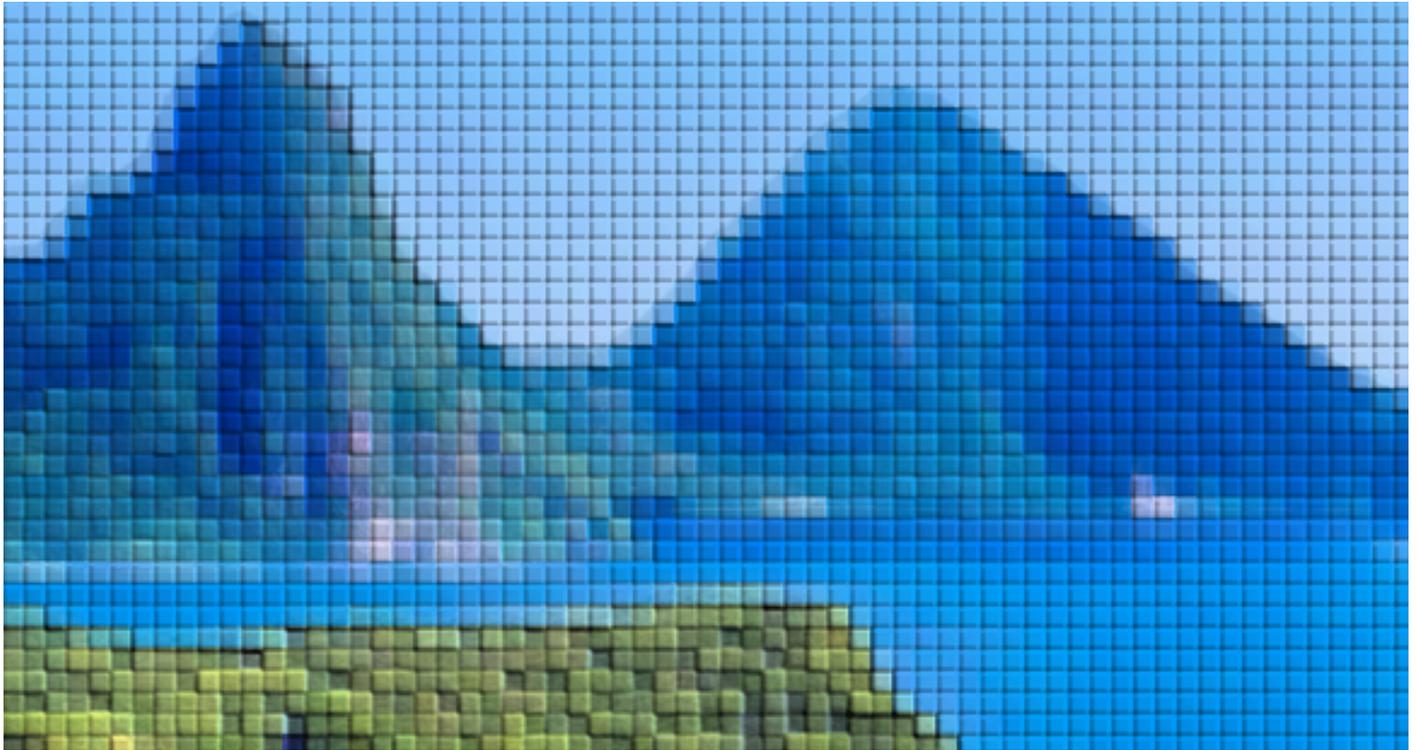




#EOCaribbean2018
Roadmap Report



Supporting Blue Growth and Risk Management through Earth Observation

Foreword

The Caribbean is a unique chain of islands in terms of geology, ecology, culture, socio-economics, and history. With seven full Member States and three Associate Members, the Organisation of Eastern Caribbean States (OECS) remains dedicated to economic harmonisation and integration, protection of human and legal rights, and the encouragement of good governance among independent and non-independent countries in the Eastern Caribbean. We are proud of our leadership and history in the management of the marine environment. We recognise the transboundary nature of shared ocean resources, and are collaborating closely to ensure sustainable opportunities for the region as we continue to explore new and innovative options for managing oceans and coasts.

