INSTITUTE OF MARINE AFFAIRS

Annual Administrative Report

October 2019 - September 2020

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IMAgovTT

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About this Report

The Institute of Marine Affairs (IMA) Annual Report 2019-2020 has been prepared in accordance with section 66 A-D of the Constitution of the Republic of Trinidad and Tobago and in accordance with Section 11 1-G of Act No. 13 of 1990 entitled the Institute of Marine Affairs Act.

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Please visit our website at www.ima.gov.tt to access an electronic version of our annual report. We also welcome your feedback and encourage you to submit your comments to imadirector@ima.gov.tt

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THE INSTITUTE
OF MARINE AFFAIRS
ANNUAL ADMINISTRATIVE REPORT
FOR THE FISCAL YEAR 2019/2020

CHAIRMAN'S REMARKS

The Institute of Marine Affairs (IMA) is pleased to share our 2019-2020 Annual Administrative Report. This report provides a detailed account of our performance during fiscal 2020: our strategic direction; key areas of our research; and outreach activities. It also details our many efforts to increase value for our stakeholders and contribute to marine and coastal conservation in Trinidad and Tobago.

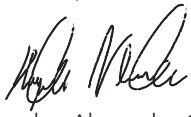
Like many other organisations, the novel Coronavirus SARS-COV-2 pandemic tested the agility of the Institute and its ability to deliver regardless of constraints; constraints not simply at the organisational level, but national. It tested our problem solving capabilities, the robustness of our business continuity infrastructure and the resolve of our staff to rise above limitations to meet the needs of the government and people of Trinidad and Tobago in the provision of research and policy advice to enable solid policy and decision-making. The Board of Governors (BOG) is pleased to report, that both staff and infrastructure rose to the challenge.

Early in fiscal 2019, the BOG commissioned the development of a Telecommuting Policy to enable certain categories of staff, using our Information and Communications Technology (ICT) infrastructure to work remotely, for up to two days a week. By October 2019 that policy became a fixture in the IMA's operations, which unknown to us, laid the foundation for our successful functioning, when, beginning 16th March 2020, the national policies in response to the COVID-19 pandemic necessitated all of us to stay in place, isolate, and work from home. Trinidad and Tobago, like other nations across the globe, felt the pangs of despair and concern as death and uncertainty ensued in the face of a virus that took the lives of many whom we knew to be vulnerable, and indeed the not so vulnerable loved ones and friends, as well. Declared a zoonotic disease, the COVID-19 virus became a living example of devastation possible if humanity does not respect the boundaries of the natural world, preserve and sustainably use natural living resources found within our green and blue spaces in a manner that conserves both biodiversity and their habitats. Our respectful engagement with the natural world prevents not only cross species contamination and transfer of disease, but enables us to study different organisms and their special characteristics for what may be harnessed for utilisation in the areas such as pharmaceuticals, personal care products, and more.

Fiscal 2020 saw us exploring the possibility of blue economy and blue assets as a viable platform to support economic diversification, implementing initiatives under the UNDP/GEF funded Caribbean Large Marine Ecosystem (CLME +) which is a collaborative platform providing access to information, knowledge, resources and tools to support a healthier marine environment in the Caribbean and North Brazil Shelf Large Marine Ecosystems; the erecting of infrastructure in support of the Mariculture research programme, and with the aid of the United Kingdom High Commission and in collaboration with The University of the West Indies' St Augustine Centre for Innovation and Entrepreneurship (STACIE), the conduct of study on the potential of mangrove forests to capture and store carbon as part of a viable strategy to reducing the nation's carbon footprint, and more.

Despite the challenges the research and public engagement continued. Researchers conducted whatever monitoring of our marine and coastal spaces possible under the national COVID-19 restrictions with special leave of the authorities in a bid to furnish the State of the Marine Environment (SOME) Report for 2020. And our information officers, pivoted and utilised software that enabled the virtual engagement of a number of stakeholder groups: students; academia; the business community; civil society; and more.

The Board of Governors (BOG) therefore wishes to congratulate the Management of Staff of the IMA for their commitment to the work and the mandate of the organisation for fiscal 2020. It is our expressed hope that as you continue to chart the way to success, your sacrifices will redound to not only the success of the organisation, but that of this great nation, as well.



Mr. Hayden Alexander Chairman,
Board of Governors Institute of Marine Affairs
IMA Annual Administrative Report 2019 - 2020

DIRECTOR'S REMARKS

This report provides an insight into the activities and accomplishments achieved under the reporting period.

The COVID-19 pandemic though disruptive, had some pluses. National restrictions curtailing the movement of persons in a bid to reduce and manage infections meant that the Institute had to review its operations and utilise ICTs to collaborate, meet, share ideas, and enable analysis and decision making, and much more. The restrictions allowed for the recovery of many coastal and marine spaces, since for the most of 2020, beaches were off limits to members of the public except for individuals involved in national coastal and marine surveillance activities and fishing interests. The IMA, too, is grateful to the authorities for having approved and allowed our access to beaches and water courses so as to facilitate our ongoing research and monitoring activities. The curtailed activities also gave IMA researchers the much needed time to finalise outstanding technical reports arising from research or investigations of environmental incidents in previous periods.

Through it all, the IMA did not lose sight of the goal post. The economic fallout of the COVID-19 pandemic with subsequent upending of global supply chains has emphasised the need for expanding our blue economy and leveraging our marine resources to improve national food security. The Institute, funded by the Public Sector Investment Programme (PSIP), will utilise the appropriate technology to create a demonstration facility for the culture of marine organisms (mariculture). The overarching aim is the development of a working business model for the controlled and consistent production of various marine aquatic species (fish, shrimp, bivalves) with the expectation that the output would create investment opportunities for the private sector and support sustainable coastal livelihoods and enhance food security. In August 2019, IMA began construction of a Mariculture Facility which was completed in June 2020. The system will initially be used for the holding of broodstock for marine finfish such as the Southern Red Snapper ***(Lutjanus purpureus)*** and Lane Snapper ***(Lutjanus synagris)***. However, for the long-term the IMA will be looking at marine finfish egg incubation and production, larval rearing and fingerling production as well as nearshore and offshore cage culture. Additional systems in the Mariculture Facility for shellfish culture and algal production, are also being considered.

Like the Mariculture Facility, a Tobago Field Station is another major PSIP project with large-scale implications. Essentially an IMA research and public education facility on the island, the project will enhance the existing cooperation and collaboration between the Divisions and Departments of the Tobago House of Assembly and the Institute and provide avenues where upcoming scientists and nature enthusiasts on the island can partner with us in conservation efforts on the island. Negotiations with the THA for a piece of land in Pigeon Point for the project were concluded and a lease agreement was prepared.

The IMA is also seeking to add to the body of knowledge on the carbon sequestration capabilities of mangroves as a climate change mitigation strategy as this nation, like other hydrocarbon producing nations, seeks to reduce its carbon emissions in support of the global target of net zero emissions by 2050. With funding from the United Kingdom High Commission and in partnership with The University of the West Indies, it is expected that the results of this study will provide us meaningful insights.

Fiscal 2020 also saw progress in studies related to the CLME+ Project, which is a 5-year project (2015-2020) implemented by the United Nations Development Programme (UNDP) and co-financed by the Global Environment Facility (GEF). Participating countries from two large marine ecosystems namely- the Caribbean Large Marine Ecosystem; and the North Brazil Shelf Large Marine Ecosystem collaborate on management strategies for shared living marine resources within their jurisdiction. In Trinidad and Tobago, our efforts surrounded the study of the impacts of land-based runoff, specifically fertilisers and pesticides, on the waters and aquatic life surrounding the Caroni River Basin area. Though somewhat hindered by national restrictions on in person meetings, the IMA and our strategic partners, the University of the West Indies were able to engage food crop farmers who planted plots near the Caroni River Basin early in fiscal 2020.

Our monitoring of coral reefs, bathing water quality, and our contributions to the ongoing activities as the United Nation's Environmental Programme's (UNEP) Regional Activity Centre for the Land Based Sources of Pollution under the Cartagena Convention continued.

What's noteworthy too, is that much of our engagement of the public persisted using either virtual platforms and/or via radio broadcasts on Gem 195.5, Sangeet 106, and Radio Tambrin. The fiscal also brought the commissioning of the IMA's integrated environmental incident software mobile application platform, SeaITT, for the reporting of the lionfish, marine the invasive species and other environmental incidents as oil spills, algal blooms, mammal standings and more. This integrated software platform and mobile application also facilitates the capture data pertaining to the country's marine environment and provides an avenue for IMA to process information collected from users as well as disseminate curated content to users on IMA's activities and the country's marine environment.

The Institute is grateful to the many grant funding agencies and corporate sponsors who enabled our work to proceed during the period, despite the many obstacles; all of it is testament to the commitment of our valued stakeholders and the indomitable human spirit that refuses to surrender in the face of challenges.

Our accomplishments, too, would not have been possible without the dedicated aid of my fellow managerial colleagues and staff. I thank all of them for their unwavering support and commitment to the task.

May 2021 and beyond, bring us all greater fortunes!

Rahanna Juman

Dr. Rahanna Juman
Director. (Acting)
Institute of Marine Affairs

ABBREVIATIONS AND ACRONYMS

APIC	Association for the Promotion of International Cooperation
β-gal	Beta-galactosidase
BBNJ	Biodiversity in Areas Beyond National Jurisdiction
BWM	Ballast Water Management
CARICOMP	Caribbean Coastal Marine Productivity
CEHI	Caribbean Environmental Health Institute
CMA	Caribbean Marine Atlas
CREWS	Coral Reef Early Warning System
EAP	Employee Assistance Programme
ESA	European Space Agency
F&ARP	Fisheries and Aquaculture Research Programme Freedom of Information
FOI	Freedom of Information
IFREMER	Institut français de recherche pour l'exploitation de la mer (French Research Institute for Exploitation of the Sea)
GEF	Global Environment Facility
GEF-SGP	Global Environment Facility - Small Grants Programme
GIS	Geographic Information Systems
IAS	Invasive Alien Species
ICC	International Coastal Cleanup
ICT	Information Communication Technologies
IFPAMTT	Improving Forests and Protected Area Management in Trinidad and Tobago
ICRI	International Coral Reef Initiative
ICZM	Integrated Coastal Zone Management
IMA	Institute of Marine Affairs
LB-IMTA	Land-Based Integrated Multi-trophic Aquaculture
LBS	Land-Based Sources
MSP	Marine Spatial Plan
NASA	National Aeronautics and Space Administration
NETMPA	Northeast Tobago Marine Protected Area
NSDI	National Spatial Data Infrastructure
NCCP	National Coastal Conservation Programme
NOSCP	National Oil Spill Contingency Plan
OCP	Oceanography and Coastal Processes Programme
ONPG	ortho-Nitrophenyl-β-galactoside
PAHs	Polycyclic Aromatic Hydrocarbons
PBBS	Port Biological Baseline Survey
PLNL	Point Lisas Nitrogen Limited
PSIP	Public Sector Investment Programme
RAS	Recirculating Aquaculture System
SEA	Secondary Entrance Assessment
SMAP	Soil Moisture Active Passive mission
SMOS	Soil Moisture and Ocean Salinity
UNEP	United Nations Environment Programme
UTT	The University of Trinidad and Tobago
UWI	The University of the West Indies

PART 1
STRATEGIC DIRECTION & PHILOSOPHY

VISION STATEMENT:

To be the Centre of Expertise for Marine Scientific Research in the Caribbean Region.

MISSION STATEMENT:

To conduct and foster research in coastal and marine policy, marine sciences and related matters and to provide advice in support of the sustainable development and management of the coastal and marine living and non-living resources of the Caribbean Region.

BACKGROUND:

The Institute of Marine Affairs (IMA) was established under Chapter 37:01 (as amended) of the Laws of the Republic of Trinidad and Tobago with the primary objective of conducting and fostering research and providing advice to support the sustainable management of the coastal and marine areas and resources of Trinidad and Tobago. The IMA is the one of the oldest multidisciplinary coastal, marine and environmental research organisation of its kind in the Caribbean Community (CARICOM) and as a result offers its services to the English speaking territories of the Caribbean.

The Institute has been formally recognised as one of two Regional Activity Centres (RACs) established by the United Nations Environment Programme - Caribbean Environment Programme (UNEP/CEP) for the Protocol on the Prevention, Reduction and Control of Marine Pollution from Land-Based Sources and Activities (LBS Protocol, 1999).

The IMA is mandated to collect, analyse and disseminate data and information relating to the economic, technological, environmental, social and legal developments in marine affairs generally, and to formulate and implement specific programmes/projects to achieve its overall objectives.

The specific objectives of the IMA as detailed in the legislation are to:

a. Develop and implement programmes and projects that translate marine and related policies of the Government of the Republic of Trinidad and Tobago into activities that contribute to national development;
b. Develop and execute programmes and projects that foster and encourage regional and international collaboration in the exploitation of the marine and other related areas of the environment;
c. Promote a public understanding of and an appreciation for all aspects of the marine and related environment;
d. Stimulate and advance the conduct of marine scientific research in Trinidad and Tobago.
e. Promote the utilisation and conservation of marine resources for the economic and social benefit of Trinidad and Tobago and to enhance the national capabilities; and
f. To do such things incidental or conducive to the attainment of the above objects.

The functions of the IMA include the:

a. Conduct of research and development on the marine and related resources of Trinidad and Tobago, the Caribbean and adjacent regions;
b. Conduct of research and development on the marine environment and other areas that impact upon the environment of Trinidad and Tobago, and adjacent regions;
c. Study of multiple uses of the sea and coastal zones, resources and use potential in Trinidad and Tobago, and adjacent regions and the evaluation and promotion of such studies to minimise conflicts which may result from such uses;
d. Collection and dissemination of information on economic, social, technological, environmental and legal developments in marine and coastal zones of the Caribbean and adjacent regions;
e. Provision information and advice to the government in its formulation of policies relating to the marine and other related aspects of the environment;
f. Response to technical enquiries and questions by policy-making organs of the government, private sector organisations and individuals;
g. Arranging of training courses and projects that foster and encourage regional and international collaboration in exploitation of the marine and related environment; and
h. Provision of advice on development and optimum utilisation of the marine and coastal resource potential of Trinidad and Tobago; and to take action necessary or expedient for proper performance of its functions.

The Information Centre (IC) supports the overall mandate of the IMA to conduct and foster research and to provide advice for the sustainable management of the coastal and marine resources of Trinidad and Tobago, as articulated in Act No. 13 of 1990 of the Laws of the Republic of Trinidad and Tobago.

Pursuant to Section 4 (c) of Act No. 13, 1990, which states, "to promote public understanding of and appreciation for all aspects of the marine and related environment", the Information Centre (IC) supports the Research Programmes of the IMA through the implementation of innovative public education and communication strategies and information dissemination.

STRATEGIC DIRECTION & PHILOSOPHY

A strategic plan for the organisation was developed for the period 2019-2024 and approved by the Ministry and Planning and Development and the Cabinet of Trinidad and Tobago. It is predicated on a vision that places the IMA alongside the best in marine science and research globally. Survival of the organisation domestically and regionally requires that the IMA brings to bear cutting edge technology, advice, and solutions on challenges faced by the Region. Therefore, the IMA must raise it competencies and capacity so that it can be positively benchmarked against the best in the world.

The Institute's Strategic Plan 2019-2024 has been developed with two main parameters in foci: the Government of Trinidad and Tobago's National Development Strategy - Vision 2030 and the maximisation of the research capacity of the organisation for the benefit of the country. It is hoped that the work of the Institute will be brought to bear on marine environmental and socioeconomic issues impacting the twin island Republic, now and in the future.

In the next five years, the IMA will seek to leverage advances in ICT to bring about innovations in the manner in which it collects and analyses data and enlists public participation, where possible, in data capture and marine conservation in a bid to improve the timeliness and reach of our work. ICT are revolutionising the way research is conducted enabling forecasting, trend analysis and the development of appropriate modelling capabilities that will contribute to the honing of the policy advice and prescriptions the IMA can provide. It is envisioned also, that greater citizen and stakeholder participation will lead to improvements in citizens' knowledge of our marine environment and more so their willingness to act, to conserve our biodiversity and marine areas.

As the Regional Activity Centre (RAC) for the United Nations Environmental Programme (UNEP), ICT also offers the IMA additional benefits. Arising from our access to regional data, ICT will enable the development of big data sets for the Region. These "big data" sets once analysed, can lead to the discovery of new information on environmental trends that discriminate human disturbance from long-term natural variation; and can be used to forecast future scenarios for planning purposes. Our aim; better policy advice for the Region and more specifically, Trinidad and Tobago.

The IMA is sensitive also to the economic opportunities that our coasts and oceans offer not only for coastal communities, but also the nation as a whole. Research activity therefore seek to support the development of marine based business both at a micro and macro level and bring about the development of a true Blue Economy for Trinidad and Tobago; that is, socioeconomic development that is not only sustainable but in harmony with our marine environment. Research must therefore benefit the people for whom the research is undertaken.

Strategic Intent & Solution

1. To leverage marine science to foster environmentally sustainable national development with a specific focus on coastal communities.

The IMA utilised the Value Chain Analysis of the organisation and the Balance Scorecard approach to review where value can be created, existing assets optimised and how the organisation can prepare itself to take advantage of emerging opportunities.

The organisation must mitigate the threat of budgetary constraints by improving its ability to source grant funding and improving its visibility and perceived worth to the Government and national and global communities. It must reduce its cost structure, utilise a value for money approach and optimise available

resources to create value. The IMA must seize opportunities that present themselves in terms of environmental trends and the employment of ICT technologies to create engaged communities and better, faster real time data collection, youth unemployment and urbanisation to demonstrate not only its value but its ability to seize the future today. The organisation's outlook must be continuously futuristic, analysing the environment for opportunities, synergies and possible partnerships that will bring process efficiencies and a reduced cost structure in the work of the organisation.

The strategic planks for the next five-year period are based on improving long term stakeholder value, improving efficiencies. As a Statutory Body, whose principal stakeholder is the GORTT and secondary partner is UNEP, the Institute's strategic (stakeholder focused) and financial objectives lie in the following goals and objectives.

The strategy for the 2019-2024 period is therefore built upon four strategic planks or priorities for the period 2019-2024.

A. IMPROVED LONG-TERM STAKEHOLDER VALUE THOUGH VISION 2030 ALIGNMENT AND THE FOSTERING OF INTERDISCIPLINARY RESEARCH WITH LINKAGES TO INDUSTRY

The IMA will provide the science that enables sound government policy decisions for the management of Trinidad and Tobago's marine and coastal environment and biodiversity. The work of the Institute will support the government's Vision 2030 strategic plan in two areas:

- The thrust towards placing the environment at the centre of social and economic development; and
- The thrust towards creating globally competitive businesses.

The Institute will support the first by providing policy advice and recommendations based on sound science to support: climate change vulnerability assessment leading to improved climate change resilience; improvements in the quality of marine and coastal ecosystems and their sustainable use; strengthened environmental governance and management systems; and a more environmentally aware citizenry.

The IMA will also increase the relevance of its science and advice to its stakeholders by pursing and promoting an interdisciplinary approach to research so as to arrive at a comprehensive picture of the country's marine and coastal environment in support robust of decision making. As the economic benefits of the marine environment become ever more apparent, an interdisciplinary approach to its study leading to the sustainable management of the ocean's resources for the livelihood of all (the blue economy) becomes critical. The IMA will therefore foster a supportive environment for interdisciplinary research and will actively seek out opportunities to partner with local and international organisations so that Trinidad and Tobago is equipped to address its environmental challenges. As regards the second Vision 2030 goal of the building of globally competitive business, the IMA will support this by creating linkages between science and industry in a bid to support business development and ultimately sustainable livelihoods.

B. GROWTH AND DIVERSITY OF RESEARCH FUNDING THROUGH GRANT FUNDING AND CORPORATE SPONSORSHIP

Funding of the marine research from the consolidated fund is expected to decrease owing to declining economic fortunes as Trinidad and Tobago undergoes economic adjustments arising from the structural changes in the global petroleum industry. The Institute will therefore seek grant and corporate sponsor funding in order to assist in supporting and expanding its research initiatives for the benefit of the country and the region.

C. OPERATIONAL COST REDUCTION AND OPTIMISATION OF RESOURCES TO ACHIEVE VALUE

Managing cost, with a value for money, operational approach to operations is another of the strategies that the IMA will employ in order to optimise the resources available to the organisation so that the people of Trinidad and Tobago achieve the greatest value for its investment in the organisation. Using 2017-2018 as a base, an analysis of the Institute's cost structure and break-even point was conducted. Based on a structure of 46% and 54% - direct and indirect cost respectively, in order to break-even, it was revealed that following strategies, either singly or in combination, must be adopted in order for the Institute to remain financially viable.

1. Increase subventions by 20%
2. Increase project revenue by 3418%
3. Reduce Direct Costs by 35%
4. Reduce Indirect Costs by 31%

D. STRENGTHENING OF EXTERNAL ENGAGEMENT

The IMA will increase the visibility of the organisation and demonstrate its relevance to sustainable development of the country. The building of the Tobago Field Station will not only advance the research in this locale but add to the national visibility and relevance of the Institute as it aligns with the island's nature tourism (ecotourism) thrust.

STRATEGIC OBJECTIVES AS OUTLINED IN THE STRATEGIC PLAN 2019-2024

To make strategic contributions to sustainable socio-economic development of Trinidad and Tobago and the region by leveraging marine science, coastal and biodiversity conservation for decision and policy making.

OBJECTIVES
Organisational Strategic Objectives

1. To build long term value for the GORTT by 100% through the alignment of the IMA's output to stakeholder's strategic goals and objectives and by responding to at least 85% of stakeholders' requests within a 24 to 48 hours.
2. To build long term value for UNEP as the Regional Activity Centre (RAC) for the Caribbean Environmental Programme of UNEP by delivering at least 60% of the Institute's obligations to the RAC on a phased basis over a two-year period.
3. To create and build the stakeholder knowledge of the Institute as competent, reliable and efficient by employing at least 85% zero rework target and quality standards for all documents for review by the principal and other stakeholders
4. To contribute to the future and long term planning and sustainability objectives of the GORTT by projecting the future needs of the country and the region by developing research projects that provide the information, management tools and advisory strategies for projected scenarios.
5. To be known as the Centre of Excellence for marine research in peer-reviewed publications in the region by at least a 50% increase and by the re-introduction of the IMA's e-journal in local and international strategic partnerships over three to five years period.
6. To expand the national awareness on marine and coastal environmental issues by 15% in two years and 35% at the end of the five-year period.

7. To build an enabling environment to foster the culture needed to support the strategic plan by employing transformational leadership approaches, building organisational trust, transparent management, and by cultivating a performance driven culture supported by a futuristic and global mindset.

Organisational Financial

1. To expand the research capability of the organisation by accessing grant funding so that it represents at least 60% of its research budget (10% in the first two years, 20% by the third year and 40% by the end of the five-year strategic period).

2. Operational cost reduction by 15% through a value for money approach and optimising available resources to achieve value.

These goals and objectives are supported by objectives, targets, initiatives and indicators for the four perspectives of the Balance Scorecard: Financial, Internal, Customer/Stakeholder, and Learning & Growth at the broad organisational level which must in turn be worked through the work plan of the various Department.

PART 2
ORGANISATIONAL PROFILE

A. Organisational Profile

A new organisational structure was proposed for the IMA to allow the organisation to fulfil its strategic objectives for the period 2019 to 2024. This structure is based on the following principles:

1. Division of the organisation into the two core functional areas – Research and Administrative Support Services. Each Division is to be headed by a Deputy Director.

2. Creation of opportunities for vertical and horizontal growth of employees through the development of multidisciplinary skills and experience with a strong emphasis on capacity building and succession planning.

3. Creation for opportunities for promotion within each bargaining unit (I, II, III) based on academic achievement, experience and qualifications (in the case of the research core group) and on qualifications and experience (in the case of the administrative support group).

