quality and quantity of water needed for basic human needs, thus undermining enjoyment of the basic rights to safe drinking water and sanitation for billions of people, warns the latest UN World Water Development Report (UNWWD), 2020.

According to the UNWWD Report 2020, climate change impacts such as the increasing frequency and intensity of extreme events – storms, floods and droughts; will aggravate the situation in countries already experiencing 'water stress' and generate similar problems in areas that have not been as severely affected. Furthermore, the report highlights that poor water management tends to exacerbate the impacts of climate change, not only on water resources but on society as a whole.

Wetlands, which include permanently or seasonally inundated freshwater habitats ranging from rivers to marshes, along with coastal and marine areas such as estuaries, lagoons, mangroves and reefs, sustain humanity and nature. Wetlands hold and provide most of our freshwater **(Ramsar@ramsar.org)**. They provide water storage, flood control, groundwater recharge and discharge, protection from storms and tsunamis, and water quality improvement. Basically, they filter the water that seeps into aquifers, helping to replenish this important water source.

Wetlands improve the quality of water flowing over and through them, a crucial function in nature's own water quality restoration process. Wetland vegetation slows water flow and captures suspended sediment thereby reducing turbidity; that is the murky quality that makes some waters unattractive for swimming and other recreation uses. Wetlands also filter out, trap, and naturally recycle nutrients like nitrogen and phosphorous that run off from the land and might be harmful in excessive quantities in surface waters. This filtration process saves millions of dollars that might otherwise be required to build and operate facilities to perform this function **(https://www.ramsar.org/news/wetlands-a-sustainable-solution-for-water-purification-and-security)**.

Wetlands can also capture pollutants like heavy metals, organic chemicals like pesticides and petroleum hydrocarbons, removing them at least temporarily and sometimes permanently from aquatic ecosystems. Unfortunately, when wetlands accumulate them, these harmful compounds can enter the food chain through wetland vegetation and wildlife, ultimately finding their way into fish and wildlife people consume.

In addition to providing clean freshwater for human use, wetlands protect us from water-related disasters such as floods, storms and tsunami. Wetlands help to lessen the impacts of flooding by absorbing water and reducing the speed at which flood waters flow. By holding back some of the flood waters and slowing the rate that water re-enters the stream channel, they can reduce the severity of flooding and erosion. Floodplain wetlands, particularly, have the capacity to temporarily store flood waters during high runoff after torrential rain events. Sometimes referred to as natural sponges that soak up water, wetlands actually function more like natural tubs, storing either flood waters that overflow riverbanks or surface water that collects in isolated ponds. As flood waters recede, the water is released slowly from the wetland soils.

Mangrove forests, in particular, reduce both storm surge and tsunami wave impact further inland (Marois and Mitsch, 2015). They can directly lessen wave action as their complex root systems enhance drag against wave energy. Across the world, coastal communities are aware of this particular protection afforded by mangroves. In India and the Philippines, villagers tell of how they have been protected from cyclones and typhoons in locations where mangroves were intact, but suffer where mangroves have been converted to shrimp farms or were otherwise lost **(Dahdouh-Guebas et al. 2005)**

Nariva Swamp

So, as we celebrated World Wetlands Day 2021, the IMA launched its new book on "Mangrove Forests of Trinidad and Tobago." Written in simple and non-technical language, the book is a compilation of primary information generated by the IMA and other published literature. It is hoped that once citizens understand the important role mangrove forests play to our economy, safety and sustainability by providing clean water for human use and in protecting us against natural disasters, they would become meaningfully engaged in its conservation. We must urgently step up the protection, sustainable management and restoration of wetlands as an essential element in integrated policies and actions for a healthy planet.