We strongly believe that we can reconcile the need for economic growth with climate risk reduction by effectively managing our resources with all the tools at our disposal. This can only be achieved through strong partnerships, a common understanding, and a collective effort throughout the whole policy and management cycle.

This report is a reflection of our collaborative efforts to further enhance the science policy interface at the OECS and wider regional level. I commend all those who have made the production of this report possible for their worthy contribution to the body of knowledge on the coastal and marine environment of the Caribbean region. It is my hope that this report will inspire our island nations to realise our ambitions, turning our dreams of sustainable and resilient growth for our communities into reality.



Dr. Didacus Jules (Ph.D)

Director General, OECS Commission



Introduction

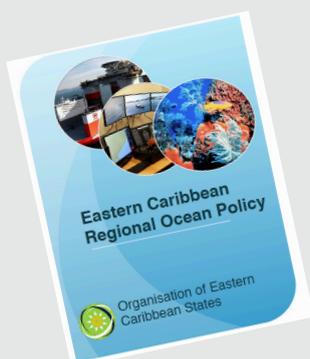
Caribbean small states are diverse but share a dependency on service-based economies, mainly tourism and financial services, as well as exploitation of natural resources such as fisheries. In tandem, their economies are vulnerable to economic shock, and natural disasters and climate change. In common with many coastal and island nations, Caribbean countries are looking to their marine space as a new frontier for diversification of economic development to ensure sustainability and societal security; so-called Blue Growth. Whilst such diversification could relieve pressures on limited and overcrowded land space, growing a maritime economy when trends clearly show a declining health of marine environments and over exploitation of marine resources will prove challenging.

A critical barrier to realising the opportunities presented by a Blue Growth agenda in Caribbean small states is a paucity of marine data relating to their offshore waters. Data are needed to assess a nation's maritime wealth in order to better define a pathway to support the growth of a country's blue economy. Data are also needed to better assess the marine environment and ecosystem services to ensure future economic activity is sustainable and does not tip ecological processes beyond their limits, or place assets at risk from climate change and disasters. This then forms the backdrop to this roadmap, which provides an overview of the opportunities for Earth Observation Data to provide innovative solutions to develop and secure Blue Growth, and meet global sustainable development challenges.

Policy Context

Both the World Bank and Inter-American Development Bank are seeking to develop regional capacity to prepare for a successful transition to a blue economy and socially equitable blue growth whilst recognising the equally important need to build the resilience of coastal communities and promote sustainable development of coastal and marine resources.

In recognition of the importance of coastal and marine space to the wellbeing of their citizens through economic activities and provision of environmental services, the Organisation of Eastern States (OECS) Commission, through its Social and Sustainable Development Division, developed the transboundary Eastern Caribbean Regional Ocean Policy (ECROP) which was approved by the OECS Authority (Heads of Government) in June 2013. The ECROP strives to maintain a sustainable, healthy, and richly biodiverse Eastern Caribbean marine environment, managed in an integrated way to promote socio-economic development and support the livelihoods and aspirations of current and future generations (ECROP, 2013). This overarching vision is actively supported by a series of legally binding policies designed to enable regional and national priorities and actions.



Regional Policies

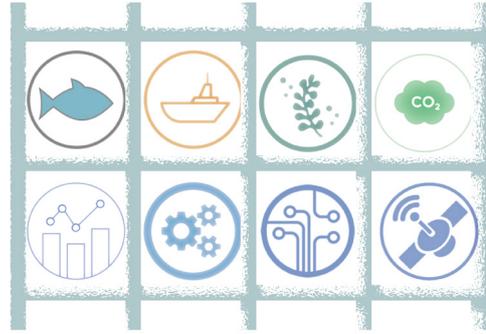
The Role of Earth Observation

Earth Observation (EO) data are an important source of information for the monitoring and modelling of oceanic, atmospheric and terrestrial processes. EO has the potential to support the Caribbean economy and address a wide range of issues of regional relevance including disaster risk management, biodiversity conservation, climate change mitigation and adaptation, coastal water safety and security, and short and long term planning challenges in the region.