4. Alignment of jobs in each group with each other based on comparators of job descriptions and job specifications.

1. Filling of all Core Research Vacancies in the following six disciplines:

a. Biodiversity and Ecology
b. Environmental Quality
c. Fisheries and Aquaculture
d. Oceanography and Coastal Processes
e. Marine Governance
f. Geomatics and Geographical Information Systems

This structure must however receive approval by the Cabinet of Trinidad and Tobago.

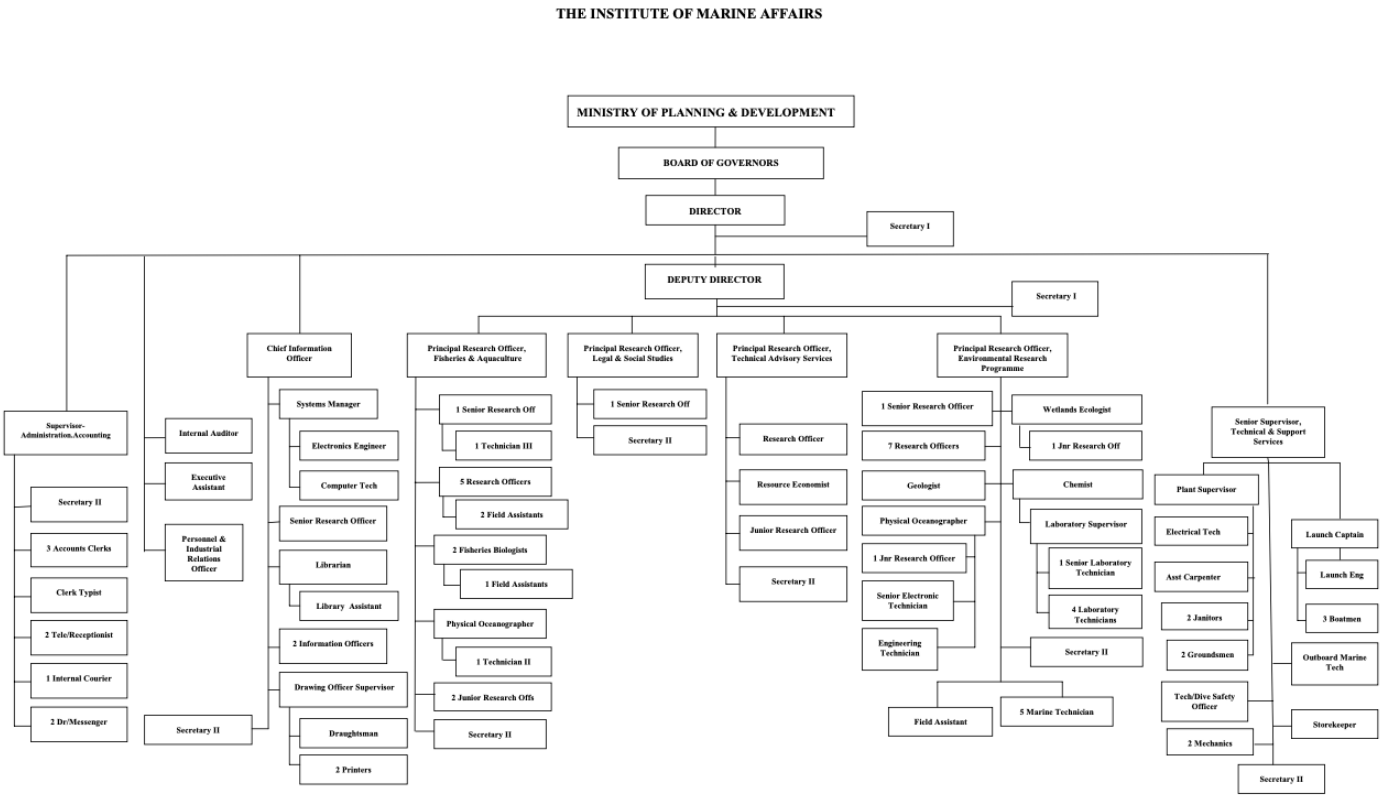


Figure 1. Organisational Structure of IMA

B. Corporate Structure

The Proposed New Corporate Structure

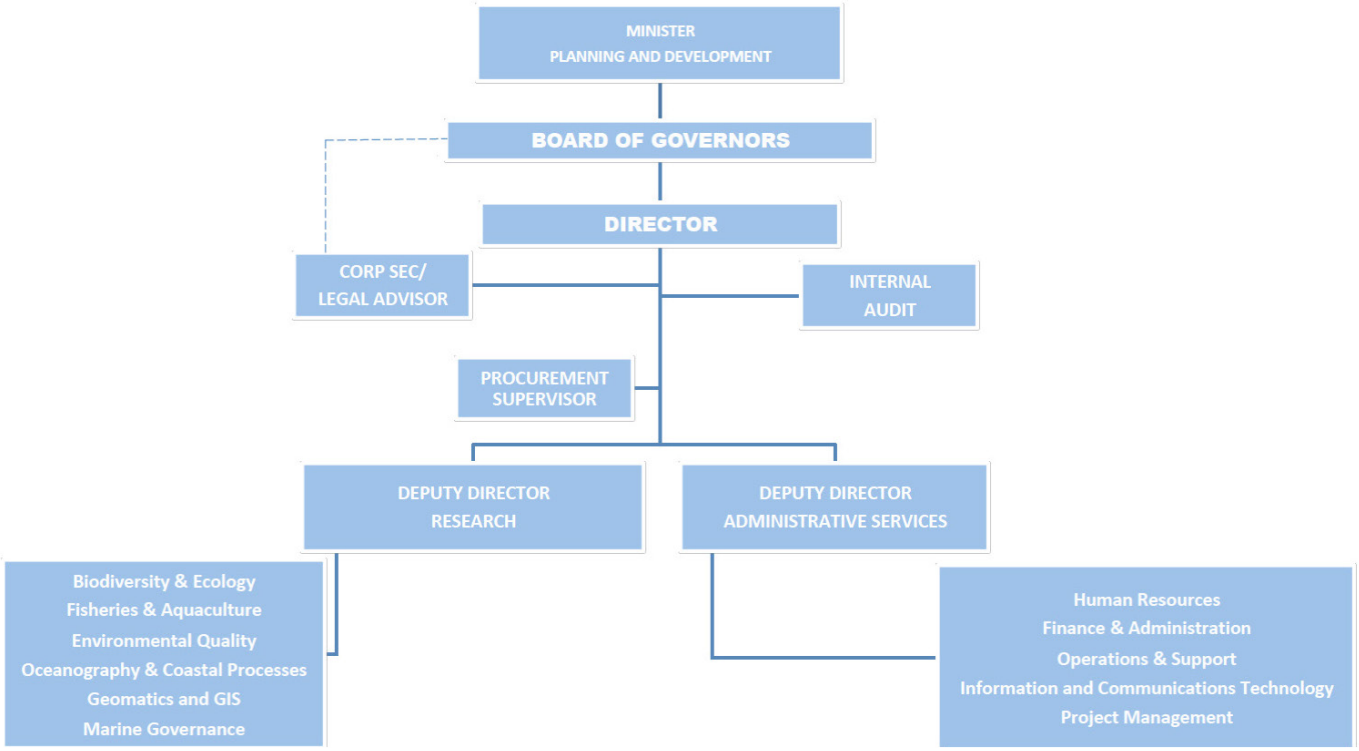


Figure 2. Proposed corporate structure

C. SERVICES PROVIDED BY THE IMA

- Policy advice
- Marine & coastal data
- Public education and awareness
- Bio-diversity and ecosystem conservation

D. SPECIAL PROJECTS

- Tobago Marine Field Station
- Development of the mariculture facility
- Construction of IMA Administrative Building
- Laboratory Accreditation ISO/IOE 17025

E. LEGISLATIVE AND REGULATORY FRAMEWORK

The Institute of Marine Affairs (IMA) was established under Chapter 37:01 (as amended) of the Laws of the Republic of Trinidad and Tobago with the primary objective of conducting and fostering research and providing advice to support the sustainable management of the coastal and marine areas and resources of Trinidad and Tobago.

F. REPORTING FUNCTIONS:

a. Department Reports to the IMA Directorate
b. Directorate to the IMA Board of Governors
c. Sub-Committees of the Board to the IMA Board of Governors;
d. Board of Governors to line Ministry- Planning and Development (via Minutes of meetings)
e. Finance and Administrative Department of the IMA to line Ministry and Ministry of Finance regarding PSIP and Recurrent Expenditure.
f. Directorate to special committees of the Parliament via the line Ministry (as requested)

RESEARCH PROGRAMMES & INITIATIVES

The following describes the programmes undertaken by the Research Department of the Institute.

BIODIVERSITY AND ECOLOGY

Survey of Benthic Macrofauna, Bon Accord Lagoon, Tobago

Seagrass beds are ecologically important marine resources as they provide a number of services essential to a productive marine environment. Seagrasses are known to create more habitats spaces for macrobenthic invertebrates as well as increase the available resources. The seagrass community of Bon Accord Lagoon covers an area of approximately 102 ha. and extends in some places to a depth of approximately 6m. Turtle grass, ***T. testudinum***, is the dominant seagrass species in the lagoon. Benthic macrofauna were collected during two sampling periods, dry and wet seasons of 2018 (March and September respectively) using a hand held PVC corer. Further sampling was conducted in July of 2020. To date, a total of 4,822 organisms belonging to 211 different species were recorded across both sampling periods. Seasonal variations, attributable to nutrient inflow within the lagoon, were found among the macrobenthic populations at some stations sampled within the Bon Accord Lagoon. Publications have been prepared and submitted.

Principal Researcher: Attish Kanhai

Marine Reference Collection (MRC)

For thirty-eight (38) years, the IMA has housed an extensive and historically significant biological Marine Reference Collection (MRC). It is the largest collection of marine biodiversity for Trinidad and Tobago. The collection includes a number of fish species, molluscs, crustaceans, and corals.

This collection is very important as it fulfils three of the six objectives of the institute which are:

1. to promote a public understanding of and appreciation for all aspects of the marine related environment;

2. to stimulate and advance the conduct of marine scientific research in Trinidad and Tobago;

3. to promote the utilisation and conservation of the marine resources for the economic and social benefit of Trinidad and Tobago and to enhance the national capabilities;

The collection is also very much in line with the aim of the Government's National Development Strategy, Vision 2030, Theme V - Placing the Environment at the Centre of Social and Economic Development. This theme focuses on the following among other environmental considerations: reducing the loss of biodiversity and the illegal species trade, as issues of national importance. The reference collection therefore serve to educate the public on the variety of species in the marine/coastal areas of Trinidad and Tobago.

Since, the relocation of the MRC to the prefabricated building, the collection of more than one thousand and sixty (1260) specimens have been refreshed by changing their preservation alcohol. They were photographed, and a database on their characteristics created with the assistance of the IT Department. Once all the specimens are re-catalogued they will be made public on an international website called Global Biodiversity Information Facility (GBIF) (https://www.gbif.org/) to enable ease of public access. Specimens from the collection has been featured in the Beyond the Blue exhibition, IMA's Career Day in its fence line community of Carenage/Chaguaramas, NIHERST's Science Week, several secondary school career days and on a UWI, St. Augustine Campus visit. Specimens have also been used by the Education and Information Officers as part of their school talks. Efforts were undertaken to build the collection with specimens of fish, rays and sharks being added.

Principal Researcher: Alana Jute

Coral Reef Baseline Assessment (CRBA)

Following the collection of the field data in July 2019, coral reef benthic images were annotated and analysed for the technical benthic report, which was sent out for external review in May 2020. The final version of this report was completed and approved in January 2021. Other activities of the CRBA project included the structural complexity data modelling and analysis, which was completed in June 2020. This data, along with the fish and benthic coral data, are currently being analysed for spatial patterns in fish communities related to benthic compositions and environmental conditions (wave action and disturbance history and reef structural complexity). The development of the hydrodynamic model using the existing IMA dataset to supply higher resolution environmental information for the community analysis was delayed until the hiring of the new oceanographer.

The socio-economic study for the coral reef sites was started with the recruitment of Ms Hannah Lochan as an On the Job Trainee (OJT) at the end of September 2020. A desktop compilation of socio-economic data was conducted to determine (1) if clear geographic patterns of human activities exist and whether this was reflected in the health of the coral reef, and (2) the level and kind of dependency of communities on the coral reefs, and therefore the level of vulnerability to the degradation of coral reefs. Survey data collection will be carried out to fill the gaps in the existing data.

The Reef Report card to showcase the health of the reefs at each monitoring site is carded for March 2021 as an output of the CRBA.

Principal Researchers: Dr. Anjani Ganase

Coral Reef Monitoring 2020

Fieldwork for the 2020 coral reef monitoring time point was conducted in June 2020. Additional data collected included coral disease and coral juvenile surveys at all survey sites. All image analysis of the 2020-time point were carried out in the following six months, along with the compilation and analysis of coral juvenile and disease data. For environmental parameters, water quality sampling and assessments were also taken at each survey site in June 2020. While the fourth time point was earmarked for March 2020, the sampling trip was delayed to mid-June because of the COVID-19 pandemic. Research reports were written and are available from the IMA Library.

ENVIRONMENTAL QUALITY PROGRAMME

The Environmental Quality Programme (EQP) conducts research to determine water, sediment and biota quality in the coastal and marine environments for the interpretation of pollutant effects on natural systems by identifying possible sources, and impacts such as bioaccumulation and eutrophication. This includes monitoring of pollutants such as nutrients, heavy metals, bacteria, and hydrocarbons. The data and information would aid in understanding the physical and chemical processes in the coastal and marine environment and assessing the various impacts on the coastal and marine environment from anthropogenic and natural influences. This project will identify changes or adverse impacts on the marine and coastal areas, from which information derived can guide/inform policy making in a timely and efficient manner for the improvement in the quality of life of citizens and preservation of our natural environments.

Long-Term Environmental Monitoring of Selected 'Hot Spots'

At a Wider Caribbean Regional Workshop entitled, 'Assessment of Land Based Sources of Pollution and Methodologies in Land Based Sources', which was held in Venezuela in 2005, representatives identified the need to establish an environmental monitoring project. Such a project would identify changes or adverse impacts on the marine and coastal areas from which information derived would guide timely policy formulation. Results of the monitoring programme in Trinidad revealed areas of elevated pollution levels or hotspots. In 2019/2020, monitoring of marine areas continued in the Gulf of Paria at locations off Claxton Bay, Pt. Lisas, Caroni, Port of Spain, Maraval and Diego Martin. Land-based sources of pollution were also assessed at coastal locations at Caroni River, Guayamare River, Blue River (Caroni Swamp), Cunupia River and at Couva River.

Water quality data was used for supporting the IMA's biennial reporting in its State of the Marine Environment (SOME) Report. It will also support the Environmental Management Authority's (EMA's) annual State of the Environment reporting requirement. This long-term monitoring programme will determine whether pollution reduction strategies are effective, identify weaknesses and recommend appropriate mitigatory mechanisms. The data will add to the international body of knowledge on impacts of pollution. It would also enhance the IMA's ability to serve its mandate as one of the Regional Activity Centres for the Land Based Sources of Pollution (LBS) Protocol. Lessons learnt from this project will be shared with countries of the wider Caribbean Region. This project is aligned to Goal 4 (Comprehensive Waste and Pollution Management Systems) of Theme V of the National Development Strategy - Vision 2030.

Principal Researcher: Dr. Darryl Banjoo

Development of a Regional Nutrient Reduction Strategy and Action Plan

Through the Caribbean Large Marine Ecosystem (CLME+) Project, the Institute of Marine Affairs (IMA) is contributing to the development of a Regional Nutrient Reduction Strategy and Action Plan in support of global commitments related to the maintenance of healthy ecosystems. The UNDP/GEF CLME+ Project "Catalysing Implementation of the Strategic Action Programme for the Sustainable Management of Shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems" in conjunction with the Regional Coordination Unit of the Caribbean Environment Programme/Cartagena Convention Secretariat (UNEP CAR/RCU) is developing the Regional Nutrient Strategy and the Associated Action Plan.

The Institute of Marine Affairs was designated as one of the two Regional Activity Centres (RAC) for the Protocol Relating to Pollution from Land-based Sources and Activities (FTCM Protocol) in May 2002 in the Tenth Intergovernmental Meeting of the Caribbean Environment Programme. The mission of the RAC IMA is to conduct and foster research and to provide advice for the sustainable management of the coastal and marine areas and resources of Trinidad and Tobago. The goal of the Regional Nutrient Reduction Strategy and Action Plan is to mitigate impacts of excess nutrient loads on priority marine ecosystems in the Wider Caribbean Region (WCR).

The objectives of the projects were as follows:

i. To expand the baseline developed under the State of Convention Area (Pollution) report and identify the most important "regionally relevant" pollution sources in terms of the transboundary nature of both sources and impacts;

ii. To identify high priority areas for further action based on the most affected ecosystem types and most important socio-economic impacts;

iii. To contribute to the operationalisation of the Caribbean Platform for Nutrients Management;

iv. To assist in defining new areas of research relating to nutrient pollution in the Wider Caribbean Region

Activities under this project are ongoing. The IMA is working with The University of the West Indies in understanding the impact of agriculture run-offs, primarily pesticides and fertilisers, on water quality and aquatic life in and around the Caroni Swamp. The intention is to introduce farmers to more sustainable methods of pest control and yield improvement in a bid to improve water quality, and the health of aquatic organisms in and around the Caroni Wetland

Principal Researcher: Dr. Darryl Banjo

Bacterial Community Analysis of Three Coastal Ecosystems (Coral reef, Mangrove swamp, and Seagrass bed) in Bon Accord, Tobago

The bacterial community plays an important role in the biogeochemical dynamics of marine ecosystems, yet it is understudied. Microorganisms which are unique to each ecosystem underpin most of the geochemical cycles that were once previously thought to be driven by inorganic processes. The microorganisms function by forming symbiotic relationships with eukaryotes, communicating with other microorganisms, acquiring nutrients and producing energy. Coastal ecosystems are currently under threat from pollution, diseases and climate change, thus the need for intervention is urgent. This project is geared towards studying the microbial communities under diverse conditions to identify the beneficial organisms needed for healthy growth and to withstand environment impacts. This project would be the foundation for further work which would involve growing the beneficial microorganisms and adding them to ecosystems under threat.

Principal Researcher: Sheldon Ramoutar

Bacteriological Water Quality at Popular Recreational Water-Use Sites in Trinidad and Tobago

Water-based recreation is an important component of leisure activities and tourism in Trinidad and Tobago. Since 1981, bacteriological water quality surveys conducted by the IMA have indicated that there is sewage contamination at some of the beaches in Trinidad and Tobago. To date however, there are still many popular beaches in Trinidad at which bathing water quality has never been assessed. Several international studies have found that there is an increased risk of contracting gastrointestinal illness, acute febrile respiratory illness and infections of the eye, ear, nose and throat from swimming in sewage contaminated water. The existence of poor water quality at any bathing beach in Trinidad and Tobago would impact negatively on public health and tourism. Technical reports on bathing water quality done during the fiscal are available in the IMA Library.

Principal Researcher: Sheldon Ramoutar

FISHERIES AND AQUACULTURE RESEARCH

The Institute of Marine Affairs (IMA) is currently engaged in a number of initiatives geared towards the development of the Marine Aquaculture (Mariculture) sub-sector of Trinidad and Tobago. The development of the mariculture sub-sector presents an opportunity for economic diversification, food security and the creation of livelihood opportunities. The objective is to establish a demonstration facility at the Institute of Marine Affairs dedicated to the cultivation of marine organisms (mariculture). This facility will serve as a valuable resource for informed decision-making by potential investors, including community-based groups. The project's primary aim is to formulate operational business models that connect the entire value chain of mariculture products, spanning from potential investors to the market. By doing so, it will contribute to the overall development of Trinidad and Tobago's mariculture industry

During the 2019/2020 fiscal, the IMA focused on the following activities:

The Development of a Mariculture Industry for T&T

Principal Researcher: Daniel Robinson

Construction and Operationalising of Mariculture Laboratory

In order to conduct mariculture research in a manner that is scientifically sound, environmentally sustainable and bio-secure, the IMA has identified the need to develop new research infrastructure and improve existing infrastructure. The IMA's mariculture research infrastructure consisted of a six 20ft diameter tank marine RAS unit and a five 4ft diameter tank quarantine system. While these systems have contributed greatly to IMA's mariculture research initiatives, there is a need for a dedicated multi-purpose mariculture laboratory. As such, the IMA began the process of procuring services for the construction of a three thousand, eight hundred square feet (3800 sq. ft.) mariculture laboratory in the 2018/2019 fiscal year. In September 2019 construction of the IMA's Mariculture Laboratory began, the facility was constructed on an existing concrete platform within the Aquaculture Facility. The laboratory contains a large open space, which will be populated with multiple marine recirculating aquaculture systems (RAS). Surrounding this open space is a number of modified shipping containers, which will serve as office spaces, supporting labs, control/pump room, feed and general storage. Fiscal year 2019/2020 saw the construction of the superstructure and outfitting of several components including the electrical, paneling of laboratory spaces. It is expected in 2020/2021 that works will be completed and the lab will be operationalised with the main marine RAS system being complete,d and preliminary research into marine fin-fish such snapper can commence.

Geo-spatial Site Suitability Study for Mariculture

During the 2019/2020 fiscal, research into the identification of sites most suitable for near-shore and offshore cage culture of finfish and shellfish in Trinidad and Tobago continued. This is being done through the use of a multiple criteria geo-spatial analysis which is looking at a variety of datasets that directly and indirectly impact suitability for such an endeavour. The criteria include the presence of ecologically sensitive ecosystems, water conditions and quality, present human activities which can potentially create user conflicts, namely, oil and gas, maritime and fishing activities.

This project experienced a number of challenges in acquiring a reliable source of remotely sensed sea surface salinity data. Due to the dynamics of Trinidad and Tobago's coast and ocean environment it is a crucial parameter to consider, as it will dictate the type of species that can be culturedas well as if it can be cultured year round with acceptable growth rates. The Soil Moisture and Ocean Salinity (SMOS) datasets obtained through the European Space Agency (ESA) proved to be unreliable particularly for the Gulf of Paria and therefore Soil Moisture Active Passive (SMAP) mission through the National Aeronautics and Space Administration (NASA) is being used. This development represents a significant milestone for the project as the full suite of parameters have now been acquired and the focus can switch to developing and fine-tuning the multi-criteria analysis model early in the 2020/2021 fiscal to produce data which can identify suitable sites for marine cage culture.

Implementation of Bio-security Plan

With increased awareness to the detrimental impact of aquatic disease and pathogens, the IMA with the assistance of the University of the West Indies' (UWI) School of Veterinary Medicine is implementing its biosecurity implementation plan. During the fiscal year 2019/2020, the IMA carried out diagnostic testing in the aquaculture facility to determine if there is the presence of aquaculture disease and pathogens. Testing by the UWI School of Veterinary Medicine indicated the presence of a few manageable aquatic pathogens, however the presence of piscine *Mycobacterium Spp*. emerged as a cause for concern due to its impact on the productivity of aquaculture systems, and the difficulty to remove from a system. As such, IMA was instructed by its Board of Governors to phase out its entire tilapia stock including its brood stock. All tilapia fish were to be euthanised and incinerated. Due to the delays called by the COVID 19 pandemic measures, this activity was delayed and resumed late into the fiscal year and is expected to be completed in the 2021/2022 fiscal year.

As part of the biosecurity measures, a number of chemicals were purchased to sanitise the facility including isopropyl alcohol, sodium hypochlorite and hydrochloric acid. These chemicals were used after systems were taken down and will be used prior to setting up system to ensure that systems are free of pathogens.