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UN World Water Development Report 2020

IMA represents in the Homeward Bound Initiative

IMA's very own Research Officer, Coral Reef Ecologist Dr Anjani Ganase, has been accepted to be part of the sixth Cohort of the Homeward Bound (HB) Leadership Programme. Homeward Bound is a leadership initiative that aims to increase the influence and impact of women in decision making that shapes our planet. This esteemed programme, brings together 1000 woman in STEMM (Science, Technology, Engineering, Math and Medicine) from around the world to develop the skills needs to lead on issues of climate change and gender discrimination. Every year HB selects 100 women from around the world to join an all-female programme to draw attention to, and improve, the low representation of women in leadership positions in science. The yearlong programme will take place online and culminates in a three-week intense training on expedition to Antarctica in March 2022. During this time, the HB participants will be trained in the tools of leadership, and the programme will facilitate the creation of networks and encourage collaborations on a variety of projects and issues that are affecting the health of our planet. Over the last four years, Homeward Bound has led four cohorts of women through this ground-breaking programme, including representatives from our neighbouring islands, Jamaica and Barbados. With a fifth cohort underway and due to depart for Antarctica in November 2021, the sixth cohort is currently working through the COVID pandemic.

Anjani is a marine biologist specialising in applied research in coral reef ecology at the Institute of Marine Affairs. Her role at the IMA is in monitoring the health of coral reefs in Trinidad and Tobago, and guide on strategies to mitigate the impacts of human activity, such as overfishing, marine pollution and coastal development. Components of her work includes developing strategies to build coral resilience to the impact of climate change. This includes researching coral restoration strategies along with other management and mitigation activities to enhance coral recovery. A large part of her work involves working with community groups to build more environmental stewardship toward coral reefs. She also engages in outreach and education activities to increase the awareness of the value of coral reefs and the significant threats they face. Previous outreach projects that Anjani has worked on includes the XL Catlin Seaview Survey, a global coral reef mapping project that developed the Global Reef Record, a publicly accessible online repository of reef data from coral reefs around the world. In Trinidad and Tobago, she was the Project Officer for the Maritime Ocean Collection, the first online collection of Street View imagery of Tobago's reef, a project in which IMA is a partner.

Why Climate Change needs Caribbean leadership?
Trinidad and Tobago should be in a position to lead climate change initiatives in the Caribbean. Brilliant Caribbean academics were instrumental in putting forward the position of small island developing states in the IPCC reports, including Professor John Agard (TT), Professor Michael Taylor (Jamaica) and Professor Leonard Nurse (Barbados). The challenge now is to implement practical approaches and solutions to the threats and to create a science of resilience. This requires leadership on the ground, in homes and communities, in private and public sectors that will bring the national conversation about climate change front and centre. IMA's area of focus considers that the global ocean resource is greater than the land. For Trinidad and Tobago, our Exclusive Economic Zone extends into the Atlantic, and is 15 times the size of our island mass, and there is an urgent need to prioritise the protection and sustainable management of our blue economy, as we shift away from fossil fuels. This year marks the start of the Decade of Ocean Science Sustainable Development (2021-2030) and IMA hopes to lead by example to encourage future generations to become marine scientists and seek solutions for improving our ocean health and resilience that will, consequently, improve our island way of life.