Dedicated satellite sensors provide consistent data that facilitate the semi-automated detection of environmental changes across broad spatial and temporal scales. This allows access to information on environmental and anthropogenic processes over large, and often heterogeneous, areas. The Caribbean islands cover a vast area with a wide range of marine and coastal environments. Incorporation of EO data can complement not only existing spatio-temporal data collection, but will also allow for inaccessible areas to be more efficiently monitored and managed.

Using EO to address identified issues will provide governments access to a new avenue of spatial and temporal information, and the opportunity to liaise and build networks with established data analysis communities. In order to promote the uptake of EO data, increase end-product knowledge and assess technical training requirements, current barriers to the utilisation of EO data must first be identified. Knowledge gaps and marine observations requirements may then be matched to possible solutions and opportunities.

The Roadmap



This roadmap investigates four key narratives that resonate across the Caribbean region and that contribute to the delivery of international accords to which islands are signatories such as the UN Agenda 2030 Sustainable Development Goals. By looking at challenges, impacts, and the role of EO, each narrative identifies priority research areas and key actions:

1. Fisheries and Aquaculture
2. Maritime Safety and Security
3. *Sargassum* Influxes into Coastal Systems
4. Climate Change and Risk Reduction

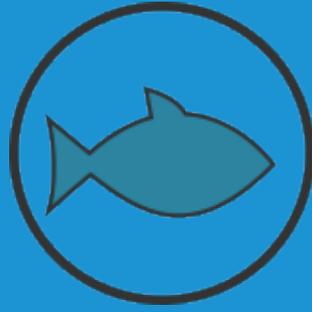
The actions presented were generated by representatives from the OECS Commission, OECS Member States, the University of the West Indies, and additional countries from the wider Caribbean. All the actions have been categorised into a typology, cross referenced and coded into a searchable database associated with this roadmap*. The typology represents:

1. Data
2. Outreach and Communication
3. Research
4. Planning and Policy
5. Collaboration
6. Education and Training

In addition, two briefs detailing broader more holistic regional needs are also presented:

1. Data Needs, Education and Training
2. Adopting a Systemic and Holistic Approach

* See the #EOCaribbean2018 workshop report for a complete list of actions



Issue 1.

Fisheries and Aquaculture

Fisheries are crucial for livelihoods across the Caribbean. Many coastal communities are dependent on fishing or fishing-related industries for income and food security and with fishing being part of their cultural identity.

Fisheries are categorised into three types: marine, inland waters and freshwaters systems, and aquaculture resources.

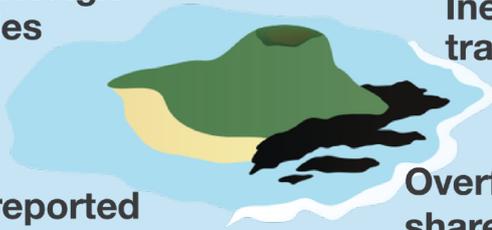


Shifts in foreign aid policies

Inequitable trade policies

Illegal, unreported & unregulated fishing

Overfishing of shared stocks



External Factors



CARICOM, OECS, CRMF, UWI

Regional & Local expertise & experience



Departments, Agencies, Associations

Knowledge Exchange



Collaborative Working

Habitat identification and management, industry regulation, conflict resolution, investment



Feasibility assessments



Research Activities



Enforcement of policies and legal frameworks

Outputs

Sustainable livelihoods and food security for the region through coordination and collaboration

Regional Development, Local Security

Regional Reality



Regional resources are currently overexploited. 55% of commercially harvested fishery stocks are depleted and 40 % of stocks are currently fully exploited. Growing human populations and reduced fish landings results in more than 40% of fish consumed being imported. Aquaculture could provide a stable source of protein and livelihoods.