GEOMATICS

Caribbean Marine Atlas

The Caribbean Marine Atlas (CMA) is an online digital technological platform that serves as a repository of geospatial and documental information to support decision-making in Integrated Coastal Zone Management (ICZM) and for the monitoring and evaluation of large marine ecosystems in the Caribbean. The Atlas's content is intended for planning officials, ministries, national and regional authorities, decision makers, policy makers, and stakeholders working with ICZM in the Caribbean. The design of the Atlas promotes the self-management of information by providing operational training in each country. It contains a large number of base spatial datasets, thematic and indicator datasets for Trinidad and Tobago and countries of the Caribbean. As of September 2019 the CMA contained one thousand, one hundred (1100) spatial data layers and eighty-five (85) documents. The CMA was fully operationalised in June 2019.

Principal Researcher: Hamish Asmath

Spatial Mapping of the living and non-living coastal resources of Trinidad and Tobago

This project involves the creation of a web based spatial data warehousing and management system at the IMA that incorporates and integrates all spatial data and metadata into a practical, searchable, catalogued database that will yield viable and practical products for both internal and external needs and users. It will improve the scope, effectiveness, efficiency, and support the development of research ideas through spatial data and products, an intranet web based system to increase the availability, presentation and usefulness of such data and products as housed in the IMA. This system will contribute to, and ensure that the IMA complies with the National Spatial Data Infrastructure (NSDI) initiative and the Caribbean Marine Atlas (CMA).

Principal Researcher: Hamish Asmath

Hydrological study of the Caroni River Basin to determine the transport and fate of land based sources of pollutants and to restore freshwater habitats

Caribbean river basins are generally of comparatively small size because of the predominance of island areas, and thus impacts are characterised by a short response time from land-use activities to coastal responses. Land-based pollution, from both point and non-point sources and activities within coastal watersheds, impacts on coastal areas and on the quality of the food harvested from these areas. In order to mitigate and control the impact of pollution on coastal and marine resources and on human health, it is essential that the type and load of pollutants be identified. This involves determination of the sources and their location, and the volume and concentration of the pollutants.

The Caroni River Basin, the hydrometric area that encompasses the Caroni Swamp, covers a total of about 883.4 km^2 , equivalent to twenty-two percent (22%) of the land surface area of the island and is the most populated and developed area of Trinidad. The hydrological regime in this river basin has been altered to facilitate human habitation and activities, including water harvesting for human consumption, flood mitigation and irrigation for agriculture. The Caroni and associated Rivers discharge into the Caroni Swamp, the largest mangrove forest in Trinidad. The Swamp is important economically for oyster and fish harvesting, for hunting and for ecotourism.

This study is modelling the hydrological regime within the Caroni Basin to determine the transport and fate of nutrient land-based pollutants. It serves to fulfil some of the responsibilities that the IMA has as the Regional Activities Centre of the Land Based Sources of Pollution Protocol.
Principal Researcher: Hamish Asmath

Mangrove forest carbon assessment

Mangroves play a significant role in the mitigation of climate change by sequestering carbon in aboveground (woody parts) and below ground (soil) pools. IMA in collaboration with the University of the West Indies, St Augustine Centre for Innovation and Entrepreneurship (STACIE) is conducting research to quantify the amount of carbon held in mangrove forests in Trinidad and Tobago. STACIE secured funding through the United Kingdom High Commission for the acquisition of a ground based Light Detection and Ranging (LiDAR), also known as a terrestrial laser scanner (TLS). The TLS is able to accurately recreate in exceptionally high detail the 3D structure of mangrove trees so that the woody portions can be quantified, which yields the amount of carbon in the tree.

Throughout the mangrove forests of Trinidad and Tobago, the IMA has established thirty (30) plots within which the diameter at breast height (DBH) and tree height of each tree is measured. The TLS carbon measurements from individual trees is combined with the DBH and tree height data from the plots to develop a highly accurate estimate of carbon in each plot. This is then combined with the mangrove tree height for all of Trinidad and Tobago which was derived from an aerial LiDAR survey in 2014 conducted by the Government of Trinidad and Tobago. The result is a highly accurate estimate of the aboveground carbon held in mangrove forests. The total amount of carbon estimated to be held in mangrove forests in Trinidad and Tobago is eight hundred and nine thousand and eighty-five point nine two (809,085.92) tonnes of carbon. This information can contribute towards inclusion in the Paris Agreement Nationally Intended Contributions, and REDD+.
Principal Researcher: Hamish Asmath

Coastline change detection from 1994 to 2014

Trinidad and Tobago is a Small Island Developing State (SIDS), with a substantial proportion of the population and economic resources located within coastal communities and in the coastal zone. A dynamic and ever-changing coastal zone, the impact of climate change, high pressures for economic activities and coastal development, leads to challenges with regards to coastal environmental management. There is therefore a need to examine the change in our coastlines overtime. Coastline Change Detection is an undertaking facilitated by remote sensing techniques to identify and quantify areas of erosion and accretion along the

coastline across a specific period. Coastlines of all of Trinidad and Tobago were extracted for a 20-year period (1994, 2007 and 2014) from aerial photography and satellite imagery, and changes in the coastline mapped and analysed. Drone imagery for Columbus Bay was also acquired in 2019 from the Ministry of Works and Transport, Coastal Protection Unit. This Bay was mapped and included in the analysis. Using DSAS 5.0 and ArcMap 10.5, change rates were generated, and areas of significant coastline change were identified. A hot\cold spot analysis was conducted using a geo-statistical approach to produce the areas of highest relative change. The largest erosion cold spot was observed in the Columbus Bay area and was the result of natural processes.. The largest accretion hotspot was observed at Pt Lisas. This was due to anthropogenic activity which facilitated the expansion of the coastline as mangroves colonised and stabilised the deposited sediments.

Principal Researcher: Hamish Asmath

MARINE GOVERNANCE

Integrated Coastal Zone Management (ICZM Policy Framework

The draft Integrated Coastal Zone Management (ICZM) Policy Framework 2019 was revised by the ICZM Inter-Ministerial Committee to reflect updates to national policies, legislative changes and international legal instruments of relevance to ICZM in 2020. The IMA is the Vice Chair of the Committee and staffs the Secretariat. The Policy Framework's implementing instrument the ICZM Action Plan was also revised to include key targets, indicators and a timeline for implementation. Upon Cabinet approval of the ICZM Policy Framework 2020 and the re-establishment of the Inter-Ministerial Committee, the ICZM Action Plan 2021-2030 can be implemented. ICZM is a strategic initiative of the country's National Development Strategy 2016 -2030 also known as Vision 2030, and it aims to facilitate an integrated approach to coastal zone management aimed at maintaining and where necessary, enhancing the functional integrity of the coastal resource system while enabling sustainable economic development through rational, inclusive decision-making and planning.

Principal Researcher: Rahanna Juman

OCEANOGRAPHY AND COASTAL PROCESSES

The Oceanography and Coastal Processes (OCP) Research Programme involves research in the following areas: oceanography, hydrography, hydrology, sedimentology and coastal dynamics. The data generated from our monitoring programmes and form research initiatives is used to inform coastal management plans and environmental policies and provide advice for sustainable development.

National Coastal Conservation Programme: Monitoring and Assessment of Coastal Processes along Shorelines with an Emphasis on Beach Dynamics

The beach monitoring component of the Coastal Conservation Programme commenced in 1988 and represents the longest beach monitoring record in the region. With increased competition for coastal spaces combined with climate change impacts, this dataset is one of the most significant components in most coastal projects. In fact, for the reporting period, many subsets of the data collected in this program were shared with university students, government ministries and other stakeholders. During the period October 2019 to September 2020 beach monitoring was carried out quarterly, to document changes in beach profiles, evidence of erosion and accretion at beaches and bays in Trinidad and Tobago. Analysis of these datasets are performed to provide a status of beaches and bays technical report across a selected period. During this fiscal, the 2009 to 2015 status report was prepared and a draft was submitted, reviewed and sent for finalisation.

Principal Researcher: Dr. Cassandra Nanlal

Impact of Climate Change on the Sandy Shorelines of the Caribbean: Alternatives for its Control and Resilience, Sandy Shorelines Project- KOICA

The increasing vulnerability of Caribbean shorelines to the impacts of climate change is widely documented with many islands are already experiencing accelerated beach erosion and more intense storms. With this realisation, the Korean International Cooperation Agency (KOICA) Sandy Shorelines Project was developed in 2017 and currently includes 9 participating Caribbean states: Trinidad and Tobago, Costa Rica, Cuba, Dominican Republic, Guatemala, Haiti, Jamaica, Nicaragua and Panama. The project is divided into 6 components shown in the figure below all with the overarching aim of better managing our Caribbean Sandy Shorelines.

Through this project, countries involved will receive approximately US $50,000.00 worth of shoreline monitoring equipment to aid with monitoring Caribbean beaches, enhance understanding of the impacts of climate change on the region and best practices to mitigate them. Additionally, Bonasse Bay, Cedros in Trinidad was selected as the pilot site for the beach rehabilitation project. The lessons learnt through this study will be shared with the other Caribbean states through the development of a best practices manual for beach rehabilitation in the Caribbean region. Reports submitted during this period include: Statement of Readiness of Trinidad and Tobago for the Monitoring Network; Revised equipment list for beach monitoring equipment for procurement- September 30th 2020 and Technical and Logistics Report for the Beach Rehabilitation Project at Bonasse Bay, Cedros.

Principal Researcher: Dr. Cassandra Nanlal

Comprehensive National Coastal Monitoring Program

The IMA is a key partner in the Comprehensive National Coastal Monitoring Program which is an initiative of the Ministry of Works and Transport, Coastal Protection Unit. As the primary national marine research institute in Trinidad and Tobago, the IMA's role in this initiative includes providing data for the national coastal monitoring database, capacity building and the continuation of the monitoring programme after the completion of the project.

Principal Researcher: Dr. Cassandra Nanlal

MULTI-DISCIPLINARY PROJECTS

CLME+ Sub Project - Strengthening Ecosystem Based Management Frameworks and Ocean Governance in the North Brazil Shelf Large Marine Ecosystem

Trinidad and Tobago was one of four participating countries of Caribbean Large Marine Ecosystem plus (CLME +) sub-project entitled "Strengthening Ecosystem Based Management (EBM) Frameworks and Ocean Governance in the North Brazil Shelf Large Marine Ecosystem (NBSLME)". The project sought to develop and test various governance arrangements to enable effective EBM of mangroves and wetlands. The interventions were designed to mitigate pollution and their impacts within coastal mangroves and wetlands within the NBSLME. This was done in the context of multilevel (local to regional) governance arrangements developed via a series of interactive, focused, multi-stakeholder consultations, and the implementation of community-based conservation interventions.

For the Trinidad and Tobago project, the aim was to reduce organic and pesticides pollution from agricultural activities in the southern section of the Caroni Swamp through the implementation of community - based conservation interventions for rehabilitating degraded mangrove forest. The Caroni Swamp, a Ramsar site, was selected as the study site for the EBM sub-component as it is the largest mangrove forest in Trinidad and Tobago, supports a wide variety of organisms, and provides livelihood opportunities such as ecotourism and fisheries (fish, oyster and crab). Since it is at the hydrological end point of the Caroni River Basin, the largest river basin in Trinidad and Tobago, it is the recipient of land based discharges from agricultural, industrial and domestic sources from the most densely populated area of Trinidad. Farming activity in the study site of the Cunupia and New Guayamare watersheds were identified and mapped.

The goal of one component of the project was to establish baseline conditions regarding nutrient levels in the Cunupia/Guayamare study site, with the aim of comparing it to future sampling events to determine whether mitigation measures and interventions with farmers resulted in a reduction of nutrient levels. The study involved sampling nutrient and physiochemical parameters at seventeen (17) stations during March and November 2019, representing one dry and one wet season in the Cunupia/New Guayamare watersheds. The results obtained for the New Guayamare and Cunupia watersheds indicated poor water quality with elevated levels of nutrients and low dissolved (DO) oxygen to support aquatic life.

Other activities under this project included surveying the farmers in these watersheds by using "EpiCollect" software application, face to face and telephone interviews to gain knowledge on major crops, soil health, pests and diseases, and existing farming practices including their use of chemicals - pesticides and fertilisers. Based on survey data, training and sensitization workshops were designed to be executed for the farmers on (i) judicious use of pesticides and fertilizers (ii) alternatives in the management of economically important pests and diseases in the area. These workshops will be facilitated by University of the West Indies, St Augustine, Trinidad. Demonstration sites are being established to show the use of alternatives for selected crops against high application of pesticides and fertilizers to reduce fertilizer usage (and hence reduce nutrient pollution runoff) while maintaining agricultural output.

Principal Researchers: Hamish Asmath, Dr. Darryl Banjoo, Wendy Nelson, Dr. Rahanna Juman, Dr. Farahnaz Solomon, Sheldon Ramoutar, Ben Maharaj

EQP Lab Accreditation Project

The IMA is seeking to attain ISO/IEC 17025 accreditation for the Nitrate/Nitrite test scope. ISO/IEC 17025 is the primary international standard for both testing and the calibration of laboratories. The standard specifies the general laboratory requirements, and the levels of the competence required by those carrying out the testing, the calibration of equipment and sampling. The standard also provides a framework for the establishment of a management system, standardised operations for the laboratory, and identifies personnel competency parameters. This process is being funded through the Public Sector Investment Programme under the Trinidad and Tobago Bureau of Standards (TTBS).

Achieving accreditation would represent a ground-breaking achievement for the Institute. The IMA would be able to boast of being the first Marine and Environmental research organisation that has a laboratory with an accredited test scope. Such an achievement has the potential to capture funded, research partnerships with local, regional and international organisations. The accreditation will serve a strong guarantee to those organisations that the IMA is committed to quality and the production of valid results. Additionally, accreditation would confirm the technical competency of the staff, as well as the commitment of the organisation to work in an ethical and impartial manner. The organisation would also have to have a well-structured management system where risks and opportunities are continuously assessed in a bid to achieve key objectives, such as, continuous operations improvement. Key members of the IMA's management, supervisory team, researchers and laboratory technicians who would have a role to play with regards to attaining the ISO accreditation received sensitisation training in preparation for the ISO accreditation process in March 2020.

The Trinidad and Tobago Laboratory Accreditation Board (TTLAB) is the certifying body.

Project Leader: Kyle Williams

Lionfish Marketing and Communications Campaign

IMA received final disbursement of $429,466 from the Green Fund Executing Agency (GFEU) for the Lionfish project on June 25, 2019. The Letter of Agreement (LoA) with the GFEU was extended by 1 years and expired in June 30, 2020. IMA engaged CARIRI in the development of an IMA App which would include information on the invasive lionfish as well as other environmental incidences and information. Contract with CARIRI was signed on October 14, 2019. The marketing campaign ran concurrent to the development of the App

Hydrological Study of the Mangrove Forest North of the Couva River

Observed mangrove dieback within the forest north of the Couva River has caused concern as no significant regeneration has been recorded since 2014. Initial water quality testing conducted in November 2020 did not provide potential cause for the mangrove dieback and a hydrological study was commissioned by Point Lisas Nitrogen Limited. This study will investigate the water levels, temperatures and salinities at various locations in the study area. Watershed and elevation mapping will be done for the study area based on available data, and a vegetation analysis will be carried out to record changes and patterns in the vegetation in order to determine the likely cause of the mangrove die-off. This study will inform a mangrove restoration plan for the area.

Principal Researchers: Dr. Cassandra Nanlal, Hamish Asmath; Nikia Gooding and Dr Rahanna Juman.

OTHER RESEARCH EVENTS

- IMA hosted a two-day meeting with Prof John Agard and Prof Terrence Forrester, SODECO, UWI Mona on January 6-7, 2020 to discuss collaboration between the entities on a mangrove restoration project in Claredon, Jamaica that is funded by DEFRA Blue Carbon Fund and executed by the IDB. As part of the project, mangrove carbon sequestration has to be quantified and IMA is currently working with Prof Agard on a methodology to quantify sequestration based on using a side scan sonar to get a three dimensional image of each tree for accurate measurements. Once the method is accepted, it is hope that IMA will be able to conduct these measurements throughout the Caribbean for the carbon trading markets. Dr Rahanna Juman has been providing technical advice to SODECO on the restoration project.
- IMA facilitated tour of the EQP Laboratory for COSTATT students, 28 November 2019.
- Dr Rahanna Juman presented at the Virtual Workshop - UN Decade of Ocean Science for Sustainable Development 2021-2030 – Western Tropical Atlantic Regional Workshop on April 28, 2020 facilitated by the Mexican Government.
- IMA hosted students from ECIAF School of Forestry as part of their Field Training Programme, 27- 31 July 2020.
- IMA facilitated interviews for Form 6 students on environmental topics
- Researchers were interviewed for the Beyond the Blue radio series on topics including ICZM, lionfish, parrotfishes and coral reefs
- Coral bleaching alert announcements for social media, September 2020

Initiatives of Core Support:
THE INFORMATION TECHNOLOGY DEPARTMENT

The Information Technology Department supports the modernisation and upgrading of how research activities are conducted within the IMA in addition to the development of a knowledge management platforms and systems for the Institute. In this regard, the Information Technology Department (ITD) made progress in the appropriate deployment of technology to increase productivity, manage workflow and enable communications. Consistent maintenance and modest improvements to the IT infrastructure were effected, to grow an agile and resilient network. Despite financial constraints, the department persevered to support organisational strategic and operational needs.

Projects were designed around specific areas namely; Service Delivery Enhancement; and IT Governance improvement and bolstering of Asset Security and Privacy.

Service Delivery Enhancement is necessary to address any deficiencies in service quality and appropriateness of service types. IT will invest in appropriate training and amassing a repository of knowledge assets to facilitate staff functioning at optimum levels. The useful life of the IT infrastructure must be extended, in light of scarce financial resources. To this end a preventative maintenance programme was initiated within the reporting period.

Recommissioning of the 80KVA Un-interruptible Power Supply for the Research Building

A recommissioning of IMA's 80 KVA UPS was undertaken to safeguard critical ICT Systems necessary for business continuity, vulnerable during a power failure. Forty, 12V 200W batteries were installed into IMA's Eaton PowerWare UPS system and tested to ensure functionality and that a manual failover was no longer required, proceeding an electricity service disruption. This project was completed in 2019 within budget to support ICT service delivery.

Integrated Environmental Incident and Lionfish Mobile Application, and Software Platform

A mobile application was successfully developed to engage stakeholders on issues pertaining to the invasive lionfish and the capture data on environmental incidents, as well as bring awareness of the IMA's activities. A strategic partnership between the developer Caribbean Industrial Research Institute (CARRI) Centre for Enterprise Development and IMA produced the SEAiTT Mobile Application. A functional mobile application capable of capturing, collating and reporting on environmental incident data and disseminating information on the marine environment was launched in 2020. IMA Service Delivery to stakeholders was greatly improved by the addition of the SEAiTT mobile application.

Recommissioning of IMA's Virtual Private Network to support Remote Work

Given the challenges the COVID-19 pandemic presented in 2020 - a Virtual Private Network (VPN) was re-established to support IMA's Telecommuting (work remotely/ home) Policy. A VPN allows a secure connection over the Internet to a corporate network allowing access to otherwise inaccessible resources. As such, authorised staff accessed data and information resources resident at IMA, thereby reducing the need for a physical onsite presence. This aided as well in the mitigation of the spread of the novel COVID-19 Virus on the Campus. This project is in congruence with the strategic objectives of enhancing ICT service delivery, and strengthening Asset Security and Privacy.

HRplus: Self Service Leave Module

The project is to automate the leave application process at the IMA. HRplus software provides a tool to support the Human Resource (HR) function and the leave module focuses on all types of leave applications such as casual, vacation, sick and the like. The new leave module also allows employees to determine leave balances, review and amend personal information via a mobile application or an online portal resident within the IMA's network. This project supports HR operations and enhances service delivery through IT and information systems. This project is ninety percent complete as of September 2020.

Cross-functional team in establishing strong event Live Streaming and production capabilities

A collaboration between the Information Technology and Information Centre Departments has been formed to expand expertise in event streaming and production. Live event streaming of symposia, product launches, webinars and other public relation events has been expanded to include Zoom, IMA's YouTube Social Media Channel to engage internal and external stakeholders. The cross functional team has honed production capabilities to a professional standard, reviewed and produced documentation to guide operations, purchased hardware and lighting to support the product quality. As of September 2020, live events streaming and audience engagement has improved greatly to support the dissemination of information and data related to IMA activities. With most broadcast receiving typically over one hundred views within 2 days of streaming.

IMA Computer System migration from Windows 7 to Windows 10

A mandatory upgrade of the operating system on IMA Staff computer systems to Microsoft Windows 10 was successfully conducted. Microsoft Windows 7 end of life occurred at the end of January 2020, therefore it was prudent to initiate the upgrade before support was withdrawn to avoid security and compliance issues. Approximately forty-two desktops and twenty laptops were migrated, with some hardware upgrades to computer systems. Computer are essential tools required for the smooth operations and synthesis of information products for various stakeholders. This project was part of the IT Governance improvement, and security and privacy initiative completed near the end of the period.

Networking of Building Seven

The network infrastructure within building (B7) was replaced subsequent to B7 being rebuilt, given its unsuitability for staff. The project required the design and outfitting of new Ethernet Cabling and Network Switches, which were connected by fibre optic cables to the server room. The project was completed prior to October 2020 and entailed the creation of a new network subnet. This project enabled connectivity to main network and facilitated the decanting of staff from Building 5 to Building 7.

Upgrade and recommissioning of the Institute's Access Control Security System.

The project involved the upgrading of hardware and software associated with the Access Control System (ACS). The ACS provides security for controlled office spaces as well as the capture of staff's time and attendance information. Karik Systems was awarded the contract and installed forty proximity card readers and twelve new maglocks throughout the IMA. Staff have been issued with proximity cards with associated access privileges. Knowledge transfer on the new system was also provided to IT personnel. The project was completed prior to October 2020.

IT Service Helpdesk

Approximately three hundred IT Helpdesk Support Tickets were carried out during the period. A Service Catalogue audit was conducted to determine emerging trends and if significant variance existed between set fulfilment timeframes and actual. Pragmatic measures were implemented to mitigate against any negative trends.

Initiatives of Core Support:
THE OPERATIONS DEPARTMENT

The Operations Department maintains the capital equipment procured for the purpose of enabling the research and other operations of the IMA. The Department is also responsible for the maintenance of the plant to in line with Health Safety and Environmental standards.

The Operations Department executed the following projects over this period, namely:

- The major construction works for the mari-culture facility project were completed. However, outfitting the containers, sealing off and electrical installation to three (3) containers and plumbing works for the fish tanks are outstanding, for completion early in the new fiscal period. These will be undertaken by Operations Department staff with the assistance of Fisheries and Aquaculture staff. The works are delayed because of national restrictions arising from the COVID-19 pandemic.
- The refurbishment of Building 7 (B7) was completed. Some variation to the scope of works had to be undertaken to allow for some corrective works to be done. These include: renovation of washrooms; works to an external handicap ramp; and works to external walkway and sidewalk. A suitable vendor is to be selected to execute these works. These variation works were also placed on hold due to COVID-19 protocols
- The Geo–Technical Soil Investigation for the Construction of the Tobago Field Station, Pigeon Point Heritage Park, was completed in June 2020.
- Development and implementation of a HSSE Standard Operating Procedure (SOP) for COVID-19 response, which was approved by the Board of Governors (BOG) in July 2020.

Ongoing Works

- Refurbishment of The female washrooms in the Admin/IT/Accounts building was successfully completed.
- Three (3) sneeze guards were built and installed in the Building 5 Reception area, Library, and Accounts Secretary workstations in keeping with recommended COVID-19 mitigation strategies.
- Hand washing stations/sinks and hand sanitiser units were strategically placed around the compound in adherence to COVID-19 protocols.

Service Contracts

The following service contracts were undertaking during the period.