For more information on Homeward Bound:
https://homewardboundprojects.com.au/

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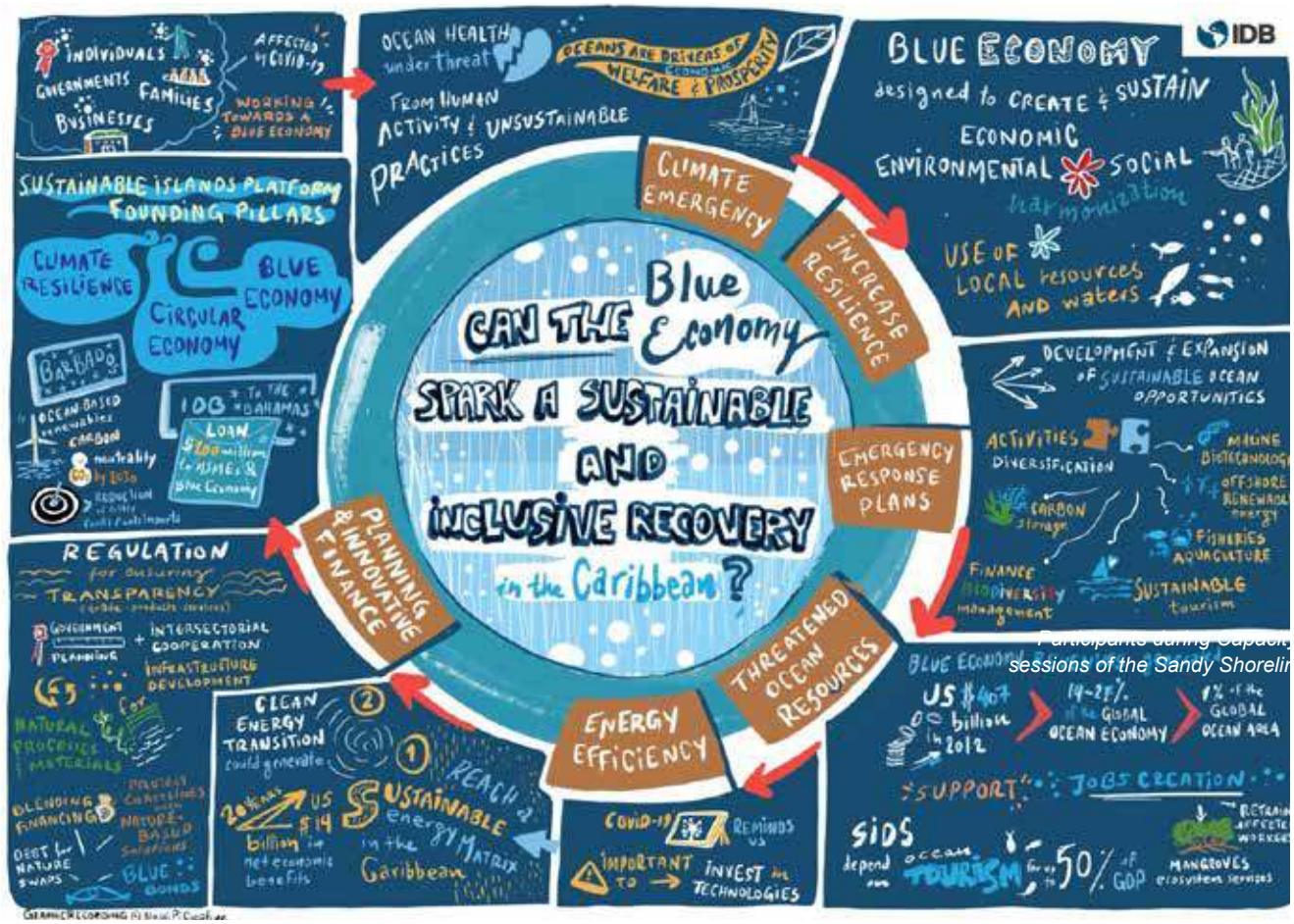

Participants during Capacity sessions of the Sandy Shoreli

Thanks to Athanasia Panagiotidi, Catalina Aguiar and Andrea García Salinas for producing this infographic.

IMA partners with the Inter-American Development Bank (IDB) to Foster the Blue Economy in the Caribbean

Rahanna Juman PhD
Institute of Marine Affairs

Across the world, there is growing awareness about the blue economy as a potential source of economic diversification and growth, and as a development paradigm, the blue economy has gained traction and favour in small island developing States (SIDS) including those of the Caribbean. The blue economy construct centres on developing ocean-based activity while emphasising improved human well-being, social justice and equity, ensuring conservation of natural resources and ecological sustainability. The Caribbean is well suited for building a strong blue economy because of the relative abundance of its maritime resources. Given the impact of the COVID 19 pandemic on the region's main economic sectors, diversification through the blue economy has become an even more pressing priority for national governments and regional agencies.

The private sector has an important role to play in preserving the health and sustainability of ocean ecosystems while producing economic value. Science and new cutting-edge technologies applied to the ocean space hold the potential to diversify into new sectors such as marine aquaculture, algaculture and agriculture, waste disposal, bioprospecting, marine biotechnology, ocean renewable energy, deep sea mining, and high-tech marine services. If effectively supported, these emerging industries can boost the resilience of these economies to climate-change related events.

In this context, the IDB Compete Caribbean Partnership Facility (CCPF) is poised to invest US$4.5 million to support private sector-driven projects in the blue economy in the Caribbean, as well as policy reforms in

the blue economy space that can help unleash growth. In order to stimulate innovation and investment in the private sector, a Blue Economy Innovation Challenge was launched in partnership with the Institute of Marine Affairs on February 25, 2021.