Threats to fisheries and aquaculture include pollution including microplastics, invasive species, climate change, and overfishing

According to the FAO, global capture rates have plateaued whereas aquaculture efforts are increasing

Industry Impacts



- Fleet: No. of commercial fishing vessels: 26, 691
- Livelihoods: 110,818 people involved in direct production
- Landings: 154,741 million tonnes (meat weight)
- Estimated value: USD 395.7 million
- Export: 70-75,000 million tonnes (value of USD 300-350 million)
- Import: 60,000-70,000 million tonnes

Challenges



- Degradation of critical habitats and ecosystems
- Insufficient data to inform management decisions
- Low capacity to enforce existing policies
- Insufficient finance for investment in, and maintenance of, infrastructure and institutional capacity building
- Lack of surveillance and enforcement
- User and use conflicts
- Extreme events
- Climate change (warmer waters, acidification, sea level rise)

The Role of EO



- Monitoring of marine biodiversity
- Estimates of biomass
- Estimates of fish stocks
- Estimates of fisheries recruitment
- Aquaculture site selection
- Ocean temperature monitoring
- Sea dynamics: waves, currents, fronts
- Bathymetry
- Monitoring of point and non-point pollution
- Harmful algal blooms



Priority Research Needs

- More effective modelling of commercial fishstocks
- Better monitoring of pollution impacting fisheries and nursery habitats
- Increased food and livelihood security through aquaculture and fish aggregating device siting

Key Actions



- Conduct studies on the viability of aquaculture as an industry including species and siting options
- Improve the monitoring of key inland water bodies using a proxy e.g. turbidity or mangrove health
- Examine biological diversity change analysis including mapping of invasive species
- Investigate EO applications that can contribute to the monitoring of illegal trawling activities on a regional scale



The FAO states that aquaculture development could increase fish production in CARICOM states by 30% within 10 years. As a region, we need to start engaging seriously with this technology for the security of both food and livelihoods

Susanna Scott



Government of Saint Lucia

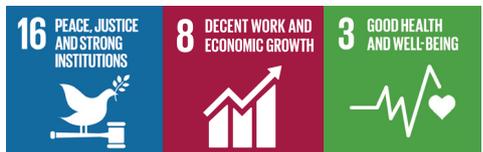
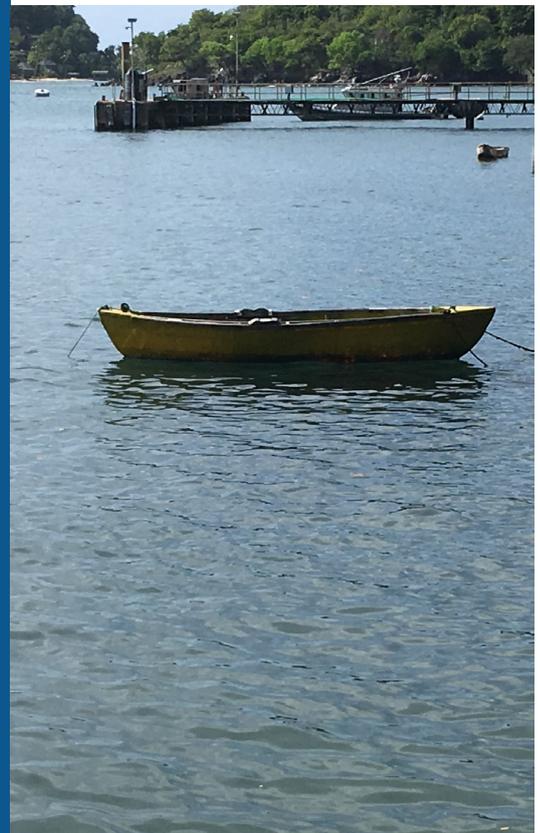




Issue 2.