- Research Building AC system- Trin Air Services Ltd.
- All other areas (A/C)–Cool Specialist Ltd.
- Freight and Passenger Lift Maintenance -Caribbean Lifts Ltd.
- Compound Generator - Genspec Ltd.
- Janitorial Services/General Cleaning- Cleanmax Janitorial & Maintenance Services Ltd.
- Security Services-PPL Security Services Ltd.
- Supplying of potable water -Blue Waters Products Ltd.

- Sanitary Bins-Rentokil Initial
- Fire Alarm System-Safety Plus Ltd
- Catholic Centre-Bus Parking
- Well Servicing- Water & Oil Well Services

Annual licenses for vehicles (land) and vessels (sea) are due in April of each year and are paid. A list of vehicles and vessels owned and maintained by the IMA are attached at Appendix IV

PART 3
POLICIES AND DEVELOPMENT INITIATIVES

POLICIES

One policy was amended during the period October 2019 to September 2020:

1. Bank Accounts Policy No. 300 (Revised June 2020)

The purpose of the policy is to provide for the standard operation procedures with regards to the opening, closing and operating of all banking accounts on behalf of the IMA and the updating authorised signatories for the same.

Development Initiatives

The Tobago Field Station

The IMA has two on-going major development initiatives supported by PSIP funding: The Tobago Marine Field Station; and the Mariculture Facility.

The Tobago House of Assembly (THA) is doing the necessary work to facilitate the granting of a lease for lands in Pigeon Point for IMA to construct its offices to facilitate marine scientific research, public education and marine conservation activities on the island.

The facility will lie within the Pigeon Point Heritage Park to the western landward limit of the Buccoo Reef Marine Park, which is a Marine Protected Area. This area hosts an ecologically rich and complex wetland comprising coral reef, seagrass, and mangrove. The site is also a popular beach, water sport and recreational area, attracting an estimated 40,000 tourists annually. IMA's presence will serve to promote marine conservation and awareness initiatives which, it is believed, will redound to a more informed public, appreciative of the benefits of island's wetlands and marine areas.

The IMA will also undertake to lend its services to the Buccoo Reef Marine Park; monitoring the beach, coral reef, seagrass, mangrove and water quality to inform management actions and decisions of Park Management. The Institute will work alongside Park Management to design conservation programmes to promote unique eco-tourism products and experiences, such as lionfish culling exercises, reef surveys, mangrove walks, and bird-watching, to list but a few.

The facility is expected to have a fully equipped:

- Wet Laboratory with a flow-through sea water system and aquaria to store live specimens and conduct ex-situ experiments, with counter space for dissections and the processing of biological samplings;
- Dry laboratory to house microscopes, water bath, computers, drying oven, balances, freezer, fridge and sediment samples;
- An Interpretive Centre with large marine aquaria, learning material both printed and digital and library; and a
- Living classroom which would include a short boardwalk through the mangroves.

The facility will also provide accommodation for offices, conference and meeting spaces, storage for laboratory materials and chemicals including geology and oceanographic equipment, access to slip way, jetty, and area for mooring boats and garage for IMA vehicle and vessels. The new offices will not only facilitate IMA research but support training initiatives benefitting the island's students and young scientists. Visiting international researchers, working collaboratively with the IMA, will also be able to gain access to the facility. The project will also enhance existing cooperation and collaboration between the Divisions and Departments of the THA and the Institute.

PART 4
FINANCIAL OPERATIONS

INSTITUTE OF MARINE AFFAIRS
UNAUDITED FINANCIAL STATEMENTS
FOR THE YEAR ENDED
SEPTEMBER 30, 2020

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INSTITUTE OF MARINE AFFAIRS

UNAUDITED BALANCE SHEET
As at 30 September 2020

	Notes	2020 TT$	2019 TT$
ASSETS			
Non-Current Assets			
Fixed Assets	**5**	42,184,846	43,327,541
Total Non-Current Assets		42,184,846	43,327,541
CURRENT ASSETS			
Cash and bank		2,116,809	2,182,858
Investments		31,105,362	35,225,424
Accounts Receivable		74,738	185,027
Goods in Transit		244,484	255,686
VAT		166,939	164,788
Prepayments & Other Assets		2,872,470	3,115,372
Total Current Assets		36,580,802	41,129,155
TOTAL ASSETS		**78,765,648**	**84,456,696**
EQUITY AND LIABILITIES			
Revaluation reserves		531,918	531,918
Retained Earnings		20,304,851	24,763,632
		20,836,769	25,295,550
Non-Current Liabilities			
Pension Plan Liability	**4**	865,159	1,305,898
Deferred Income		53,591,412	54,791,412
Retentions		1,275,880	1,304,090
Total Non-Current Liabilities		55,732,451	57,401,400
Current Liabilities			
Accounts Payable		677,729	513,807
Accruals & other Liabilities		1,518,699	1,245,939
Total Current Liabilities		2,196,428	1,759,746
TOTAL EQUITY & LIABILITIES		**78,765,648**	**84,456,696**

The accompanying notes form an integral part of these financial statements.

Chairman Board of Governors_____ Director: _____

INSTITUTE OF MARINE AFFAIRS

UNAUDITED INCOME AND EXPENDITURE ACCOUNT
For the year ended September 30, 2020

	Note	2020 TT$	2019 TT$
INCOME			
Government Funds		19,255,628	20,242,860
Interest		486,783	367,211
Gain/(Loss) on Foreign Exchange		19,294	(14,374)
Gain/(Loss) on Asset Disposal		-	(238,690)
Non-Government Income		350,626	273,847
Total Income		**20,112,331**	**20,630,854**
EXPENDITURE			
Salaries & Related Cost		16,364,948	16,546,889
Administrative Expenses	**6**	3,242,006	3,690,121
Maintenance & Repairs		890,899	1,352,014
Research Expenses		651,435	1,052,380
Audit fees		86,400	100,913
Board remuneration		264,728	385,009
Depreciation Expense		2,916,507	3,384,333
Total Expenses		**24,416,923**	**26,511,659**
Surplus (Deficit) for the period		**(4,304,592)**	**(5,880,805)**
OTHER COMPREHENSIVE INCOME			
Unrealized Gain on Investment		20,709	232,064
Pension Plan Adjustment		(174,903)	(355,455)
Total Comprehensive Income		**(4,458,786)**	**(6,004,196)**

The accompanying notes form an integral part of these financial statements

INSTITUTE OF MARINE AFFAIRS

UNAUDITED STATEMENT OF ACCUMULATED SURPLUS
September 30, 2020

	2020 TT$	2019 TT$
Accumulated surplus brought forward	**24,763,632**	**30,767,828**
Deficit for the period	**(4,458,786)**	**(6,004,196)**
Accumulated surplus carried forward	**20,304,851**	**24,763,632**

The accompanying notes form an integral part of these financial statements.

INSTITUTE OF MARINE AFFAIRS

UNAUDITED CASH FLOW STATEMENT
For the year ended September 30, 2020

	2020	2019
OPERATING ACTIVITIES	**TT$**	**TT$**
Deficit for the period	(4,458,786)	(6,004,196)
Adjustments:		
Depreciation	2,916,507	3,384,333
Revaluation Reserve		
Unrealized Gain on Investments	(20,709)	(232,064)
Loss on Asset Disposals	-	238,690
Deferred Income	(1,315,178)	(1,799,109)
(Decrease)/Increase in Pension Plan Liability	(440,739)	13,582
Gain/(Loss) on Foreign Currency	19,294	(14,374)
Net cash used in Operating Activities	(3,299,611)	(4,413,138)
Decrease in Trade and Other Receivables	362,242	1,608,150
Increase in Creditors and Accruals	304,874	709,687
Changes in Operating Assets & Liabilities	667,116	2,317,837
Net Cash used in Operations	(2,632,495)	(2,095,301)
INVESTING ACTIVITIES		
Capital grants received	115,178	599,109
Acquisition of Fixed Assets	(1,670,209)	(4,059,114)
Proceeds from disposal of Assets	-	2,739
Net cash flow investing activities	(1,555,031)	(3,457,266)
Gain/(Loss) on Foreign Currency	(19,294)	14,374
Unrealized Gain on Investments	20,709	232,064
Net (Decrease) in cash and equivalents	(4,186,111)	(5,306,129)
Cash Balance at Beg. of period	37,408,282	42,714,411
Cash Balance at End of Period	**33,222,171**	**37,408,282**
Represented by:		
Cash at bank	2,116,809	2,182,858
Investments	31,105,362	35,225,424
	33,222,171	**37,408,282**

The accompanying notes form an integral part of these financial statements.

INSTITUTE OF MARINE AFFAIRS

NOTES TO THE FINANCIAL STATEMENTS - September 30, 2020

1. INCORPORATION AND ACTIVITIES

The Institute was established by an Act of Parliament of Trinidad and Tobago on 10th May 1976, Chapter 37:01 of the Laws of the Republic of Trinidad and Tobago refers. This Act was amended by Act #13 of 1990.

The principal activities are:

a. to develop and implement programmes and projects that translate the marine and related policies of the Government into activities that contribute to national development;
b. to develop and execute programmes and projects that foster and encourage regional and international collaboration in the exploitation of the marine and other related areas of the environment;
c. to promote a public understanding of and appreciation for all aspects of the marine and related environment;
d. to stimulate and advance the conduct of marine scientific research in Trinidad and Tobago;
e. to promote the utilisation and conservation of the marine resources for the economic and social benefit of Trinidad and Tobago and to enhance the national capabilities;
f. to do all such things as are incidental or conducive to the attainment of the above objects.

2. REPORTING CURRENCY

These financial statements are expressed in Trinidad and Tobago dollars.

3. SIGNIFICANT ACCOUNTING POLICIES

a. Accounting Convention

These financial statements are prepared under the historical cost convention and in accordance with approved accounting standards. No account is taken of the effects of inflation

b. Accounts Receivable

Accounts receivable are stated net of provision for bad and doubtful debts. The provision for doubtful debts remains unchanged from 2017.

c. Fixed Assets

Fixed assets are depreciated at rates estimated to write off the depreciable amounts of the fixed assets over their useful lives.

The annual depreciation rates used are: -

Category	Method	Rate
Buildings and improvement works	Straight line	2%
Plant and machinery	Reducing balance	10-25%
Computer Equipment	Reducing balance	33%
Furniture and fittings	Reducing balance	10%
Marine vessels	Reducing balance	25%
Motor vehicles	Reducing balance	25%
Reference and resource materials	Reducing balance	10%

d. Income

The Government of Trinidad and Tobago funds most of the operations of the Institute by means of monthly subventions. These are recognised on a cash basis and credited to income.

e. Deferred Income

Grants from Government, related to the purchase of fixed assets, are deferred and credited to revenue over the useful life of the assets concerned.

f. Taxation

The Institute may be exempted from payment of, or the Government shall bear the cost of any taxes, customs duties, fees or levies which may be imposed on the Institute in respect of any equipment, materials and supplies imported into Trinidad and Tobago by the Institute which are essential for its operations

g. Foreign currency

Transactions involving foreign currencies are converted at the rates prevailing on the dates of such transactions. Monetary assets and liabilities are translated at the rate prevailing at the Balance Sheet date. Exchange gains and losses are taken directly to the Income and Expenditure Account.

h. Actuarial Gains and Losses

Actuarial Gains and Losses are recognised immediately through the statement of other comprehensive income.

4. PENSION PLAN LIABILITY

The Institute's pension plan is a defined benefit plan. The plan is operated by virtue of a Trust Deed made on 8th June 1990 between the Institute of Marine Affairs and the Trustees of the Plan. The assets supporting the Plan are invested through a Deposit Administration Policy with an insurance company.

Effective October 1st, 1999, the Institute adopted the provisions of International Accounting Standard 19 Employee Benefits (IAS 19) (Revised). It treated with the transitional asset as an adjustment to the opening retained earnings of that period because it was impracticable to restate the comparative information of prior periods.

Retirement Benefit Asset/Liabilities

Net liability in statement of financial position

	2020	2019
Present value of defined benefit obligation	(54,600,862)	(53,797,033)
Fair value of plan assets	53,735,703	52,491,134
Value of surplus/(deficit)	(865,159)	(1,305,898)
Unrecognized actuarial losses/(gains)	-	-
Net defined benefit asset/(liability)	**(865,159)**	**(1,305,898)**

INSTITUTE OF MARINE AFFAIRS

Pension Plan Liability (Continued)

Movement in present value of defined benefit obligation

	2020	2019
Defined benefit obligations at start	53,797,033	51,132,128
Current service cost	1,892,620	1,747,082
Interest cost	2,870,874	2,599,838
Members contributions	382,832	388,892
Past service cost/(credit)	-	-
Re-measurements:		
Experience Adjustments	-	-
Actuarial (gain)/loss from change in financial assumptions	(1,564,158)	471,762
Benefits paid	(2,778,338)	(2,542,670)
Defined benefit obligation at end of year	**54,600,862**	**53,797,033**

Movement in fair value of plan assets

	2020	**2019**
Plan assets at start of year	52,491,134	49,839,812
Actual return on plan assets (prior year adjustments)	(8,375)	-
Actual return on plan assets	1,584,098	2,955,692
Company's contributions	2,115,517	1,888,108
Members contributions	382,832	388,892
Benefits paid	(2,778,338)	(2,542,670)
Experience Adjustments	-	-
Administration & other non-Plan Investment Management Expenses	(51,165)	(38,700)
Fair value of plan assets at end of year	**53,735,703**	**52,491,134**
Actual return on plan assets	**1,584,098**	**2,955,692**

Expenses recognised in profit or loss

	2020	**2019**
Current service cost	1,892,620	1,747,082
Interest Cost	2,870,874	2,599,838
Expected return on plan assets	(2,746,652)	(2,484,381)
Administration & other non-Plan Investment Management Expenses	51,165	38,700
Net pension cost	**2,068,006**	**1,901,239**

INSTITUTE OF MARINE AFFAIRS

Pension Plan Liability (Continued)

Re-measurements recognised in other comprehensive income

	2020	2019
Actuarial (gain)/loss from changes in financial assumptions	(38,099)	(37,411)
Experience Adjustments	(1,526,058)	509,173
Expected Return on plan assets	2,746,652	2,484,381
Actual return on plan assets	(1,584,098)	(2,955,692)
Total amount recognised in other comprehensive income	**(401,603)**	**451**

Reconciliation of opening & closing statement of financial position entries

	2020	2019
Opening defined benefit asset/(liability)	(1,305,898)	(1,292,319)
Actual return on plan assets (prior year adjustments)	(8,375)	-
Net pension cost	(2,068,006)	(1,901,239)
Re-measurements recognised in other comprehensive income	401,603	(451)
Company contributions paid	2,115,517	1,888,108
Closing defined benefit asset/(liability)	**(865,159)**	**(1,305,898)**

Summary of principal assumptions as at 30th September

	2020	2019
Discount rate	5.50% per annum	5.25% per annum
Expected return on assets at the end of the year	5.50% per annum	5.25% per annum
Future promotional salary increases	3.75% per annum	3.50% per annum
Future inflationary salary increases	0.75% per annum	0.75% per annum
Future increases in the NIS Ceiling for earnings	Nil	Nil
Future increases to pensions	0.75% per annum	0.50% per annum
Mortality	UP94 Generational at 2020	UP94 Generational at 2019
Termination of active members	Nil	Nil
Early Retirement	Nil	Nil
Future expenses	Nil	Nil

INSTITUTE OF MARINE AFFAIRS

Pension Plan Liability (Continued)

Sensitivity analysis	2020	2019
Base IAS 19 Results	54,600,862	53,797,033
Reduce Discount Rate by 1.0% pa	64,923,515	63,846,763
Increase Discount Rate by 1.0% pa	46,599,375	46,006,318
Reduce Salary Increase by 0.5% pa	52,955,712	53,003,259
Increase Salary Increase by 0.5% pa	56,371,455	55,477,366
Increase average life expectancy by 1 year	54,901,969	54,952,984

INSTITUTE OF MARINE AFFAIRS

NOTES TO THE FINANCIAL STATEMENTS - SEPTEMBER 30, 2020

5. FIXED ASSET

Property, plant and equipment	LAND & BUILDINGS	CAPITAL WORK IN PROGRESS	MOTOR VEHICLE	PLANT & MACHINERY	REFERENCE & RESOURCE	FURNITURE & FIXTURES	TOTAL
Year ended 30 September 2019							
Opening book value 2019	30,458,181	2,467,260	344,383	7,688,272	171,479	2,197,966	43,327,541
Transfers							
Additions		1,094,724		507,188	35,802	32,495	1,670,208
Retentions		103,603					103,603
Disposals							
Depreciation on Disposal							
Depreciation charge	(728,007)		(86,094)	(1,891,490)	9,978	(220,894)	(2,916,507)
Closing net book value	**29,730,174**	**3,665,587**	**258,287**	**6,303,969**	**217,259**	**2,009,568**	**42,184,844**
At 30 September 2020							
Accumulated Cost	39,684,323	3,665,587	1,915,575	46,441,880	1,295,346	5,973,271	98,975,982
Accumulated depreciation	(9,954,149)	-	(1,657,288)	(40,137,911)	(1,078,087)	(3,963,703)	(56,791,138)
Net book value 2020	**29,730,174**	**3,665,587**	**258,287**	**6,303,969**	**217,259**	**2,009,568**	**42,184,844**
Year ended 30 September 2019							
Opening book value 2018	30,907,406	1,019,360	459,175	7,761,522	190,666	2,415,654	42,753,783
Transfers	(370,294)			370,294			-
Additions	469,785	1,307,498		2,254,810		27,024	4,059,114
Disposals				(1,651,468)		(1,334)	(1,652,802)
Retentions		140,402					140,402
Depreciation on Disposal				1,411,372			1,411,372
Depreciation charge	(548,717)		(114,794)	(2,458,259)	(19,185)	(243,378)	(3,384,333)
Closing net book value	**30,458,181**	**2,467,260**	**344,383**	**7,688,271**	**171,479**	**2,197,966**	**43,327,541**
At 30 September 2019							
Accumulated Cost	39,684,323	2,467,260	1,915,575	45,934,693	1,259,545	5,940,776	97,202,172
Accumulated depreciation	(9,226,142)	-	(1,571,193)	**(38,246,421)**	(1,088,066)	(3,742,810)	(53,874,632)
Net book value 2019	**30,458,181**	**2,467,260**	**344,383**	**7,688,271**	**171,479**	**2,197,966**	**43,327,541**

INSTITUTE OF MARINE AFFAIRS

NOTES TO THE FINANCIAL STATEMENTS - September 30, 2020

6. ADMINISTRATION

Included in Administration expenditure is the cost attributable to a thirty (30) year lease agreement between the Chaguaramas Development Authority (CDA) and the IMA. This lease is an operating lease and provides for an annual rent of $12,000 over the total period of the lease.

	2020	2019
	$	$
Minimum lease payments recognised as an expense in the year	254,960	254,960

As at the balance sheet date, the IMA has outstanding commitments under the operating lease as follows:

Within one year	12,000	12,000
In the second to fifth years inclusive	48,000	48,000
After five years	252,000	252,000
	312,000	312,000

7. SEVERANCE BENEFITS

Under the provisions of the Retrenchment and Severance Benefits Act 1985, the Institute is required to pay severance benefits to workers who are retrenched. The Institute has adopted a 'pay-as-you-go' approach in dealing with these payments. With this approach provision is not made for obligations until employees are actually retrenched.

PART 5
HUMAN RESOURCE DEVELOPMENT PLAN 2019-2020

HUMAN RESOURCES:

The Human Resources Department supports the organisational change and capacity building through initiatives that lead to the following:

- Staff alignment with vision and strategy;
- Transformational Leadership;
- Fostering A Winning Attitude;
- The implementation of a Measurement & Performance Driven Culture; and
- Process efficiency and the implementation of Standard Operating Procedures.

The Department manages the change and transition, and provides training to build the capacity of staff.

Human Resource Information System – (HRPLUS)

In keeping with the Strategic Plan to create paperless and seamless approval systems, the Human Resource Department along with the Information Technology Department have been working closely with HRPLUS Team to have the computerisation of Leave Administration Online Self-Service Module implemented.

Employees would be able to directly query the system for details on their leave balances, medical coverage and other personal information. Managers would also be able to query the system for employee information needed to assist them in efficiently managing staff. Properly implementation of this online self-service module of HRPLUS would allow the human resource staff to focus more attention on strategic matters.

In alignment with the IMA's Strategic Plan 2019-2024 the Human Resource Department has been supporting the organisational change and capacity building through the following Human Resource Management approaches:

1. Recruitment processes

Recruitment and selection of staff to fill critical vacancies at the supervisory level will also support the realisation of the goals and objectives outlined in the IMA strategy was a key deliverable of the Human Resource team.

The Human Resource Department worked to ensure the Institute had the right staff; with the appropriate level of capabilities, competencies and experience, in place at the right time so that the organisation could effectively to execute its mandate. Recruitment of staff that fit the organisation's desired culture was also paramount. Newly hired employees were on-boarded and taken through an orientation process to aid their understanding of the organisation's processes and procedures, and improve the candidates' chances of success in the job, in a bid to avoid workplace issues in the future.

2. Human Resource Planning and Staffing

In keeping with the organisation chart, the Human Resource Department will fill all positions with individuals who are assessed by the Institute to be capable of discharging the duties and responsibilities of the post in a competent, effective and efficient manner and to the required standard.

To achieve the objectives outlined in this Strategic Plan the senior management positions ought to be filled on a long term, permanent basis. The vacant positions of Principled Research Officer are required to be filled with experienced and competent professionals who can provide leadership and guidance to the staff of the Institute, subject to availability of funding.

There are some types of expertise that the Institute would only be able to recruit if the IMA is allowed to offer compensation packages in keeping with market rates. For such a position, the Institute, with Ministerial permission, would have to offer the position on contract. For the sake of continuity and institutional strengthening managerial positions should be offered on a permanent basis subject to a probationary period.

Innovative means of securing necessary expertise will continue to be utilised, for example:

- Collaboration with the Ministry of Education and the Ministry of labour for specific resources.

- Affiliating with The University of West Indies and The University of Trinidad and Tobago.
- The Research Fellowship Programme as a means of encouraging the development of specialised skills in the various areas of study, while at the same time harnessing the resource to assist in the research activities.
- The Summer Internship Programme to give university students the opportunity to get involved and assist in research activities and thereby encourage students to consider careers in marine research.

3. Compensation and Benefits

The Institute is funded by government and as a result the levels of salaries and allowances are constrained by pay levels in the general public service which in turn are national economic circumstances and what is available in government's consolidated fund.

All efforts are being made to amicably conclude negotiations on all outstanding Collective Agreements for 2013 – 2016 and 2016 to 2019. The Human Resource Department will continue to calculate for payment and record all claims for Overtime and Compensatory Time earned.

The Institute, in providing benefits (non-cash element of the total compensation package) to employees, meets a heavy cost. Group Health Insurance, Pension Plan, Life Insurance, EAP, Commuting Assistance, staggered work hours, subsided loans and advances, special allowances and uniforms are some of the benefits enjoyed by the staff.

The Human Resource Department will continue to review the present programme of benefits to ensure that the needs of the employees are being met and to ensure that each benefit is supportive to achieving the Institute's strategies, goals and desired organisational culture.

The Human Resource Department supervised a comprehensive job evaluation and compensation exercise conducted by the Human Resources Company (HRC) that is tied to the Institute's Strategic Plan to ensure that senior positions which do not fall under the Bargaining Units are properly compensated based on the reasonable market value of the jobs.

The recommendations from the exercise were submitted to the Ministry of Planning and Development for onward submission to the Human Resource Advisory Committee and final government approval.

4. Industrial Relations

The Seamen and Waterfront Workers' Trade Union is the recognised bargaining agent for the Institute's staff. The Institute continues to maintain good relations with the have good relations with the Union for the purpose of facilitating arrangements for negotiations, consultations, communication and the settling of grievances. The Human Resource Department has been able to oversee the proper implementation of the terms and conditions agreed to in the Collective Agreements. Discussions are on-going with regard to negotiations for having the government settle outstanding compensation and benefits since the Collective Agreement in force is dated.