The Innovation Challenge is looking to provide support to selected Caribbean start-ups and innovative firms to create new products and services, improve their processes and scale their commercial models rooted in cutting-edge technologies that contribute to the sustainable management of oceans and coastal resources (or marine and river ecosystems) as the basis for livelihoods, food security and economic development of the Caribbean region.

This call aims to encourage start-ups and private sector firms to engage in hands-on exploration of innovative solutions to solve pervasive challenges and build a pipeline of projects involving disruptive technologies within the Blue Economy that can be piloted in the Caribbean. These challenges include but are not limited to- sustainable fisheries, aquaculture, marine ecotourism, fish traceability, waste disposal, green coastal infrastructure and real time data collection. IMA will play a key role in managing the call for proposals and evaluating the projects that will be selected competitively in compliance with the CCPF operating regulations.

For more information on the Compete Caribbean Blue Economy Innovation Challenge, please go to **www.competecaribbean.org**

Water Quality Testing at Debe Secondary School

Shane Ramsammy IMA technician gives introduction of use of an YSI meter (Yellow Spring Instrument Company)

Students preparing for use of equipment at Debe Secondary School

The Institute of Marine Affairs (IMA) in collaboration with the Environmental Management Authority (EMA) conducted a water quality testing exercise at the Debe Secondary School on March 17 2021. The exercise was conducted to assist students of the form six Environmental Science class with their School Based Assessment, which is a component of the Caribbean Advance Proficiency Examination. The IMA and EMA provided "hands on" experience in testing for various water quality parameters. Students were told at the beginning of the activity that water quality testing is an important part of environmental monitoring. When water quality is poor, it affects not only aquatic life but the surrounding ecosystem as well.

The students tested two ponds, intended for aquaculture use, for nitrates, phosphates, dissolved oxygen concentration, pH (potential of hydrogen which is a measure of how acid or alkaline a liquid is), temperature and turbidity.

IMA scientists continually monitor these water quality parameters to help differentiate between levels due to natural processes and those from human impacts. These sampling and analysis activities provide data that would inform any intervention to arrest environmental degradation and restoration and rehabilitation plans.

IMA Supporting budding young scientist in the Classroom - Beach Profiling!

Despite restrictions related to the public health orders arising from the Covid 19 pandemic, the IMA's Oceanography and Coastal Processes Department continue to assist students of the Bishop Anstey High School East in the collection of beach profile data as part of a School-based assessment required for their regional examinations. In the past, IMA researchers would have accompanied the students on the field and demonstrate to them how data is collected. The students had the opportunity to interact with the natural environment and with the researchers. On this occasion, the beach profiling activity was recorded and streamed to a classroom on February 10, 2021. In the live video staff demonstrated the collection of field measurements such as beach gradient, wave height, frequency, direction and wind speed. A multimedia presentation was also delivered which focused on wave processes, coastal features and deformation.

Welcome to the IMA, Mr. Khaliem Sajad

Mr. Khaliem Sajad assumed the position of Operations Manager effective February 1, 2021.

Mr. Sajad is a Project and Construction Management professional with over sixteen (16) years' experience in the construction industry. He is a graduate of the University of the West Indies with a Master's of Science Degree in Civil Engineering and a Bachelor's of Science Degree in Civil Engineering. He is also a registered Engineer with the Board of Engineering of Trinidad and Tobago (BOETT) and a member of the Association of Professional Engineers of Trinidad and Tobago (APETT). Mr. Sajad also holds certification in Project and Contract Management and brings to the IMA a wealth of experience in project management, construction management and procurement."

The Board of Governors is confident that Mr. Khaliem Sajad is the best candidate to aid the IMA in realising its strategic goals.

The Board also wishes to record its appreciation to Mr. Zaheer Khan for his invaluable contribution as Officer in Charge of the Operations Department from April 2020 to January 2021. Thank you for stepping up to serve!