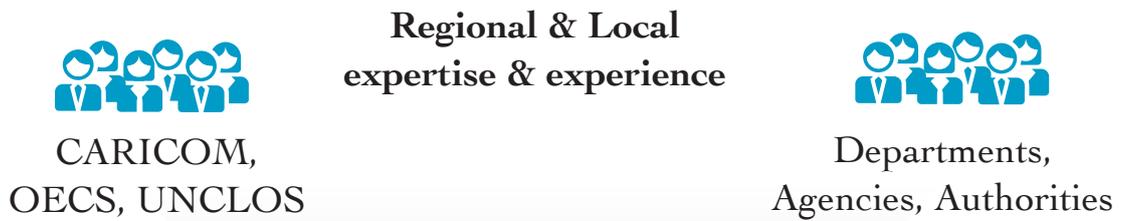
Maritime Safety and Security

Making trade and travel by sea as safe and secure as possible is critical within an archipelagic region like the Caribbean. The ability and capacity to manage and mitigate threats with the potential to compromise maritime security have wide ranging economic, environmental, and social implications.





Regional Coordination, Local Benefits



Knowledge Exchange



Collaborative Working

Monitoring, control, and surveillance across the Eastern Caribbean



Outputs

Coordinated activities and action to combat illegal activity whilst making the seas a safer place to work

Regional Reality



As part of the revised treaty of Chaguaramas, CARICOM* created the Caribbean Single Market and Economy. Within this area, various activities take place including maritime traffic to and from the Panama canal, movement of oil, fishing, leisure activities, etc. This leads to a busy maritime area with many aspects to consider for both safety and security.

Monitoring, control and surveillance is a key principle of fisheries management both in areas under national jurisdiction and the high seas

Governmental maritime security agents vary between nations as do marine surveillance assets and resources

Security Aspects



- International peace and security
- Sovereignty/territorial integrity/political independence
- Security from crimes at sea
- Resource security
- Environmental security
- Security of seafarers and fishers

* The following OECS Member States are member states of CARICOM: Antigua and Barbuda, Commonwealth of Dominica, Grenada, Montserrat, St. Kitts and Nevis, Saint Lucia and St. Vincent and the Grenadines

Challenges



- Lack of legal framework and enforcement
- Limited coordination between island authorities
- Lack of enforcement vessels and human resources
- Limited ability to observe activities across territories
- Limited communication assets on many vessels
- Non-SOLAS ships on international voyages
- Piracy
- Drug trafficking
- Illegal immigration
- Movement of hazardous waste

The Role of EO



- Near real-time vessel detection including monitoring of fishery activities
- Tracking of position, course and speed of vessels across national boundaries
- Search and rescue operation support
- Detection and monitoring of pollution including oil spill detection
- Ship grounding detection and damage assessment including potential salvage activities



Priority Research Needs

- Ocean circulation pattern modelling to enhance search and rescue and salvage missions
 - Monitoring of pollution events such as oil spills
 - Monitoring of illegal activity at sea

Key Actions



- Improve safety at sea, salvage and recovery of shipwrecks through better ocean surveillance

- Increase monitoring of transboundary illegal activities such as drug trafficking, migrant smuggling and illegal fishing

- Monitor pollution discharge such as oil spills and illegal bilge discharges and dumping, illegal dumping of garbage and sewerage

- Monitor natural and anthropogenic activities that cause areas to be inaccessible due to dangerous working conditions e.g. volcanic activity



Shipping is perhaps the most important industry in the Caribbean - and one of the most dangerous. Enhancing both safety and security throughout the region remains an enormous challenge that we must address together