5. Training and Development

Training and development improves employee engagement. Continuing the education of employees on the establishment and the upgrading their skill sets and knowledge is the key responsibility of the Human Resource Department. Ongoing employee training is vital for the Institute to maintain its level of expertise, professionalism, and relevance. Where possible the Institute would provide support in the form of partial funding or assist in locating external funding.

Having regard to reduced government allocations, the Human Resource Department was required to source alternative funding and or create innovative training and programmes, to ensure that employees were equipped, utilising whatever resources were available.

Research Staff were encouraged to pursue higher research degrees and were allowed to utilise the IMA resources to undertake studies aligned to the IMA's core business. Where full-time study, programmes were required, the Institute may grant of study leave in conformity its policy on Study Leave.

The new organisational structure proposes that the post of Secretary be upgraded to that of Administrative

Assistant. The Institute has pledged to support the present secretarial staff to acquire the necessary higher-level skills through participation in the APS Diploma Course at UWI.

In keeping with the strategic objective to obtain laboratory accreditation, laboratory staff have been undergoing training in the requirements of such accreditations.

Opportunities for undertaking collaborative research with scientists in the Latin American countries was also available.

The Human Resource Department continues to work with the department heads to determine the skills/ competence gaps and to develop training strategies to reduce and/or eliminate these gaps wherever possible.

6. Performance Management

To ensure organisational excellence and promote high levels of productivity the existing Performance Management System will be utilised more effectively as both staff and managers are supported with regards to improving their knowledge of how the tool is to be utilised. All employees have been educated about their role, function, and what they are accountable for, that is, the Key Performance Indicators and Key Behaviour/ Competence Areas, specific to their roles. The Human Resource Department has facilitated the developing of key targets, performance planning, interim reviews and the final closeout of performance appraisal processes.

7. Employee Relations

The Human Resource Department places emphasis on keeping employees grounded by maintaining and improving employee satisfaction and workplace harmony. Employees were recognised for their contribution and international observances such as Administrative Professionals Day, Women and Girls in Science, Mothers' and Fathers' Day and national state holidays were among the observances to encourage camaraderie and well-being. Staff accomplishments and achievements were recognised through the Institute's Internal and at other times External Newsletters.

The Human Resource Department also promoted and encouraged employee wellbeing and work life balance initiatives by hosting a Health Fair for employees and Managing Work/Life Virtual Sessions.

Human Resource Policy Development

The existing Personnel Policy Manual was upgraded to a Human Resource Policy Manual. The Human Resource Department ensured that the policies and procedures embraced and reinforced the philosophies and values of the desired organisation culture in line with international human resource best practice.

The Human Resource Policy Manual is also in alignment with the IMA's Collective Agreement, the labour laws of Trinidad and Tobago and contemporary best practices. An Employee Handbook, summarising these policies, has been drafted for consultation and final distribution to staff.

8. Employee Services

The Human Resource Department will continue to administer the Group Plans namely, the Group Health Plan, Travel Insurance and Group Life Plans. The department will continue to administer employment, industrial and executive medicals and the issuance of staff uniforms (including field gear).

The department's role as the official liaison with the Employee Assistance Programme (EAP) Service Provider and Chair of the EAP Steering Committee will continue. As part of the EAP activities, educational workshops to promote mental and emotional wellbeing will be delivered. Other activities to promote greater use of the programme will also be undertaken.

9. Health and Safety

The Human Resource Department, through participation on the Health and Safety Committee continue to monitor/oversee the health and safety of workers at the Institute to facilitate a safe working environment in keeping with the legislation of Trinidad and Tobago.

PART 6
PROCUREMENT PROCEDURES

The Procurement Unit's responsibilities are in regard to all procurement activities which are undertaken at IMA, unless otherwise provided by a recorded decision of the Board of Governors. Unless so specified by the BOG, procurement activities carried out by other departments are conducted as agents of the Procurement Unit. The Procurement Unit main responsibility is ensuring that organisational procurement of goods and services is done in accordance with the provisions of applicable laws and the Institute's approved policies and procedures and from an established Approved Vendors Listing.

A procurement professional was recruited in 2019 for the purpose of aligning the IMA policies and procedures with the impending proclamation of the Public Procurement and Disposal of Public Property Act, 2015 (Act No. 1 of 2015) as amended. New forms and standard operating procedures in line with the regulations contained in the Act were developed and sensitisation of IMA staff with on the new procedures and requirements of the Act was done in a bid to ensure the IMA's readiness of the impending proclamation of the new legislation.

PART 7
PUBLIC AND COMMUNITY RELATIONS

INFORMATION CENTRE

The Information Centre (IC) undertakes the promotion of the research work of the Institute of Marine Affairs and the public education and awareness initiatives in a bid to encourage marine conservation and the sustainable use of marine resources. The Information Centre also disseminates research results to inform policy and to keep stakeholders abreast of ongoing studies. For this purpose, the Information Centre includes a Library that serves as the only national repository and documentation centre that provides local and regional marine environmental information.

The Centre is accountable for the following:

- Public Education and Awareness
- Information dissemination (including Social Media)
- Stakeholder relationship management
- Library services

The following strategic developments were spearheaded under the various categories for the period October 2019 to September 2020.

COMMUNICATION TACTICS

The Information Centre is tasked with the responsibility of communicating the research output information and conducting outreach with a number of key stakeholders: schools; academia; the business community; civil society; and the general public. A Strategic Communications Plan was devised and approved by the Board of Governors in Fiscal 2019, and provided the basis for external and internal communications and engagement activities of the IMA. A major tactic of th plan was a national survey to set the baseline for ongoing communications activities with the IMA stakeholders and provide feedback on the success of past initiatives in a bid to hone a communications strategy that was evidence-based and filled whatever gaps identified by the national survey.

A major aim of the communication strategy was to refine the development of marine environmental messages and expand reach of the Institute's communications products to audiences that were not hitherto actively engaged, in a bid to increase the organisation's visibility.

Consistent with its mandate to promote a public understanding of and appreciation for all aspects of the marine and related environment, the Information Centre (IC) made significant contributions to the dissemination of marine environmental knowledge through the production and implementation of public education programmes. The dissemination of marine environmental knowledge/messaging was achieved using a combined approach of traditional and digital communications.

This section covers deliverables that were achieved in traditional and digital communications media for the period under review. Traditional media, which briefly documents deliverables attained for fiscal 2020, comprised the following:

- Traditional Media: Direct Engagement
- Traditional Print Media – Newspapers; External Newsletter, and Tidal Calendar
- Traditional Broadcasts Media - Radio Broadcasts
- Digital Communications-New Media: Website; Internal News Blog; Social Media, SeaiTT Mobile Application and Virtual Distinguished Lecture

The Centre also engages a number of stakeholders directly, either via face-to-face meeting or virtually (as a result of the COVID 19 restrictions).

Direct Engagement

Face to Face Engagement

The Centre actively engages a number of school pupils, tertiary level students, stakeholders, community-based organisations, non-governmental organisations, government agencies and the private sector through the staging of public exhibitions, delivery of school presentations and other outreach activities.

Information Centre's public awareness and outreach programme engaged **1,969** students and teachers, which included primary school pupils, secondary school students, tertiary level students, citizens and various private and public organisations and agencies, during the period October 2019 to March 2020. Marine conservation awareness was carried out in various forms, including educational talks, games, exhibits.

Twenty-five (25) secondary school students and ninety-four (94) primary school students were accommodated at the IMA for a tour of the Fisheries and Aquaculture Research Programme.

The Information Centre participated in environmental exhibitions where the Information Officers engaged more than 600 persons on the significance of coastal and marine conservation. During outreach activities, Officers delivered presentations on various topics including Coral Reefs and Wetlands, Climate Change, and Marine Litter/Pollution to more than 700 students at several primary and secondary level schools in Trinidad and Tobago. The Officers also facilitated several career days at both primary and secondary schools, disseminating information and guidance on the subjects required for a career in marine sciences.

The IMA in collaboration with Ministry of Works and Transport, Coastal Protection Unit, was involved in an outreach campaign to inform students about coastal erosion in Trinidad and Tobago, through the Comprehensive National Coastal Monitoring Programme (CNCMP). Coming out of the CNCMP, a National 'Coastal Tales' School tour was hosted from 28 January 2020 - 18 February 2020, with a total of 510 students engaged. Thirty-seven (37) schools along the northeast, southeast and southwest coasts of Trinidad were visited by Coastal Protection Unit and the Institute of Maritime Affairs to share information via presentations on coastal issues as part of its stakeholder engagement strategy. The presentations were delivered via multimedia (PowerPoint and video), with a duration of thirty minutes, inclusive of ten minutes to stimulate an interactive session of questions and answers. A display area with the aid of posters was staged at each school to highlight the current state of erosion at each respective coastal area. (Appendix V). Unfortunately, due to the COVID-19 pandemic and the national stay at home order issued in March 2020, no further community outreach could have been carried out, therefore the outreach and public awareness activities with a face-to face component, such as the "Sea and Me" Project could not take place. Additionally, the annual International Coastal Cleanup to raise awareness about marine pollution could not take place due because nation's beaches were closed in September 2020.

However, a number of virtual activities were undertaken in a bid to keep the IMA's stakeholders engaged and informed.

Virtual Engagement: The Distinguished Lecture Series

A virtual distinguished lecture and panel discussion was hosted by the IMA on 20 July 2020 via a zoom conference and facebook live stream. The purpose of hosting the distinguished lecture was to generate ideas on how the concept of the Blue Economy could create revenue generating opportunities for Trinidad and Tobago. The lecture was presented by Professor John Agard, Professor of Tropical Island Ecology, UWI and Director of the St. Augustine Centre for Innovation and Entrepreneurship, UWI. The lecture was entitled "The Blue Economy – Driving Economic Diversification: Possibilities and Challenges for Trinidad and Tobago". Guest lecturers/Panellists were Dr. Thackwray Driver, CEO of the Energy Chamber of Trinidad and Tobago; Mr. Baldath Ramkissoon, General Manager, Treasury, Republic Bank Ltd; Mr. David Ramjohn, CEO of Alg Internal and Head of Sustainability Kind Earth Tech; Mr. David Simmons, Managing Director of Simmons and Associates; and Dr. Ryan Mohammed, Biologist and representative for Council of Presidents for the Environment. Current blue economic activities in Trinidad and Tobago and the wider Caribbean include fisheries, tourism, transportation and oil and gas. There is enormous potential available for other blue economic activities such as marine biotechnology, renewable energy, utilising offshore wind energy and solar energy as well as using sargassum and algae. The lecture followed by the panel discussion stimulated an interactive question and answer segment by the viewing virtual audience.

Media Coverage Report

The event garnered considerable press (newspaper) coverage and social media activity. Newspaper articles were written on the Institute's Virtual Distinguished Lecture enabling and fostering the start of a national conversation on the blue economy. Coverage included five (5) news articles that were published in the following national dailies.

1. The Trinidad Express
2. The Trinidad Guardian
3. The Newsday
4. LoopTT

The following table provides a list of news articles

Date	Title of Article	Newspaper
20th July 2020	Big Money in Trinidad and Tobago's Mangroves says UWI Professor	LoopTT
22nd July 2020	UWI Professor: TT's Blue Economy must be Managed Sustainably	LoopTT
23rd July 2020	Agard: Get more Money $$ from Cruise Ships	The Newsday – Tobago Newsday
23rd July 2020	Making the most of the Blue Economy	The Trinidad Guardian
23rd July 2020	Blue Opportunities in COVID-19 Times	The Newsday

The event also gained international recognition as Ms. Daniela Palma Munguia, President of the Economic Transformations Group (ETG) Consultancy in New York, requested a phone interview with Professor John Agard and Ms. Carter-Fisher to discuss this country's blue economy opportunities, having read some of the news articles. These discussions will serve to provide significant information for an Inter-American Development Bank Report thereby highlighting the sustainable development opportunities of Trinidad and Tobago while underscoring the research efforts of the IMA. Please see appendix VI on page … for more information)

A recording of the lecture was also posted to IMA's facebook page for additional views at https://www.facebook.com/IMAgovTT/videos/1143132512732075

Traditional Print Media Initiatives

Traditional Media – Newspaper Articles

Consistent with the mandate of the Information Centre (IC) to disseminate information on all aspects of the marine environment, the Library coordinated the publication of thirty (30) newspaper articles in three national circulating newspapers through the development and implementation of a newspaper editorial content plan.

Guided by the objectives of the Research Programmes WorkPlan 2018-2020 and approved by the Director (Ag.), the newspaper editorial content plan comprised an itemised list of marine environmental topics set to a calendar for the timely submission and release/publication of articles. For the period under review, twenty (20) newspaper articles were submitted and published thirty (30) times in three national circulating newspapers (Daily Express, Newsday and the Trinidad and Tobago Guardian) and one online platform – Looptt. These articles were also uploaded on the Institute's website and the following websites in an effort to expand reach to online stakeholder communities –

- Institute of Marine Affairs – www.ima.gov.tt
- Ministry of Planning and Development website – www.planning.gov.tt
- Arthur Lok Jack Global School of Business – www.lokjackgsb.edu.tt
- National Library and information System Authority (NALIS) – www.nalis.gov.tt

All published articles included the logo of the IMA which enhanced the Institute's brand messaging and stakeholder recognition. The use of traditional media such as the newspaper is still a viable medium to raise awareness on marine conservation and environmental issues. (Appendix V).

The IMA publishes an **external newsletter** entitled, IMA News in April, August and December annually for the purpose of providing updates on the progress in research projects and the results of environmental monitoring initiatives such as beach water quality, wetlands health and more. A tidal calendar, the **IMA Tidal Calendar 2020** was produced to not only inform of tidal projections but to showcase the beauty of the seascapes and coastal areas. These tidal projections support the fishing, maritime sector and yachting sectors, to list but a few.

Traditional Broadcast Media Initiatives

Despite the rapid proliferation of new information and communications technologies (ICTs) in the media industry that reflects a gradual shrinking of traditional media giving way to digital media, radio broadcast still has a dominant role in our society. According to a National Environmental Literacy Report that was produced by the Environmental Management Authority in 2016, radio and television remain the first source of information of the general public. Considering the fact that traditional media remains a stalwart in today's dynamic media landscape, the IC used radio broadcasts programming to alert, raise awareness and foster a better understanding of environmental issues to key stakeholders and the general public that would not only attempt to change public attitudes and perception but to also garner their support for the protection and conservation of natural resources. Funded by the Republic Bank Limited, the IC produced forty (40) radio programmes entitled, Beyond the Blue (BTB) – the IMA Supporting Vision with Science for the period under review.

A radio content editorial was crafted identifying content and internal and external subject matter experts for the marine environmental matters to be explored. Subject matter experts via the aid of an interviewer, the IMA's Chief Information Officer, used story-telling to frame the narratives around which the various issues, their significance and impact, were explored. The Beyond the Blue – the IMA Supporting Vision with Science Radio Programme focused and delivered on the following marine environmental content for fiscal 2020;

- water quality at our beaches;
- status of Tobago's coral reefs and the impact of bleaching on the marine ecosystems such as coral reefs;
- turtle hatcheries;
- the significance of the United Nations Decade of Ocean Science for Sustainable Development 2021-2030;
- blue economy;
- sustainable fisheries; and mangrove conservation.

The aforementioned bulleted list represents a part of the varied and comprehensive content that was produced and disseminated to the public. Produced by the staff of the Information Centre and disseminated to the general public via the following radio channels:

- I.95.5 Fm during the morning drive time;
- Sangeet 106F during the afternoon drive time; and
- Radio Tambrin during mid-morning, the broadcasts were also shared via the IMA's website.

With the inclusion of environmental radio programmes to its outreach agenda, the IC was able to raise awareness to key environmental concerns thereby delivering on its mandate.

The BTB, funded by Republic Bank Limited and administered by the Chief Information Officer, had the overall objective of raising awareness to several issues that challenge our marine environments. The grant supported the development of a radio broadcast but also an in person Marine Science Exhibition (which could not be hosted owing to national COVID 19 restrictions on in-person meetings) and the hosting an in-person Distinguished Lecture, which was held virtually having regard to COVID 19 restrictions.

The following are some of the comments of listeners to the broadcast.

"Those people at the IMA are really bright, you know, you learn so much on the environment. I look forward to the programme."

The broadcasts were also made available to members of the public via the on IMA's Sea iTT Mobile Application as well as on the IMA website at www.ima.gov.tt.

A Prize Giving Ceremony for the "Beyond the Blue" Marine Environmental Exhibition's Essay Competition was held on 11 December 2019 at IMA's auditorium. The three winners were from St. Augustine Girls' High School, receiving the top prize, Vishnu Boys' Hindu College and St. James Secondary School. Students who attended IMA's Marine Exhibition at NALIS in September 2019, were encouraged to submit an essay after being exposed to the various issues surrounding ocean health, climate change and the supporting roles of mangroves and coral reefs regarding coastal protection. This exhibition was part of its education and awareness campaign to raise awareness in anticipation of the UN's Decade of the Ocean beginning in 2021.

Digital Communications

Digital communications incorporate the use of digital tools to effectively communicate with stakeholders, staff and members of the public. A rapidly growing communication channel, digital communications continue to be cost-effective resulting in it being the most preferred medium/platform for communication, particularly by government agencies and ministries.

The following section captures a snapshot of the performance of digital communication in supporting the Institute's strategic goals and research objectives for the period October 1st 2019 to September 30th, 2020. The section is further divided into the following categories;

- Website Management Performance
- Social Media Performance
- WhatsApp Usage
- Mobile App Launch

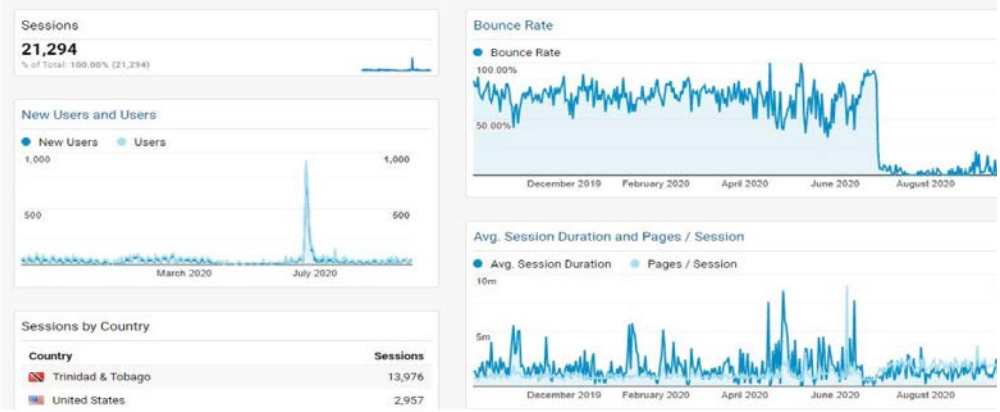
Website Management Performance (www.ima.gov.tt)

The website of the IMA has been developed with the objective to promote the research output (publications and data) of the four research programmes, to raise awareness on marine environmental issues, provide conservation solutions and advice to these environmental issues, disseminate pertinent research-based, scientific information and provide information on the Institute's public education and awareness/outreach activities.

As the IMA website (www.ima.gov.tt) is quickly becoming a main platform to engage new visitors and stakeholders, connect with existing online communities and retain current stakeholders, measuring the performance of its website/web page has become a strategic issue.

To measure performance, Google Analytics was used to provide an overall snapshot of the website's audience (visitors and users) and their activity through a dashboard. This is usually done by tracking key performance indicators such as pageviews, bounce rates and referral traffic. The dashboard helps to also measure visitors' and users' data to optimize for website usage efficiently. The following dashboard measures the Institute's web page (www.ima.gov.tt) performance in communicating its environmental messages to external members of the public for the period 1st October 2019 to 1st September 2020.

The following image provides a graphical illustration on the number of visitors, the average number of pageviews, the engagement or average page duration and geographical location).



Sessions - There were 21,294 sessions for the period under review which refer to user interactions with the Institute's website within a given time frame – 1st October 2019 to 30th September 2020.

New Users or Visitors – Out of the 21,294 sessions for fiscal 2020, a little over 600 new or unique visitors accessed the web page based on the illustration. Unique visitors are more valuable than returning visitors as it shows the IC's successful efforts to expand reach to new visitors. The sessions and unique visitors peaked in the months of June – July 2020 which coincided with the national pandemic lockdown. As persons were forced to stay indoors to limit the spread of the coronavirus pandemic, they were drawn to the content placed on the IMA website. Furthermore, the virtual Beyond the Blue Distinguished Lecture and Panel Discussion event, which was held on the 26th July 2020, drew numerous visitors to the website.

Engagement – Based on the graphical illustration generated from Google Analytics, the bounce rate of 75% to 85% was extremely high for the months October 2019 to June 2020 and nose-dived to an optimal 15% and under for the months July to September 2020. Again, this can be attributed to the virtual Beyond the Blue Distinguished Lecture and Panel Discussion event and the Beyond the Blue Radio Broadcasts uploaded onto the cloud. The low bounce rate recorded in the latter months of fiscal 2020 means that visitors were spending time on landing pages and clicking on available links.

Sessions by Country

Country	Sessions
Trinidad & Tobago	13,976
United States	2,957
Jamaica	1,570
Canada	358
United Kingdom	262
Barbados	179
China	127
India	121
Germany	110
Antigua & Barbuda	99

Geographic Report – This part of the analytics reveals where visitors to the IMA web page are geographically located. Based on the illustration at the side, the majority of returning visitors who accessed the website more than once were from Trinidad, followed by the United States at 2,957 sessions and Jamaica at 1,570

Social Media Management

Social media has become so widespread in its use that government ministries utilise this digital channel to connect and communicate effectively with key stakeholders and members of the

public. In fiscal 2020, the IMA continued to use social media to promote its research output, raise awareness to the UN declared and observed environmental days and to expand reach to users and persons with an interest in marine environmental science. Social media continues to represent an opportunity for the IMA to grow its audience in a quick and cost-effective means through the provision of timely and relevant content. One such example was the virtual Beyond the Blue Distinguished Lecture and Panel Discussion event which saw an increase in followers and users.

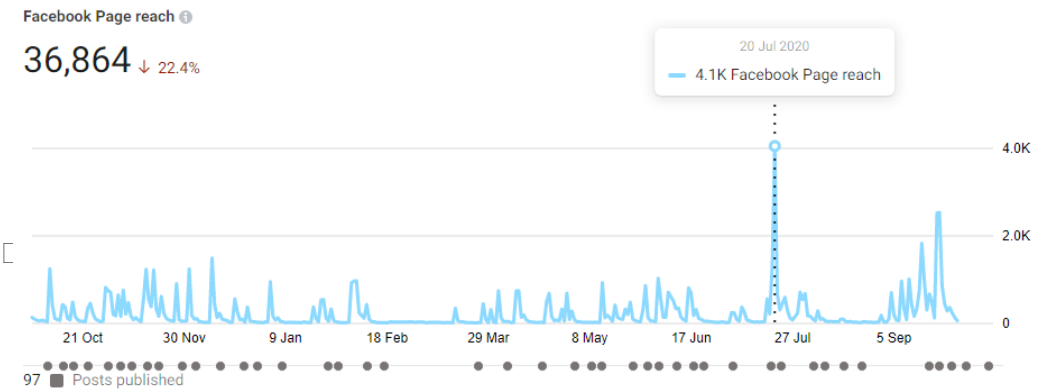
In fiscal 2020, the IMA maintained an active presence on three primary social media platforms: Facebook, YouTube and Twitter.