THE BLUE CORNER

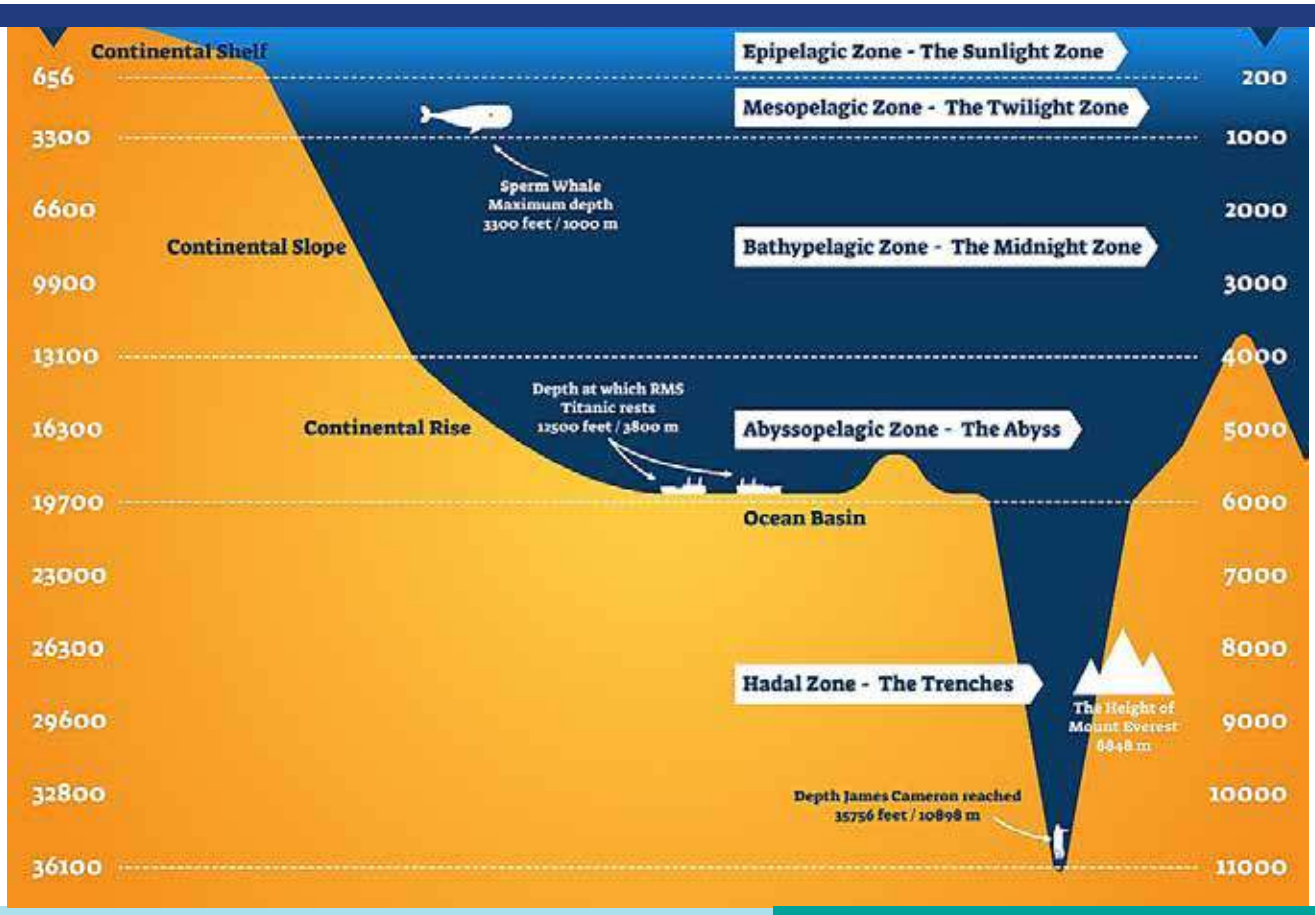

Image credit: VectorMine/Shutterstock.com

How low can you go?

Have you ever wondered how deep our oceans are?

The ocean covers more than 70% of the Earth's total surface and contains roughly 97% of all its water. Measuring about 361.9 million square kilometres, it is a massive continuous body of salt water, so large in fact, that oceanographers estimate that less than 20% has been explored.

IMA NEWS

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