David Robin



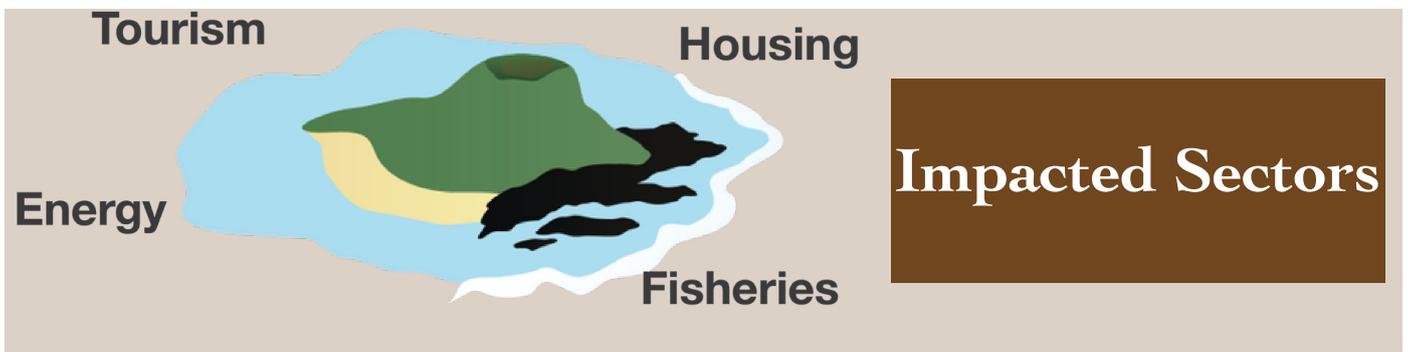


Issue 3.

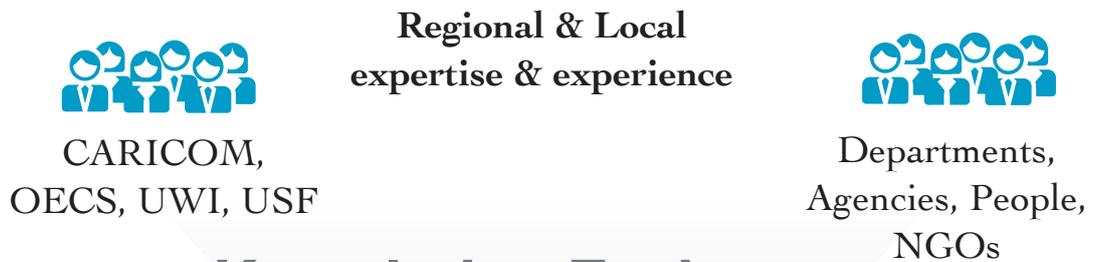
Sargassum Influxes into Coastal Systems

Sargassum is a free floating brown macroalgae common to the Caribbean. It has an important ecological role acting as a nursery for various marine species, including turtles, cetaceans and pelagic fish. Excessive amounts of *Sargassum* on beaches can cause problems and requires physical removal.

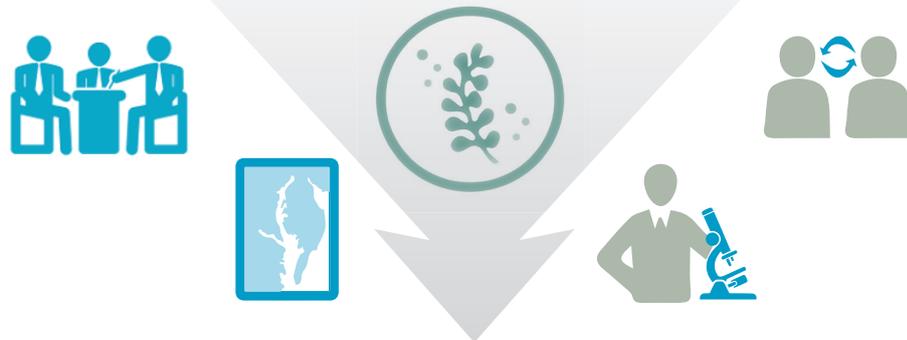




Regional Opportunities, Local Options



Knowledge Exchange



Collaborative Working

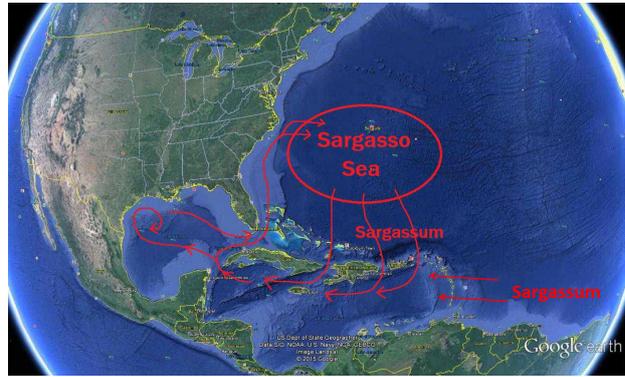
Predictive capacity, industry involvement, alternative uses, local engagement



Outputs

The development of a coordinated regional response to large Sargassum events that allows for potential benefits to be realised locally

Regional Reality



In 2011, *Sargassum* became a major issue. The amount was so large, initial reports mistook it for an oil spill. *Sargassum* had never been seen in this volume. This is a continuing occurrence. These blooms provide habitat for marine life, but large amounts of *Sargassum* deposition on the beaches have caused numerous problems to the local environment, tourism industry, and economy.