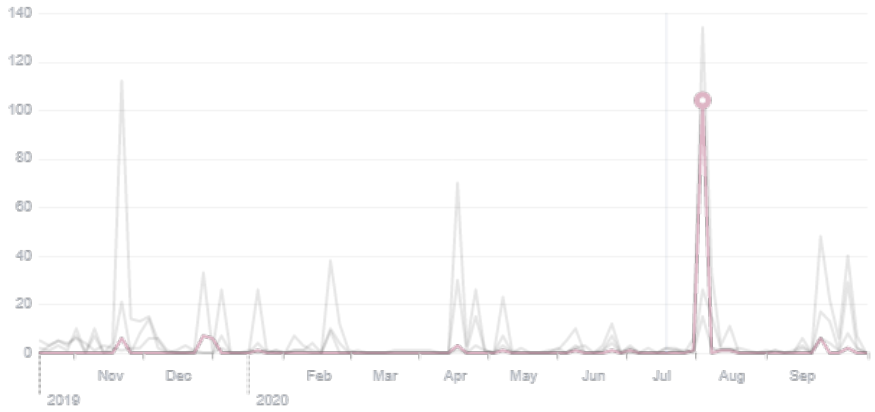
Facebook – With billions of users across the world, Facebook continues to be the most widespread social media tool used by government administration, business, industry, homemakers and the IMA to communicate with stakeholders and general public. The following represents analytics for the period under review.

Facebook:

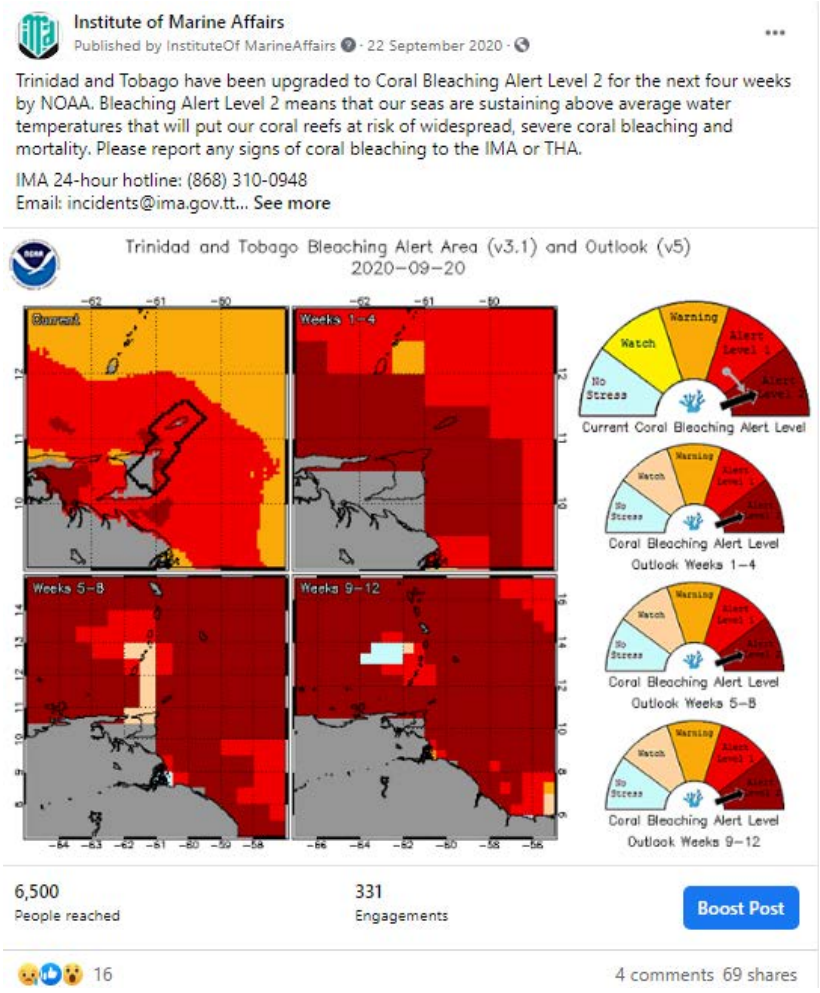
- New followers - 318
- Followers – 3863
- New Page Likes – 296
- Total Reach – 38,694

- **Total Reach – 36,864 (Facebook)**





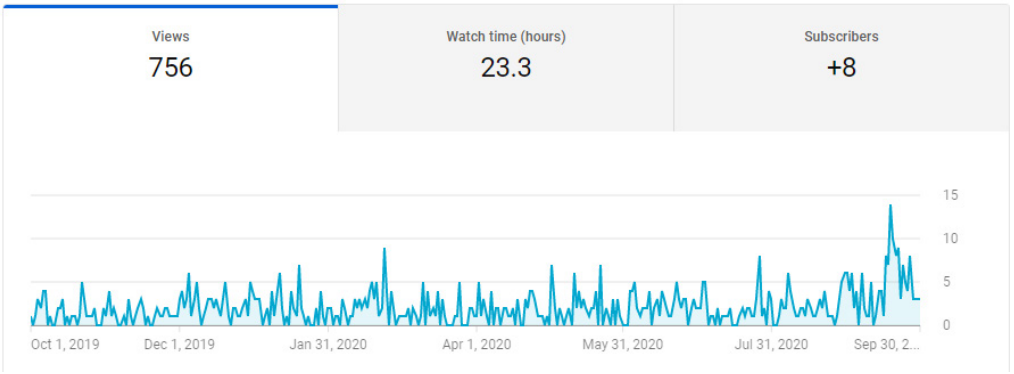
Recent content	Content type	Reach	Likes and reactions	C
Trinidad and Tobago ha... 22 Sep 2020		6.5K	73	
Institute of Marine Affair... 20 Jul 2020		5.4K	136	
Can you feel the heat? D... 16 Sep 2020		3.1K	42	
According to NOAA, app... 10 Jun 2020		3.1K	49	
Untitled 11 Dec 2019		2.3K	116	



YouTube

YouTube remains the top video platform in the world with over 1.5 billion monthly users. Uploading home-grown educational videos on marine environmental issues, produced by the IMA, provides the opportunity for environmental messages to be shared, disseminated in the hope of bringing changes in attitudes to how society views its precious marine resources. The following analytics refer to the period under review.

- YouTube 11 Subscribers – 19 likes and comments
- YouTube Posts -3
- Total Impressions -
- Followers -160
- Total Posts – 5
- Total Impressions: 9602
- Total Engagements (Likes, Comments, shares)
  - » 49.4Watch time (hours)
  - » 1625 Views
  - » 1:49 Average view duration
- Top Posts
  - » 756 views
  - » 23.3 Watch Time(hours)
  - » Generating 8 additional subscribe
  - » View duration 1:52 (minutes)
  - » 40.6% - Average percentage viewed



Twitter

- Total Tweets 43
- Tweets Impressions: 72851
- Profile Visits: 674
- Mentions: 71
  - » New Followers: 93

Stakeholder Relations

In support of Trinidad and Tobago's youth and the development of interest towards marine science, along with encouraging students to be environmental stewards, the IMA awarded its 2019 Marine Biology Award to a UWI student from the Faculty of Science and Technology at a ceremony held on 22 October 2019.

Achieving one of its targets according to the IMA 2019-2024 strategic plan, IMA signed a Memorandum of Understanding with the University of the West Indies which sought to strengthen the scientific and technical cooperation in the areas of research, training and public education.

Internal Relations

- In an effort to engage with its internal audience, IMA transitioned from a printed internal newsletter to an internal blog. Articles such as "Living the IMA Brand" was published to inform staff about what the characteristics of the IMA brand entails in concrete terms as it relates to the actions, behaviours and beliefs that staff must adopt if they are to successfully communicate the brand experience to stakeholders.

- The internal blog also highlighted some of the work and contributions of the IMA's Green Team, which is a group dedicated to ensuring that the IMA practices what is preaches in terms of conducting its activities in the best interest of environmental conservation and preservation. Waste collection and the keeping of green spaces on the IMA campus were some of the issued highlighted.

- The internal blog was produced for months of December 2019, January 2020, February 2020, June 2020 and July 2020 and was hosted on an internal platform using WordPress. This blog ensured staff remained connected throughout the national COVID 19 responses which necessitated working from home beginning March 2020.

- World Wetlands Day 2020 was commemorated with a visit to Chacachacare Island on 31st January by IMA staff. All categories of staff were exposed to a lecture on the role and importance of wetlands and why they need to be conserved. Themed "Wetlands and Biodiversity",IMA workers also learned about the island's rich history, and the types of surrounding biodiversity at the site. The trip also included a visit to Salt Pond.

- A retirement function was held on the IMA compound to recognise the dedicated service

and contribution of Corporal Veronica Deane to the IMA on 10th October 2019. Staff attended and expressed their gratitude to Corporal Deane for her devotion to the IMA over the years.

- A retirement function was held in recognition of Christine Bullock, Senior Research Officer, Deborah Patterson-Lewis and Derry Juman on 25th October 2019 on the IMA's compound where staff bid farewell to the three for their loyalty and dedicated service to the IMA.
- IMA's Christmas potluck brunch was celebrated on 13th December 2020 in the auditorium of the IMA campus.

The LIBRARY UNIT

In alignment with Goal No. 14 – Life Under water, which is articulated in Theme V of the Government of the Republic of Trinidad and Tobago's National Development Strategy – Vision 2030, the Institute of Marine Affairs (IMA) Library Unit continued to meet the research objectives and information requests of the support departments through the provision of a comprehensive cache of relevant and current information resources. This section onwards documents the achievements and contributions made by the Library Unit for the fiscal period October 2019 to September 2020. For readers' convenience, the fiscal period is referred to as FY2020 throughout this section, which is organised under the following sub-headings;

- Library Management
- Library Operations
- Library Services

Library Management

The Library's mission is to provide a current and comprehensive cache of varied formats of information that support the Institute's strategic direction and meet the relevant needs of the research programmes and support departments. In FY2020, the Unit continued to support the the IMA's research and public education and awareness thrust through online access to current informational resources in the wake of COVID-19 pandemic.

Management of the Library Unit demanded an appropriate response to the COVID-19 pandemic and ensuing national lockdown with the use of Information Communication Technologies (ICTs) that would enable and maintain a healthy and safe workplace for staff and internal users, provide continued access of information service to remote users during the national lockdown, and ensure the continued acquisition of electronic resources and operational activities.

1. COVID-19 Library Response
   i. On Thursday 12th March 2020, the Honourable Terrence Deyalsingh, Minister of Health, confirmed Trinidad and Tobago's first imported case of the Novel Coronavirus officially named COVID-19. Declared a Public Health Emergency of International concern in January 2020 by the World Health Organisation (WHO), the novel coronavirus COVID-19 was later upgraded to pandemic status in early March. On March 27th, 2020, Dr. the Honourable Keith Rowley, Prime Minister of the Republic of Trinidad and Tobago, publicly announced the closing of all non-essential public and private businesses, sporting and recreational activities and places of worship in an attempt to mitigate exposure to the COVID-19 virus and save lives. This closure, which was referred to as the national pandemic lockdown, took place during the months 27th March April to 16th June 2020. As a non-essential public service, the Institute of Marine Affairs was closed inclusive of the Library. Although fully closed to the public, the Library was still able to provide/offer a virtual information service during the pandemic lockdown in April - June 2020.

   ii. Given that there is no known cure available for the COVID-19 virus at the time, the IMA Library closed its public walk-in information service to staff and members of the public on 27th March 2020 in an effort to prevent the spread of this highly contagious and deadly illness.

   iii. Correspondence informing of the Library's closure due to health and safety concerns related to the COVID-19 pandemic were sent via e-mail to five key stakeholders and several public and special libraries throughout Trinidad and Tobago.

   iv. Notices informing of the availability of the Library's Virtual Information Service following its physical closure to public walk-ins were uploaded on the Institute's website www.ima.gov.tt and posted on the Institute's Facebook social media account. Although physically closed to users, the Library ensured its sustainability during this period through the provision of a virtual information service.

   v. In accordance with the COVID-19 Guidelines and Regulations articulated in the Public Health Ordinance {2019 Novel Coronavirus (2019-nCoV) (No. 32) Regulations, 2020, signage depicting compulsory wearing of face masks or coverings and six feet physical distancing were erected inside

the Library. This was undertaken to protect the health and safety of staff. The signage would remain erected and kept intact until there is provision to change them as guidance adapts and as health protocols and rules change.

vi. The National Library and Information System Authority (NALIS) and the International Federation of Library Associations (IFLA) were consulted to confirm the safe handling of returned books and other material, which were quarantined for seven days, during the pandemic.

vii. Safeguarding the health and well-being of staff also included erecting a Sneeze Guard Plexiglass for the Library Technician, which would help reinforce social distancing with the physical plexiglass barrier and, enabling library staff to work remotely or from home.

Sneeze Guard Plexiglass installed by the desk of the Librarian Technician

viii. To keep connected with Staff during the national pandemic lockdown, the Librarian ensured that marine environmental, related information products and other general fun activities were downloaded and disseminated to staff and their families while at home during the lockdown.

ix. Although the national pandemic lockdown was lifted resulting in the majority of government and private businesses to open, the Library still remained closed to public walk-ins. However, the Library opened for staff use only with increased ventilation, staff rotation and opening for shorter periods in an effort to promote staff well-being.

Library Acquisitions and Expenditure

Library acquisitions refer to the selection and purchase of materials or resources that would enrich and support the research programmes and output of the support departments. The Government of the Republic of Trinidad and Tobago, as the primary budgetary source, continued to allocate funds to acquire resources (books and select journal and periodical subscription renewals). In FY2020, the total expenditure was TTD 10,638.00, a minimal decrease of TTD 12,000 when compared to FY2019. Government agencies and ministries continued to experience reduced allocations for the period under review. As a premiere research organisation, the budget allocation is barely adequate to purchase materials for research projects and while the number of research projects continue to increase, the continuous reduction of the Library's allocation has the potential to adversely impact the IMA's research output.

MINISIS M2L Database

The Library's database combines the functions (acquisitions, cataloguing, and serials management) into a unified a system with an online public access catalog (OPAC) interface available only to staff. Discussions were held with CHACH Instruments, the sole regional service provider of the MINISIS database system, to upgrade the interface, include one social media account and to enhance access to full text publications for remote users. As the national pandemic lockdown, which took place from 27th March to 16th June 2020, helped accelerate a number of private and government businesses to offer their services online. the Library has started working with the service provider to provide an improved information service that would facilitate/ target remote users.

Library Query Database

The first phase of the Library Query Database was completed with the entry of over one hundred queries that were recorded. Work has started on the second phase which would see the option include full text queries.

Library Standard Operating Procedures (SOP)

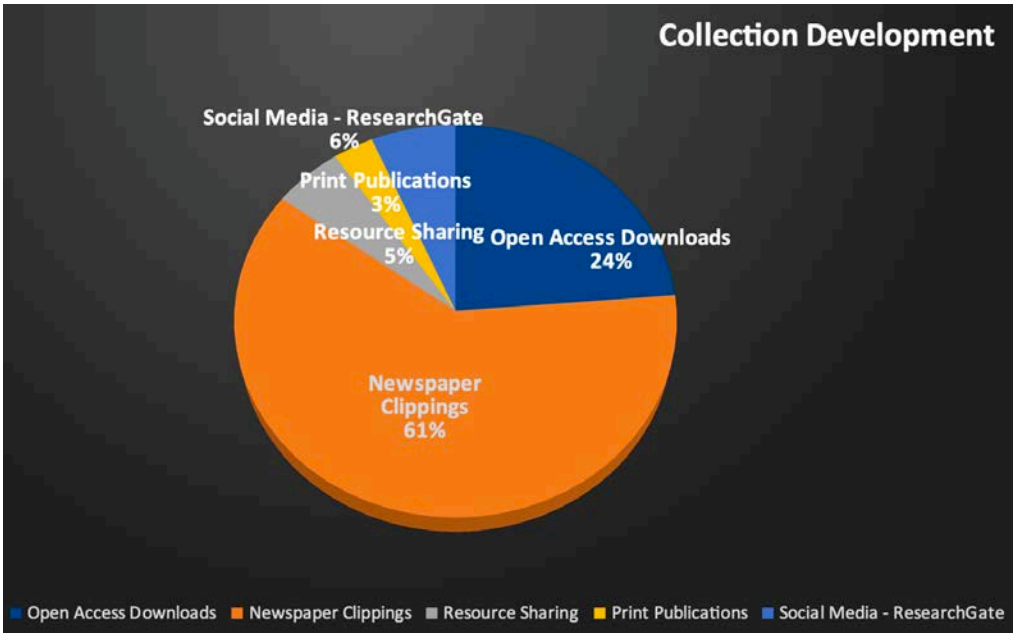
A first draft of the Library Standard Operating Procedures was prepared and submitted for external review by The University of the West Indies (UWI) Alma Jordan Library to ensure accuracy and sufficiency.

Library Operations

Library operations refer to the acquisition, cataloguing and classification, processing and storage of information resources. The following sub-sections highlight the major operational activities undertaken to advance the research objectives and public education awareness thrust in fiscal 2020.

Collection Development

A total of three hundred and fifty-four (354) publications wre added to the Library's collections for the period under review of which eighty-four (84) were downloaded from open access peer-reviewed websites, eleven (11) items received via traditional print mail, nineteen (19) items were received via an electronic mail resource sharing arrangement with The University of the West Indies (UWI) Alma Jordan Library and Environmental Management (EMA) Library, twenty-three (23) items received via social media – Researchgate and two hundred and seventeen (217) newspaper articles are searched, captured, downloaded and recorded. The eighty-four (84) electronic publications (e-publications), the second largest category format of publications that were added to the Library's collection represent the diminishing value of print material.



Newspapers provide local current content that strengthens an information service. With repeated annual subscriptions to the three national daily circulating newspapers – Daily Express, Trinidad and Tobago Guardian and the Newsday, two hundred and seventeen (217) newspaper articles relatable to the local and international marine environment were identified, captured and saved to relevant folders.

Collection Management – Preservation

In FY2020, a total of twenty-three (23) publications, totalling over one thousand four hundred (1,400) pages and seven photographs, were scanned and digitised by the Library Technician. These publications comprised research reports (33 scanned), environment incident reports (24 scanned), technical reports (14 scanned), relevant environmental photographs (7 digitised), technical advisory service reports (19 scanned) and maps (3 professionally digitised) in FY 2020. The continued digitisation of the Institute's intellectual property not only enabled preservation of corporate memory but also greatly facilitated the dissemination of information to key stakeholders and addressed remote queries.

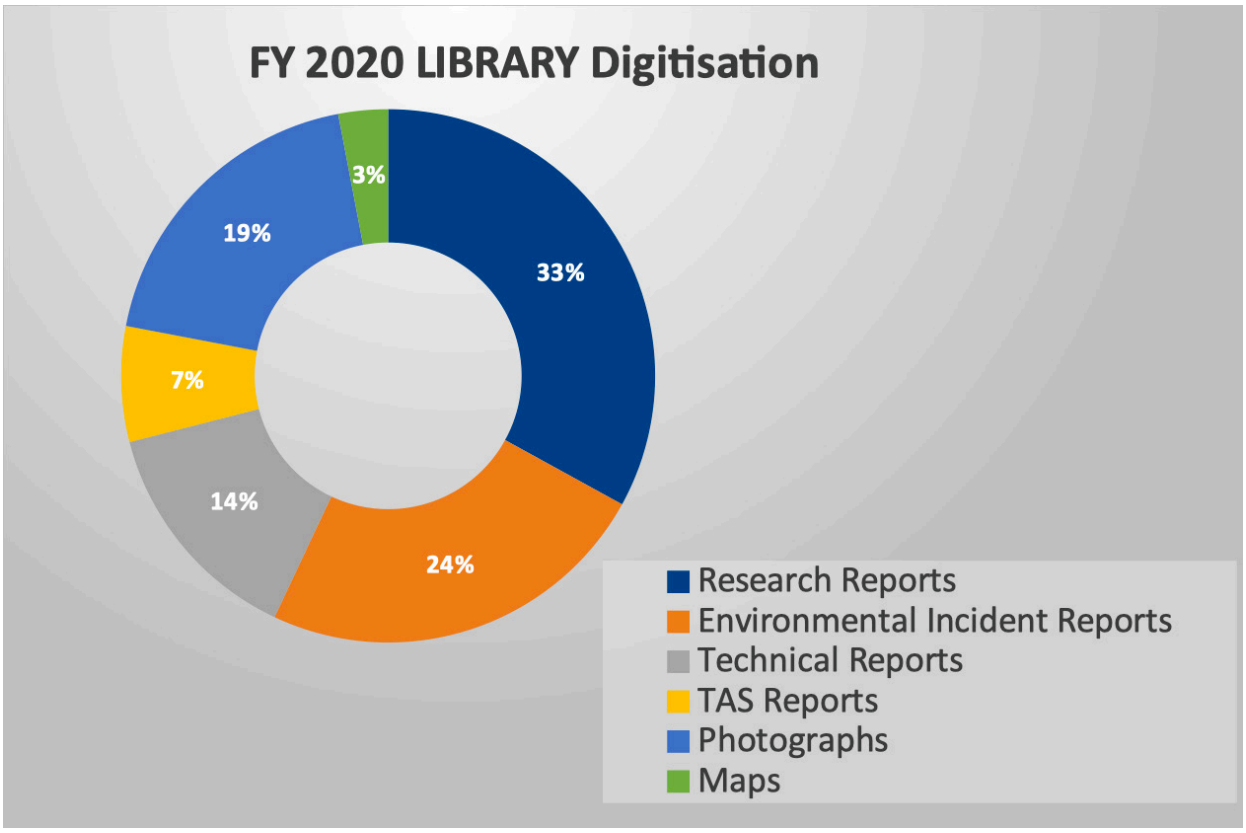
1. Collection Management

In FY2020, Fifty-nine (59) publications were catalogued, classified and entered into the Library database for the period under review, of which thirty-eight (38) accounted for electronic publications that were dowloaded from the Elsevier ArticleChoice, JSTOR and Athens online scientific platforms. Two of the publications catalogued were e-mail receipts from the Environmental Management Authority Library as part of the ongoing Library Resource Sharing with key external libraries.

Collection management also addresses weeding out obsolete and redundant reports which do not provide any relevant information to the Institute of Marine Affairs, nor can be used to stimulate research. A total of seventeen (17) reports, which focused on DOS-operated computer reports and books, were weeded from the collection to facilitate a more current collection. number of books were repaired with the use of unibind book binding system

LIBRARY SERVICES

Expanding the Institute's knowledge at the Library takes many forms, which include reference and virtual information services, select dissemination of information (SDI) services, exhibition and displays and use of physical space to name a few. The following section provides a snapshot of the library services for the period under review.



Library Key Performance Indicators – Fiscal 2019 and 2020		
Fiscal Periods	**2018-2019**	**2019-2020**
Library Services – Activity	**Total**	**Total**
Circulation of IMA Publications	**41**	**41**
Staff Users of the Library	**45**	**45**
Queries	**216**	**216**
Internal Queries	**(65)**	**(65)**
Public Walk-in Queries	**(52)**	**(52)**
Structured Groups (Schools and public)	**(31)**	**(31)**
E-mail Queries	**(53)**	**(53)**
Website Queries	**(11)**	**(11)**
Social Media Account Queries	**(04)**	**(04)**
Data Requests	**03**	**03**
Freedom of Information Requests	**02**	**02**
Physical Displays / Exhibitions	**4**	**4**
Electronic Displays	**6**	**6**
Commemorative Publications sold		
Reprographics Services		
Library Space used for Meetings	**48**	**48**
New Publication (Gratis) Additions	**20**	**20**
Downloaded publications	**31**	**31**
Cataloguing and Classification of publications	**53**	**53**
Digitization of IMA Research Reports and other publications	33	33
Newspaper Clipping Articles	277	277
Assess the helpfulness and friendliness of Library Staff	**77%** very satisfied **23%** somewhat satisfied	**77%** very satisfied **23%** somewhat satisfied
Assess overall library service	**54%** very satisfied **22%** satisfied **24%** somewhat satisfied	**54%** very satisfied **22%** satisfied **24%** somewhat satisfied
Assess the relevance and currency of content	**48%** very satisfied **52%** partially satisfied	**48%** very satisfied **52%** partially satisfied

As the Library continued its quasi-virtual information, provision of the Library's information service to its internal users and the public took many forms, which mainly included telephone reference calls towards the earlier part of the FY2020, virtual information services, select dissemination of environmental information (SDI) services, and the use of electronic word games to engage staff.

Virtual engagement with staff was conducted through word puzzle games such as Cross Word and Word Search Puzzles to observe United Nations Declared days such as the First ever World Mangrove Day Crossword Puzzle 2020.

Winners of the Library Mangrove Day 2020 Croswword Puzzle – Jerusha King and Nisa Joseph
L-R – Ms. Anasa, Mr. Cyril Best, Ms. Jerusha King, Ms. Gyllis Noel, HR Manager, Ms. Nisa Joseph, Ms. Alicia Carter-Fisher, Chief Information Officer

APPENDIX I
LIST OF IMA PUBLICATIONS FOR FISCAL 2019-2020

PUBLICATIONS

Technical Reports

- Caribbean Large Marine Ecosystem (CLME+) Ecosystem Based Management (EBM) Agricultural Survey (H. Asmath).
- Coastline Change Detection of Trinidad and Tobago (1994 to 2014) (H. Asmath).
- The bathing beach water quality along the Chaguaramas Peninsula. Trinidad, WI. 14th April 2020 (S. Ramoutar)
- The bathing beach water quality at Maracas and Las Cuevas Beach, Trinidad, WI. 18th September 2020 (S. Ramoutar)
- Status of Beaches and Bays in Trinidad and Tobago 2009 to 2015 (C. Alexis).
- National Report on Data Buoys in Trinidad and Tobago for the Data Buoy Cooperation Panel-Submitted 15th September 2020 (C. Nanlal).
- Development of Monitoring Protocols for Caroni Swamp, Nariva Swamp and Northeast Tobago Marine Protected Area - Water Quality Component (W. Nelson,).
- Report on the fingerprinting analyses on oil samples collected from vessel FSO NABARIMA in the Gulf of Paria, Venezuela. 19pp (D. Banjoo).
- An Agricultural Survey of the Guayamare and Cunupia Watersheds. (B. Maharaj, H. Asmath, F. Solomon, N. Gooding and G. Collins)
- Criteria for selecting indicators/indicator species for monitoring of Caroni Swamp, Nariva Swamp and Northeast Tobago Marine Protected Area
- The Northeast Tobago Marine Protected Area Protocol. February 2020.
- Nariva Swamp Monitoring Protocol. December 2019
- Caroni Swamp Monitoring Protocol. December 2019
- Benthic Composition of Coral Reefs of Tobago in 2019 and Summary Report 2010-2019. October 2020 (A. Ganase).
- Bullock, C. 2019. Recreational Bacteriological Water Quality of Mayaro Bay, Trinidad November-December 2008. Institute of Marine Affairs, Hilltop Lane, Chaguaramas.
- Preliminary Quantification of bacteria indicators in the water and oysters (Crassostrea Rhizophorae) along three watercourses in the Caroni Swamp, Trinidad during Seasonal Variations. 13th October 2019 (S. Ramoutar)
- Assessment of Heavy Metals in the Blue Land Crab (Cardisoma guanhumi) from the Caroni Swamp (F. Solomon and W. Nelson)
- Age and Growth Studies of the Marine Invasive, Pterois volitans (Lionfish), from an Early Invasion in Tobago Waters. Draft Report (R. Kishore, F. Solomon, T. Henry)

Research Proposals

- Green Fund Proposal: Bacteriological water quality of Trinidad and Tobago 31st July 2020
- GBIF data mobilization Grant – Concept Note for the establishment of a Marine Biodiversity Hub

- Technical proposal for the St Lucia National Trust bid - Marine Ecosystem Assessment and Rehabilitation Plan Consultancy, Pigeon Island, Pointe Sable Environmental Protection Area, St Lucia

Journal Publications

- Sheldon Ramoutar. "The use of Colilert-18, Colilert and Enterolert for the detection of faecal coliform, Escherichia coli and enterococci in tropical marine waters, Trinidad and Tobago." Regional Studies in Marine Science (2020): 101490. September 2020
- Wendy Nelson (2020). Fractionation of Trace Metals in Coastal Sediments from Trinidad and Tobago, West Indies. Marine Pollution Bulletin 150, 110774.
- Valiela, I, Juman, R. Asmath, H., Hanacek, D.M., Lloret, L., Elmstrom, E., Chenoweth, K. and Brookshire, E. N. J. 2020. Water quality, nutrients, and stable isotopic signatures of particulates and vegetation in a mangrove ecosystem exposed to past anthropogenic perturbations. Regional Studies in Marine Science 35

Newspapers Articles

- Article for World Environment Day, "Our Solutions Lie in Nature" published on May 20th 2020, Trinidad Newsday (A. Kanhai).
- Trinidad Guardian newspaper interview on June 18th 2020 (S. Ramoutar).
- "The water quality at Chaguaramas, Las Cuevas and Maracas during lockdown" May 14th 2020 (S. Ramoutar).
- Article on "Dangerous Marine Life at Sea," May 2020 (A. Jute).
- "The Role of Natural History Museums in Creating Awareness and Conserving Natural Heritage" (in press) (A. Jute).
- Tackling the Plastic Waste Crisis: The Basel Convention Plastic Waste Partnership- Trinidad Express, 28 May 2020 (W. Nelson).
- Living with Nature (World Environment Day), June 2020 (A. Ganase).
- One step towards ecosystem based management, published in Newsday, 28th August 2019 (D. Banjoo).
- Hungry parrotfish crucial to healthy reefs. Newsday. 13th May 2020 Pg. 21 (F. Solomon)
- Hungry parrotfish crucial to healthy reefs. Tobago Newsday. 13th May 2020 Pg. 11-12 (F. Solomon)
- Rethinking the Oceans: Accelerating towards a Blue Economy. Tobago Newsday. June 10th 2020. Pg. 11 -12 (F. Solomon)
- Rethinking the ocean: Transitioning to the Blue Economy. Tobago Today. Friday 12 th June 2020 (F. Solomon)

Newsletter

- EUREC4A article (H. Asmath).
- Mangrove forest carbon article (H. Asmath).

Other Publications

- Banner and brochure on marine creatures and livelihoods for FAO (A. Ganase)

- "Marine Life of the North-East Coastal and Marine Area Tobago" (Brochure and Poster) September 2020 (A. Jute).
- "Livelihoods of the North-East Coastal and Marine Area Tobago" (Brochure and Poster) September 2020 (A. Jute).
- IMA Marine Ecotarium concept note (A. Jute and A. Ganase).

Environmental Incident Reports

- Macqueripe Bay – Tracking sewage contamination – August 24th 2020 (S. Ramoutar).
- Field report on unapproved coastal protection works at Plaisance, Mayaro: September 2020 (C. Nanlal and A. Mohammed).

APPENDIX II

LIST OF TRAINING, CONFERENCES, MEETING & SEMINARS ATTENDED & PRESENTATIONS FOR MEETINGS PREPARED BY IMA STAFF FOR 2019/2020

TRAINING

- Workshop on conducting surveys on rocky and sandy shores by the Marine Biodiversity Observation network (MBON), Cancun, Mexico. March 2019 (A. Jute).
- Museology and Museum Management Training Course, New Dehli, India courtesy the Indian High Commission in Trinidad and Tobago at the National Museum Institute of History, Art, Conservation and Museology under the Indian Technical and Economic (ITEC) programme. 21st August - 3rd September, 2019. (One of four Trinidadians selected for this training) (A. Jute).
- Museum Conservation Skills Course at UWI St Augustine. September-November 2019 (A. Jute).
- Preliminary training exercise with DIQE for sieve analysis procedure and standards: July 2020 (A. Mohammed).
- Delair UX11 Drone Training- 6th- 10th January 2020 (A. Mohammed).
- World Oceans Visions Virtual Conference- July 23rd and 27th 2020 (C. Nanlal).
- Local 2030 Islands Network: Building Back Better: How Nature-based Solutions contribute to climate adaptation benefits for improved fisheries and food security in coastal communities. Wednesday 26th August 2020, 5:00 to 6:30 pm (C. Nanlal).
- Meso American-Caribbean Hydrographic Commission (MACH)-Seabed 2030 Inventory- 15th September 2020 (C. Nanlal).
- NOAA Webinar- Smart Ocean, Smart Industries 22nd September 2020
- Global Ocean Observation Service (GOOS): Co-designing the Science we need for the Ocean Decade- September 24th 2020 (C. Nanlal).
- MACH/ IOCARIBE Seabed 2030 2nd webinar-25th September 2020 (C. Nanlal).
- Trinidad and Tobago Bureau of Standards, Measurement Uncertainty Training Workshop, 6 - 9 July 2020 (W. Nelson).
- Commonwealth Blue Charter Training on Project Proposal Development delivered by UNEP-WCMC and GRID-Arendal, October 19-20, 2020 (R. Kishore).

WORKSHOPS

- Caribbean Regional Climate Outlook Forum, December 2019, Hyatt Regency Hotel. National Greenhouse Gas (GHG) Inventory Workshop, February 2020, Hyatt Regency Hotel (H. Asmath).
- Caribbean Marine Atlas continuity workshop, May 2020, online (H. Asmath).
- Land Degradation Neutrally workshop, July 2020, online (H. Asmath).
- EURICA atmospheric remote sensing workshop, August 2020, online (H. Asmath).
- Trinidad and Tobago Biodiversity Information workshop, May 2020 (H. Asmath).
- Caribbean Natural Resources Institute (CANARI) Stakeholder Workshop on Biodiversity Beyond National Jurisdiction, March 5th 2020, Barataria (R. Thompson).
- The University of the West Indies (UWI) Farmers Training Workshops for the Caribbean Large Marine Ecosystem+ Ecosystem-based Management (CLME+ EBM) Project, July 27th, August 3rd-4th 2020, Felicity and Jerningham (R. Thompson).
- Ministry of Planning and Development Inception Workshop Capacity Building Transparency Initiative (CBIT) Project, September 7th 2020, Online (R. Thompson).

- Virtual workshop by ISA on Deep-Sea Taxonomic Standardization Strategic Approaches for Collaboration. September 2020 (A. Jute)
- Virtual workshop by ISA on DeepData: Focusing on Data Management Strategy. September 2020 (A. Jute)
- Virtual workshop via the Commonwealth Blue Charter on Stakeholder Engagement (Oct 2020) and Project Proposal Development. November 2020 (A. Jute).
- Diadema Restoration in the Caribbean: What have we learned? (A. Ganase)
- Global fund for coral reefs (A. Ganase)

EXTERNAL MEETINGS

- Stakeholder meeting for the implementation of the NBSAP, 12th and 13th November 2019 (A. Kanhai).
- Inception meeting of Bioreach project, October 8th, 2019 at Cara suites (A. Kanhai).
- Ministry of Energy and Energy Industries Synthetic Aperture Radar for oil spill detection
- Trinidad and Tobago Biodiversity Information System (H. Asmath).
- CDA "Bathing beach water quality in Chaguaramas" December 17th 2019 (S. Ramoutar).
- 5th Meeting of Focal Points of the Sandy Shoreline Project (Virtual Meeting): September 18th 2020 (C. Nanlal).
- Consultation with members of DIQE regarding the IMA's assistance in the installation of 4 tide gauges at strategic location in Tobago: Thursday 23rd July 11 am-12 pm. (C. Nanlal and A. Mohammed)
- Meeting with CCCCC regarding the installation of a new CREWS data buoy system, 6th August 2020 (C. Nanlal).
- Introductory meeting with Fugro Trinidad to discuss possible collaboration and data sharing 29th September 2020 (C. Nanlal).
- Project Advisory Committee Meeting - Capacity Development for the Improved Management of MEAs for Global Environment Benefits, 10th October 2019 at 1:00pm – 3:00pm at the office of the EPPD, Level 7, Tower C, International Waterfront Complex (D. Banjoo).
- Attended IMA Lionfish Software Solution between IMA and CARRIRI team on Wednesday January 15 , 2020 10am - 12pm, IMA auditorium (D. Banjoo).
- Participated in virtual meeting on nutrient management in the Caribbean with RCU CAR UNEP, RAC CIMAB and Federal University of Para, Brazil on 24th June 10 - 11:00 am, via Microsoft Teams (D. Banjoo).
- Participated in the EMA's Virtual Presentation on the Gulf of Paria Baseline Ecological Risk Assessment on 24th June 9am - 12:00 pm, via Goto meeting Complex (D. Banjoo).
- Participated in CLME+EBM meeting with UWI and IMA on 25th June 10 - 11:00 am, via Zoom (D. Banjoo).
- Participation in virtual meeting of Contracting Parties to the LBS Protocol on Thursday 30th July 2020 at 10:30 a.m. (Trinidad time) (D. Banjoo).
- Participation in Caribbean Challenge Initiative (CCI) and the Caribbean Biodiversity Fund (CBF) 5th CCI-CBF Week. Participation in panel discussion on nature-based solutions, session 1: Nature's Role in the COVID-19 Recovery Pathway, on July 14, starting at 10:00 a.m.-12.00pm (D. Banjoo).

- Participation in virtual meeting with IMA colleagues and Ecotorium Bay , San Francisco with Dr. Dayne Buddo on plans for a Trinidad Aquarium on 19th August 2020 at 10:00a.m. (Trinidad time) via zoom meeting (D. Banjoo).
- Participation in The Environmental Policy and Planning Division (EPPD) webinar entitled "Invasive Alien Species : The Lionfish" by IMA's Dr. Farahnaz Solomon, Marine Biologist, 6th August 2020,1:00p.m via zoom meeting (D. Banjoo).
- Participation in Virtual Call with CAR/RCU UNEP on GEF CLME+ EBM (Trinidad & Tobago) on 22 September 2020, 3.00-4.00 pm via Microsoft teams meetings (D. Banjoo).
- Participation in FSO Nabarima Visit planning meeting with MEEI on 21 September 2020, 2-3 pm via zoom (D. Banjoo).
- Participation in CREWS meeting with Mr Ansel Dubon, Project manager of 5C, Belize and IMA colleagues on 6th August 2020,10:00a.m via zoom meeting (D. Banjoo).
- Participation in upstream effluent management (UEM) Working Group Virtual 29 September 2020, 9.30 12 via Microsoft teams meetings (D. Banjoo).
- Participation in FSO Nabarima Visit Inspection Checklist Development Meeting with MEEI on 29 September 2020, 1.30-2.30 pm via zoom (D. Banjoo).
- Commonwealth Blue Charter Sustainable Aquaculture Action Group Inaugural Meeting, Larnaca, Cyprus. February 25-27, 2020 (D. Robinson).
- "Road Map for the Participatory Development of Protected Area Management Plans" hosted by IFPAMTT. Virtual Event. 4th June 2020 (F. Solomon).
- Trinidad and Tobago Biodiversity Information System (TTBIS) Webinar, Environmental Policy and Planning Division, Ministry of Planning and Development. 5th August 2020 (F. Solomon).

INTERNATIONAL CONFERENCES / SYMPOSIA / WORKSHOPS / WEBINARS

- "Managing Coastal Biodiversity Under Urbanisation and Climate Change Pressures" 14th to 18th October in Singapore
- NASA Synthetic Aperture Radar for Forestry Applications training workshop. May 2020, online
- EUREC4A: A Field Campaign to Elucidate the Couplings between Clouds, Convection and Circulation. January 2020
- Global Biodiversity Information Facility (GBIF) - BID programme and other GBIF-led activities in Latin America and the Caribbean, Regional Engagement. May 2020
- United Nations Environment (UNEP) – Addressing Marine Litter in the Caribbean: Experiences from the Regional Node of the GPML. May 2020
- United Nations Environment (UNEP) - Sargassum Webinar: Sargassum seaweed invasion harms economies in West Africa and the Caribbean. May 2020
- United Nations Environment (UNEP) - Sargassum in the Caribbean and West Africa: Key Challenges, Responses and Collaboration - Human Nitrogen Footprint. May 2020
- United Nations Environment (UNEP) – Herbivorous Fish to improve Coral Reef Health: Science and regional regulatory measures. June 2020
- Global Biodiversity Information Facility (GBIF) – GBIF and sequence-based information. June 2020

- International Maritime Organisation (IMO) – Vessel-Check: an aquatic biosecurity risk assessment tool. June 2020
- United Nations Environment (UNEP) - The Science of Sargassum. July 2020
- The Environmental Policy and Planning Division (EPPD) - Biodiversity of North East Tobago-Ridge to Reef" by Ms. Lanya Fanovich- Senior Ecologist. July 2020
- Marine Biodiversity Observation Network (MBON) – MetaZooGene: Marine zooplankton biodiversity based on DNA metabarcoding. July 2020
- The Environmental Policy and Planning Division (EPPD) - Unlocking the Green Fund. August 2020
- United Nations Environment (UNEP) - Sargassum #3: West Africa Region Perspective. September 2020
- American Caribbean Maritime Foundation (ACMF) - The Maritime Linkup Beyond Borders. September 2020
- Applied Remote Sensing Training Program - Remote Sensing of Coastal Ecosystems. September 2020
- American Caribbean Maritime Foundation (ACMF) - Our Future: Our Seas:" Caribbean environmental issues, regulations, and compliance. October 2020
- The Environmental Policy and Planning Division (EPPD) - Marine Plastic Litter and Micro-plastics" by Mr. Christopher Corbin and Ms. Marissa Mohamed. October 2020
- United Nations Environment (UNEP) - Sargassum in the Wider Caribbean Region - challenges, responses, and synergies." November 2020
- United Nations Environment (UNEP) - Origin and dynamics of Sargassum in the Caribbean Sea: mesoscale analysis. November 2020
- Associated Caribbean States (ACS) - Resilience and biodiversity in marine ecosystems. November 2020
- Associated Caribbean States (ACS) - Origin and dynamics of Sargassum in the Caribbean Sea: mesoscale analysis. November 2020
- The Environmental Policy and Planning Division (EPPD) - "The Role of Ecosystems in Mitigation and Management of COVID-19 and other Zoonoses" by Dr. Thomas Gillespie Professor-Environmental Science and Environmental Health, Emory University. November 2020
- Basel Convention Regional Centre-Caribbean/ Environmental Management Authority/ Environmental Policy and Planning Division Meeting on the GEF ISLANDS Project Proposal for Trinidad and Tobago, 6 May 2020
- Environmental Management Authority- Findings of the Baseline Ecological Risk Assessment of the South West Peninsula, Trinidad, 24 June 2020
- International Atomic Energy Agency Workshop on Nuclear Techniques for Sargassum Control, Kingston, Jamaica, 4- 8 November 2019
- International Atomic Energy Agency Interregional Training Course on Ocean Acidification, IAEA Environment Laboratories, Monaco, 2 - 6 December 2019
- First Meeting of the Plastic Waste Partnership Working Group, Beau Vallon, Seychelles, 2- 5 March 2020

- EMA's National Environmental Policy Mainstreaming Workshop November 26th 2019, 8.30 -12.00 pm Bria Lara Cricket Academey, conference centre, Gasparillo
- Participated in Skype Teleconference on LBS working group with CAR RCU/UNEP on 26th March 2020, 10.00am
- Participated in Skype Teleconference on GEF CLME+ Ecosystem based management (EBM) Pilot Project with CAR RCU/UNEP and countries Guyana and Suriname on 24th March 2020, 10.00am
- Participated in Teleconference on Virtual Nutrients Meeting (GEF CLME+ EBM RNS) with RCU CAR UNEP, RAC-CUBA and Prof. Fenzl of Para University,Brazil on 30th April, 2.00pm
- Participated in Teleconference call with Prof. Mahon based on Discussion points for the CLME+ UNEP CEP Ecosystem-based adaptation (EbA) projects (Trinidad, Guyana, Suriname) on 9th April 2020, 1.00pm
- Participated in Teleconference call with RCU CAR UNEP on RACS, Development of workplan on 9th April 2020, 10.00am
- Participated in Upstream Effluent Management Working Group on Friday 12th June, 2020 at 9:30am via Zoom).
- Participated in the second Joint Virtual Meeting of the Global Partnership on Nutrients Management (GPNM) and Global Wastewater Initiative (GWI) on 10th June 2020 at 10.00-12.00
- The Blue Economy Caribbean 2019 – A Leadership and Transformation Event. Miami, Florida, October 15th 2019. Hosted by the Caribbean Development Bank (CDB), the Government of Canada and the Inter-American Development Bank (IDB)
- Consultation of CARICOM National Focal Points for the CLME+ Project. Virtual Event. June 2020
- CLME+ Project Steering Committee Meeting. Virtual Event. 16th -18th June 2020
- Consultation of CARICOM National Focal Points for the CLME+ Project. Virtual Event. 27th July 2020
- 1st meeting of the CLME+ MOU Drafting Group. Virtual Event. 1st September 2020
- Consultation of CARICOM National Focal Points for the CLME+ Project Virtual Event. October 2020
- Blue Economy Workshop: #1 The Imperative of Ocean Exploration hosted by the IDB. 10th October 2019
- "Sargassum in the Caribbean and West Africa – Key challenges, responses and collaboration". UNEP. 26th May 2020
- "Keeping up Momentum for Ocean and Climate Action in 2020". International Alliance to Combat Ocean Acidification. May 27th 2020
- "Mapping the Commonwealth one coral reef at a time". The Commonwealth Blue Charter World Ocean Day Virtual Event. June 5th 2020
- "Unlocking the wealth of mangrove ecosystems" hosted by the Commonwealth Blue Charter. July 2020
- Beyond the Blue Distinguished Lecture - The Blue Economy Driving Economic Diversification: Possibilities and Challenges for Trinidad and Tobago. IMA Virtual Lecture and Panel Discussion on the Blue Economy – 20th July 2020

- "The Blue View": Opportunities and Challenges for the Blue Economy" hosted by the Commonwealth Blue Charter. 27th August 2020

CONSULTATIONS

- Quantification of Bacterial Indicators in the water and oysters along watercourses in the Caroni Swamp. CLME project - 28th September 2020 (S. Ramoutar).
- Caroni Swamp Wider Stakeholder Consultation. IFPAMTT Project. Caroni Swamp Conference Room. 22nd October, 2019. (F. Solomon).
- Nariva Swamp Wider Stakeholder Consultation. IFPAMTT Project. 24th October, 2019. Nariva, Trinidad. (F. Solomon).
- Northeast Tobago Wider Stakeholder Consultation. IFPAMTT Project. 30th October, 2019. The Sheep Farm Conference Room, Blenheim, Tobago (F. Solomon).
- CLME+ National Consultation, Ministry of Agriculture Land and Fisheries, Aquaculture Demonstration Center, Aquaculture Unit, Bamboo Settlement # 2, Valsayn. 28th February 2020 (F. Solomon, R. Kishore)
- Caribbean Regional Fisheries Mechanism (CRFM) Independent Strategic Review, Ministry of Agriculture Land and Fisheries, Aquaculture Demonstration Center, Aquaculture Unit, Bamboo Settlement # 2, Valsayn. 11th March 2020 (F. Solomon, R. Kishore)
- Certificate of Environmental Clearance (CEC 5695/2019) for activities within the Galeota Block (offshore the east coast of Trinidad) (B. Maharaj)
- The establishment of a modern, multipurpose port at Grande L'Anse Bay, Toco, North Coast of Trinidad (B. Maharaj)
- Public Consultation Osprey East Development-CEC 5761/2019 (B. Maharaj)
- San Fernando Waterfront Redevelopment Project (CEC 5515/2018) (B. Maharaj)

PRESENTATIONS

- "Towards EBM: Governance for Effective Management of Mangroves and Wetlands" presented at IMA's CLME+ EBM Project Stakeholders Meeting on September 28th, 2020 (R. Thompson).
- Quantification of Bacterial Indicators in the water and oysters along watercourses in the Caroni Swamp. CLME project 28th September 2020 (S. Ramoutar).
- Assessment of Heavy Metals in the Blue Land Crab (Cardisoma guanhumi) from the Caroni Swamp (F. Solomon and W. Nelson)
- Pesticide levels in the Black Tilapia (Oreochromis mossambicus) from the Caroni Swamp. CLME+ Virtual Stakeholder Meeting, 28 Sept 2020 (F. Solomon, W. Nelson and D. Banjoo).
- Caroni Swamp Monitoring Protocol - Water Quality Component. IMA Stakeholder Training Workshop- FAO/IFPAMTT Project, Caroni Visitor Centre, 21 January 2020 (W. Nelson).
- Nariva Swamp Monitoring Protocol - Water Quality Component. IMA Stakeholder Training Workshop- FAO/IFPAMTT Project, Kernahan Field Station, 24 January 2020 (W. Nelson).
- Baseline Nutrient Pollution in the Cunupia and New Guayamare Watersheds of the Caroni Swamp. Presentation of Results for the CLME+ Ecosystem Based Management Sub-project to Stakeholder Agencies, September 28, 2020 - via zoom (D. Banjoo).
- "The Selection of indicators/indicator species for monitoring of the proposed North-east Tobago Marine Protected Area" - Northeast Tobago Wider Stakeholder Consultation. The Sheep Farm Conference Room, Blenheim, Tobago. 30th October, 2019. (F. Solomon)

- "The Development of a Lionfish Fishpot Fishery in Tobago, W.I." Green Fund Advisory Committee. 5th December 2019. (F. Solomon)
- "Reef Fish Identification" - North-East Tobago Marine Protected Area (NETMPA) Monitoring Protocol Training Workshop. Charlotteville, Tobago. 4th February 2020 (F. Solomon)
- "Tier I Monitoring" - North-East Tobago Marine Protected Area (NETMPA) Monitoring Protocol Training Workshop. Charlotteville, Tobago. 4th February 2020 (F. Solomon)
- "Lionfish" - Arima Boys RC School. IMA Library. March 3rd 2020 (F. Solomon)
- "Invasive Alien Species – The Lionfish". The Environmental Policy and Planning Division Webinar Series. Virtual Event. 6th August 2020. (F. Solomon)
- "COVID 19 and the Ocean – Focus on the Blue Economy". The University of Trinidad and Tobago Online Event. Environmental Stability after Covid-19. 1st September 2020. (F. Solomon)

APPENDIX III
TECHNICAL STAFF OF THE IMA SIT ON THE FOLLOWING GOVERNMENT COMMITTEES

EXTERNAL COMMITTEES

- National Focal Point- Sandy Shoreline Project executed by the Association of Caribbean States
- Member –Steering Committee GEO Blue Planet
- Member -GESAMP (Joint Group of Experts on the Scientific Aspect of Marine Environmental Protection) Working Group 41 on Climate Intervention for Climate Change Mitigation
- National Representative Technical and Legal Submissions of the Caribbean Sea Commission, Association of Caribbean States
- National Focal Point, Commonwealth Blue Charter Action Groups
- Steering Committee for the 6th National Report to the CBD
- Improving Forests and Protected Area Management Commitees, Nariva and Caroni Subcommittee
- Ministry of Energy and Energy Industries Synthetic Aperture Radar Evaluation
- Vulnerability and Adaptation (V&A) Assessment of the Coastal Resources of Trinidad and Tobago.
- Management Advisory Committee for the Nariva Swamp Managed Resource Protected Area Environmentally Sensitive Area
- Integrated Coastal Zone Management Inter-Ministerial Committee
- Capacity Building for Improved Management of Multi-lateral Environmental Agreements for Global Environmental Benefits Project Advisory Committee
- Steering Committee for the Preparation of Trinidad and Tobago Third National Communication and Biennial Update Report to the United Nations Framework Convention on Climate Change
- Land Reclamation Committee
- Turtle Task Force Committee
- The Caroni Lagoon National Park and Bird Sanctuary Management Committee
- National Working Group/Trawl Multi-Sectoral Committee for Co-Management on Bycatch Issues and Improved Livelihood Strategies in the Shrimp Trawl Fishery in Trinidad and Tobago (REBYC II –LAC Project)
- Marine Scientific Research Sub-Committee
- Environmental Multi-Stakeholder Group of the Trinidad and Tobago Extractive Industries Transparency Initiative (TTEITI)

APPENDIX IV
TRANSPORTATION VESSELS OWNED BY THE IMA AND MAINTAINED BY THE OPERATIONS DEPARTMENT

Fleet of Vehicles (land)

The Operations Department provided IMA's researchers with proper working vehicles and vessels for their respective projects.

The Operations Department currently maintains a fleet of vehicles comprising of:

1	Mazda	BT-50 Pick Up	TCF 1840
2	Mazda	BT-50 Pick Up	TDH 7658
3	Mazda	BT-50 Pick Up	TDH 7659
4	Nissan	X-Trail	PBZ 4582
5	Nissan	Wingroad	PBX 8909
6	Nissan	Panel Van	TCF 516
7	Nissan	Civilian Passenger Bus	TBJ 1599
8	Toyota	Hilux	TCX 5579
9	Toyota	Hilux	TCX 5580
10	Nissan	Frontier	TDM 1928

The Operations Department prepares for annual vehicle inspections which usually occurs during the period March/April
The following vehicles are in derelict form requiring auctioning:

- TBR 4966-Mazda B2500 Pick Up
- TBZ 5770-Mazda B2500 Pick Up
- TBZ 4737-Mazda B2500 Pick Up

Fleet of Vessels (sea)

- R.V. PELAGICA
- M.L. KANAWA
- MAKO 25
- YAMAHA SX-210.
- MUDSKIPPER + Trailer

APPENDIX IV
INFORMATION CENTRE DETAILS OF PUBLIC EDUCATION AND OUTREACH ACTIVITIES OCTOBER 2019– SEPTEMBER 2020

SCHOOL VISITS TO THE IMA:

- **El Dorado East Secondary School**
  28th January 2020
  25 students and teachers visited the IMA as part of an environmental science class project. The purpose of the visit was to enable students to receive a hands-on experience and appreciation for the sequencing involved in water quality testing. The information captured would then be used to assist the students in their individual School Based Assessments.

- **Arima Boys R.C Primary**
  4th March 2020
  94 students visited and received a presentation on "Water resources and the importance of the marine environment". Students also learned about in significance of Corals. The visit concluded with a tour of the Aquaculture facility.

SCHOOL OUTREACH

- **Arima Girls' R.C. Primary School – Career Fair**
  4th October 2019.
  IMA participated at a Career Fair with 180 students from Standards 2-4, with teachers visiting the booth and learning about possible careers in the field of marine sciences.

- **Tranquility Secondary School – Career Fair**
  31st October 2019.
  IMA participated at the school's Career Fair themed "Towards a Brighter Future" by hosting a booth to share information on the types of research conducted at the IMA and the various careers offered. Approximately **70** students visited the IMA's booth.

- **Cipriani College of Labour and Cooperative Studies (CCLCS) – Health & Wellness Programme**
  4 - 5 November 2019
  IMA participated at the CCLCS Health and Wellness programme. Presentations on the importance of Water Quality monitoring as it relates to health impacts was carried out.
  Approximately **80** students and teachers benefited from the information presented.

- **Belmont Secondary School – Career Day**
  8th November 2019
  IMA participated at the Belmont Career Fair, where students were provided with information from professionals about their career experiences and career journeys thus far. The IMA during this venture aimed to inspire students to set careers and goals in marine science and diligently working to achieve them.
  200 student's forms 4&5 were reached.

- **Providence Girls' Catholic School – Career Day**
  12th November 2020
  A presentation on "Careers in Marine Science" was delivered to 20 students at the school's career day by IMA's Director (Ag.), Dr. Rahanna Juman.

- **Bon air West Government ECCE Centre**
  6th March 2020
  The IMA conducted an outreach session on "Marine Turtles", approximately 20 students aged 6-9 years. The presentation was guided by information from the Endangered Caribbean Sea Turtles Handbook provided by the Wider Caribbean Sea Turtle Conservation Network. (WIDECAST)

- **Five Rivers Secondary School – Career Fair**
  11th March 2020
  IMA participated in the school's Career Fair and 160 students received information on the various careers offered in Marine Sciences. The IMA also set up an interactive booth where students were allowed to handle tools used during field exercises to collect scientific data.

EXHIBITIONS

- **NIHERST Community Science Week 2019 – Diego Martin**
  6th November 2019
  The IMA was invited to host an educational booth for the Community Science Week at the St Anthony's Secondary School from 4th – 9th November 2019. The event aimed to promote understanding of science, technology and innovation in order to assist students to make more informed choices about scientific issues and apply new developments in science and technology in their daily lives. The IMA showcased state of the art field equipment necessary for working in marine environments. The IMA attended one day (6th November) and was able to accommodate more than 230 students, parents and teachers.

- **Environmental Exhibition at Marabella North Secondary School**
  30th October 2019
  The IMA attended an environmental exhibition at the Marabella Secondary School. The aim of the exhibition was to help build environmental awareness among the student body. The exhibition hoped to assist in fostering a responsible society that understands the importance of sustainable development. At the IMA'S booth a coral reef replica was showcased together with a virtual reality segment. Attendance of 120 students.

- **University of the Southern Caribbean - Environmental Exhibition**
  13th February 2020
  The IMA was invited to set up a booth at the USC grounds to promote environmental awareness. The exhibition was entitled "The Great Meltdown: Pollution, Flooding and Heat". On display were examples of marine ecosystems that help reduce floods in coastal areas. Brochures on Mangroves and Coral reefs were circulated. Approximately 200 students were reached.

- **The Adopt A River Programme. Connecting the dots - Mentoring Towards Sustainability**
  The IMA was represented at the workshop and an information booth was set up which showcased various marine environmental reading material as well equipment used in water quality testing. The IMA's booth received an estimate of **60** persons.

- **Collaboration with Coastal Protection Unit through CNCMP**
  15 out of **37** primary and secondary schools were visited by the IMA under the Coastal Tales tour with Coastal Protection Unit under the Comprehensive National Coastal Monitoring Programme (CNCMP). A total of 510 students received presentations delivered by the Institute of Marine Affairs.

  - Mayaro Government Primary School
  - Ortorie / St. Joseph R.C Primary School
  - Mayaro Secondary School
  - Manzanilla Government Primary School
  - Manzanilla High School
  - Guayaguayare R.C School
  - Guyaguyare High School
  - Matelot Community R.C Primary School
  - Matelot Community College
  - San Souci R.C Primary
  - Grande Riviere Anglican Primary School
  - Cumana S.D.A. Primary School
  - Cumana A.C Primary
  - Toco Secondary
  - L'Anse Noir Moravian

APPENDIX VI

THE VIRTUAL DISTINGUISHED LECTURE AND PANEL DISCUSSION GARNERED CONSIDERABLE PRESS (NEWSPAPER) COVERAGE EVIDENT IN THE FOLLOWING SCREENSHOTS OF NEWSPAPER ARTICLES WRITTEN ON THE EVENT.

UWI professor: T&T's blue economy must be managed sustainably

ALINA DOODNATH CREATED : 22 JULY 2020ENVIRONMENT

File photo.

MARINE BIOLOGIST AND HEAD OF THE LIFE SCIENCES DEPARTMENT AT THE UNIVERSITY OF THE WEST INDIES, PROFESSOR JUDITH GOBIN, SAID THE DEVELOPMENT OF TRINIDAD AND TOBAGO'S BLUE ECONOMY MUST BE DONE CAREFULLY AND RESPONSIBLY.

IN A STATEMENT SHARED TO LOOP NEWS, PROFESSOR GOBIN REFERENCED RECENT COMMENTS MADE AT AN ONLINE SESSION ON THE COUNTRY'S BLUE ECONOMY HOSTED BY THE INSTITUTE OF MARINE AFFAIRS (IMA).
PROFESSOR GOBIN SAID THAT WHILE THE COUNTRY POSSESSES MANY MARINE RESOURCES, THESE SHOULD BE PRESERVED AND MANAGED CAREFULLY.

Big money in T&T's mangroves, says UWI professor

File photo.

TRINIDAD AND TOBAGO'S MANGROVE FORESTS CAN BRING REVENUE INTO THE COUNTRY DUE TO THEIR KEY FUNCTION IN STORING CARBON DIOXIDE, A MAJOR GREENHOUSE GAS WHICH CONTRIBUTES TO GLOBAL WARMING.

PROFESSOR JOHN AGARD, DIRECTOR AT THE OFFICE OF RESEARCH DEVELOPMENT AND KNOWLEDGE TRANSFER AT THE UNIVERSITY OF THE WEST INDIES, ST AUGUSTINE, WAS SPEAKING AT A WEBINAR HOSTED BY THE INSTITUTE OF MARINE AFFAIRS ON THE BLUE ECONOMY AND POSSIBLE AVENUES OF REVENUE FOR THE COUNTRY.

4 TOBAGO NEWS NEWSDAY THURSDAY JULY 23, 2020

Agard: Get more $$ from cruise ship visits

UWI Professor John Agard said more needed to be done by Caribbean countries to extract revenue from cruise ships which visit them. He made this comment during during a webinar on the blue economy, hosted by the Institute of Marine Affairs on Monday.

Simmons and Associates managing director David Simmons said while cruise ship arrivals to the Caribbean are currently down because of the covid19 pandemic, they will be "back up and running" in due course.

Agard said many people take cruises to the Caribbean because they like the fresh air and the scenery. Against that background, he said they "should pay us money." Agard argued the current cruise ship head tax used in the region of US$5 per person is ridiculous. "We are being abused and mistreated." Agard added, "We have to figure out how we are going to get you to pay more money.

He also suggested that Government consider tapping into some of the approximately $7 billion in the Green Fund to finance projects that will develop TT's blue economy. He made this suggestion.

According to Agard, the money in the fund is largely unused and could be helpful to finance blue economy projects. Agard also suggested some kind of blended finance strategy be explored as well. Blended finance is model for financing development projects that combines an initial investment with a subsequent commercial investment. The initial investment often comes from a philanthropic or government entity.

A 2017 document published by the World Bank and the United Nations, defines the blue economy as "the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem." The blue economy consists of several components. These include established traditional ocean industries such as fisheries, tourism, and maritime transport. New and emerging activities, such as offshore renewable energy, aquaculture, seabed extractive activities, marine biotechnology and bio-prospecting, are other components of the blue economy.

Thursday, July 23, 2020
guardian.co.tt
news BG5

Ships docked off the PoS Waterfront
PICTURE ROBERTO CODALLO

Making the most of the blue economy

Geisha Kowlessar-Alonzo
geisha.kowlessar@guardian.co.tt

According to the United Nations Conference on Trade and Development, the value of the global ocean based economy is estimated between US$3 to 6 trillion/year.

The World Bank noted that 17 Sustainable Development Goals (SDGs) are a "blueprint" for all countries to work towards.

It said aligning with SDG 14 (Life Below Water), which aims to "conserve and sustainably use the oceans, seas and marine resources for sustainable development," is what the Caribbean must now do in a blue economy model.

"It is time for a paradigm shift; from thinking of the region as small land-based economies to large and powerful ocean-based economies," the World Bank advised.

In a panel discussion hosted earlier ing energy services in the offshore sector to grow revenues and support regional energy development include:

- Shore-based services-linked to local services sector
- Offshore fabrication, spool yards
- Vessel provision-specialised vessels/tugs/support
- Maintenance, spares, tools
- Skill workers with off-shore certification and experience
- Bunkering-diesel, LNG, hydrogen, ammonia, methanol, bio-diesel

Driver said the energy transition

Algae: The blue-green regenerative economic alternative

David Ramjohn who leads AlgEternal Technologies, LLC (AET) noted that an economy built on algae will be regenerative, sustainable, ecocentric, high-value and will result in low environmental impact.

AET is a company focused on the sustainable application of microalgae as an alternative to fossil hydrocarbons.

Ramjohn noted algae has been used by humans for a variety of purposes for thousands of years, adding that its current uses include food, feed, skincare, nutritional supplements, fertilisers,

TABLE 3: Potential microalgae products and prices

PRODUCT	SUBSTITUTE	PRICE	UNIT
Biodiesel	Diesel	$2.27	USD/gal
Bio-ethanol	Gasoline	$1.96	USD/gal
Bio-methane (fuel)	Liquefied petroleum gas	$1.97	USD/gal
Bio-jet fuel	Jet fuel	$2.49	USD/gal
Electricity	Fossil energy	$0.13-$0.21	USD/kWh
Bio-methane (electricity)	Natural gas	$0.05-$0.06	USD/kWh
Biofertilizers	Synthetic fertilizers	$0.25-$0.63	USD/kg
Biostimulants	Growth promoters	$37.50-$312.50	USD/kg
Biopesticides	Synthetic pesticides	$5.00	USD/acre
Bioplastics	Fossil based plastics	$1.75	USD/kg
Food	Proteins, carbohydrates, oils	$50.00	USD/kg
[illegible]	[illegible]	[illegible]	[illegible]
Omega-3 polyunsaturated fatty acids	Fish	$50.00	USD/g
Aquaculture	Fishmeal/fish oil	$68.75-$625.00	USD/kg
Livestock Feed	Soybean meal	$100.00	USD/tonne
Feed additives	Botanicals, antibiotics	$20.00	USD/kg

- Fund wide applications of algae, not just biofuels
- Increase funding for research, development, demonstration and deployment of algae-based biotechnologies

Financing the Blue Economy

als of the blue economy in the Caribbean.

The success of the initiatives however, he said is hinged upon developmental and operational activities of these industries being seamlessly married with the appropriate strategies and policies.

Blue opportunities in covid19 times

In this photo taken in April, sargassum seaweed washes ashore in Rocky Bay, Lambeau, Tobago. While sargassum can pose a threat to fishing and tourism, it can also be an opportunity, with some

The blue economy could provide opportunities for countries like TT during uncertain economic times caused by the covid19 pandemic and volatile global energy prices. This formed part of the discussions in a Beyond the Blue webinar hosted by the Institute of Marine Affairs (IMA) on Monday.

According to a 2017 document published by the World Bank and the United Nations, the blue economy is defined as "the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem."

The blue economy consists of several components. These include established traditional ocean industries such as fisheries, tourism, and maritime transport. New and emerging activities, such as offshore renewable energy, aquaculture, seabed

APPENDIX VI

INFORMATION CENTRE GRAPHIC DESIGN REPORT OCT 2019 – SEPT 2020

Reports & Policy Documents

- Annual Administrative Reports (2016 – 2017; 2017 – 2018 draft submitted)
- SOME 2018
- HR Policy (Manual; Employee handbook)
- HSSE Policy statement

Newsletters

- IMA NEWS (August 2019, December 2019, April 2020, August 2020)
- IMA NewsWave - August 2019
- ICZM NEWS (Template design; December 2019, March 2020, June 2020, September 2020)

Publications

- Tidal Calendar 2020 design
- Public education posters (ongoing)
- Tidal Calendar 2021 (Design; Field photography)
- CLME+ stakeholder presentation - PDF package

Cultural & Environmental observances

- Social media/Email Flyers

Social media artwork

- Our climate is changing… are we (design & layout - Instagram)
- Beyond the Blue promotions (various events)
- World Oceans Day 2020
- World Environment Day 2020
- SeaiTT promotions

Staff events

- Retirement reception programmes & invitations (Bullock, Juman, and Paterson)
- Christmas Celebration 2019

Templates, Forms, Certificates etc.

- IMA Green Team – Certificate of Excellence (2019 Challenge)
- IMA Forms (Purchase Order; Purchase Requisition; Stores Request)
- IMA PowerPoint presentation template
- IMA letterhead (MS Word template)

Branding

- IMA logo usage guidelines package
- SeaiTT (logo & branding platform design; logo package; product launch campaign artwork & slogan conceptualizing & design)
- Beyond the Blue - 2020 theme artwork

Advertisements, Alerts and Notices

- Coral bleaching alerts
- Tidal Calendar 2020 pressadvertisement
- COVID-19 awareness campaign artwork (7 flyers)
- World Oceans Day 2020 press artwork
- IMA Online Auction 2020 press and social media artwork
- SeaiTT launch press artwork

Broadcast design

- Beyond the Blue prize-giving
- Zoom backgrounds (various)

Related services

- Photo editing

Special Committees

- IMA public education mascot development
- SeaiTT content testing & promotional review
- DSLR camera lens procurement

APPENDIX VII

NEWSPAPER ARTICLES/MEDIA RELEASES

Edoo, Yasim (2020, September 25) “Let's take nutrient pollution seriously”. Guardian Tobago Today.

Edoo, Yasim (2020, September 24). “Why should we be concern with nutrients pollution” Trinidad Express.

Edoo, Yasim (2020, September 23) “Nutrient pollution can be costly.” Newsday Tobago.

Banjoo, Darryl. (2020, August 28 – 30) “One step towards ecosystem based management”. Newsday Tobago.

Dennie Aleisha (2020, July 17) Can you live plastics-free? Guardian Tobago Today.

Dennie Aleisha (2020, July 16) Can you live plastics-free? Trinidad Express.

Asmath, Hamish. (2020, July 7) From the backyard to the seas. Newsday Tobago.

Asmath, Hamish. (2020, July 3) What I do in my yard affects our seas. Guardian Tobago Today.

Kanhai, Attish. (2020, June 25) “Untold story of Saharan dust.” Trinidad Express.

Ganase, Anjani. (2020, June 18) “Living with nature” Newsday Tobago”.

Ganase, Anjani (2020, June 18) “Living with nature” Newsday.

Ganase, Anjani, (2020, June 18) “Learning to co-exist with nature” Trinidad Express.

Solomon, Farahnaz (2020, June 12) “Rethinking the Oceans: Transitioning towards the Blue Economy” Guardian Tobago Today

Solomon, Farahnaz. (2020, June 12) “Rethinking the Oceans: Accelerating to the Blue Economy”. Tobago Newsday

Ramoutar, Sheldon (2020, June 5) “Beaches Benefit COVID 19 Lockdown”. Guardian Tobago Today.

Ramoutar, Sheldon. (2020, June 2) “Water quality at beaches improving”. Newsday Tobago

Nelson, Wendy. (2020, May 28) “Tackling the plastic waste crisis”. Trinidad Express.

Kanhai, Attish. (2020, May 20) “Our solutions lie in nature”. Newsday Tobago

Solomon, Farahnaz. (2020, May 15) “Parrotfish eating their way to healthy reefs”. Guardian Tobago Today.

Solomon, Farahnaz. (2020, May 13) “Hungry parrotfish crucial to healthy reefs”. Newsday Tobago

Solomon, Farahnaz. (2020, May 13) “Hungry parrotfish crucial to healthy reefs”. Newsday.

Thompson, Ruqayyah. (2020, May 11) “Ocean science for climate change”. Newsday Tobago.

Thompson, Ruqayyah. (2020, May 1) “Ocean science for climate change”. Guardian Tobago Today

Juman, Rahanna. (2020, April 22) “Yet to solve the Sargassum problem”. Newsday Tobago.

Jute, Alana. (2020, April 17) “Sea sand and a terrible sting” Guardian Tobago Today.

Juman, Rahanna (2020, April 10) “Sargassum again a visitor to our beaches Guardian Tobago Today.

Barrow, Lorraine (2020, April 3) “Importance of gender equality to marine science” Tobago Today.

Charles, Shantel (2020, March 12) “Sustaining all life on earth”. Trinidad Express.

Juman, Rahanna (2020, January 30) “Wetland biodiversity and you.” Trinidad Express.

Ganase, Anjani (2019, November 7) “Coral bleaching and Tobago.” Trinidad Express.

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