Sustainable management of *Sargassum* will require both local action and regional coordination across national borders

Sargassum blooms in May–August in the Caribbean and quantity and timing of events can potentially be predicted in February

Sargassum Impacts



- Reduces biodiversity and ecology
- Creates anoxic coastal waters
- Blocks light to coral reefs
- Gives off an overwhelming smell and restricts beach access
- Gets tangled in engines & fishing gear
- Causes damage to infrastructure
- Causes revenue fluxes for industry

Potential Uses



- Human food products
- Livestock and fish food
- Fertiliser for crops
- Chemical compounds
- Energy security in the form of biofuels/ biogas
- Chipboard and construction materials

The Role of EO



- Near real-time movement of large *Sargassum* mats
- Forecasting of large-scale events
- Regional trends in *Sargassum* movement and density
- Identification of adequate mats for juvenile turtle and fish rehabilitation habitat
- Monitoring of resources for biofuel production



Priority Research Needs

- Examining biophysical, social and economic impacts of *Sargassum* events
- Development of models that can predict the timing and size of *Sargassum* events in advance

Key Actions



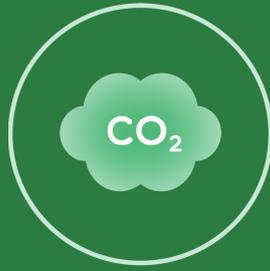
- Identify potential siting locations for a regional virtual buoy observing network
- Create a Caribbean *Sargassum* monitoring network with academic, governmental and NGO representatives
- Develop and implement an engagement process to involve community stakeholder groups in the long term management of *Sargassum*
- Examine the potential for using *Sargassum* as a source of biofuels for energy security on small and large scales



Sargassum is not a stink bomb. It's a resource that we need to be able to exploit for the good of the region. We need to continue to investigate what our options are throughout the Caribbean

Sarita Williams-Peters





CO₂

Issue 4.

Climate Change and Risk Reduction

The Eastern Caribbean is considered by many to be one of the most disaster-prone regions of the world. Climate change is increasing disaster vulnerability in a region already exposed to a range of natural hazards including tectonic and volcanic activity, tsunamis, hurricanes, floods and storm surges.



13 CLIMATE ACTION



11 SUSTAINABLE CITIES AND COMMUNITIES



3 GOOD HEALTH AND WELL-BEING

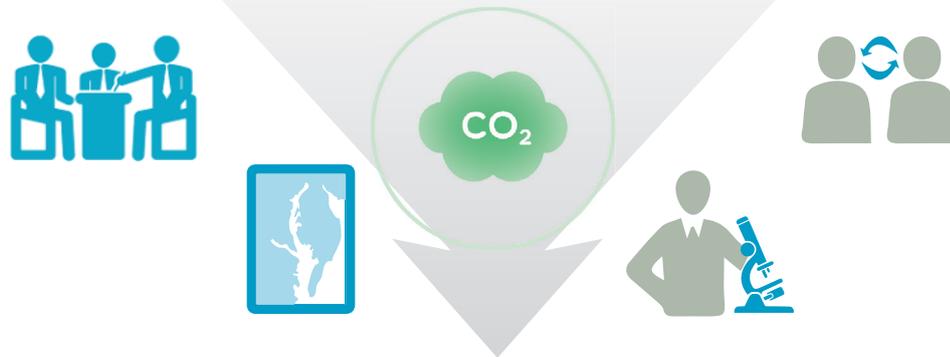




Regional Collaboration, Local Action



Knowledge Exchange



Collaborative Working

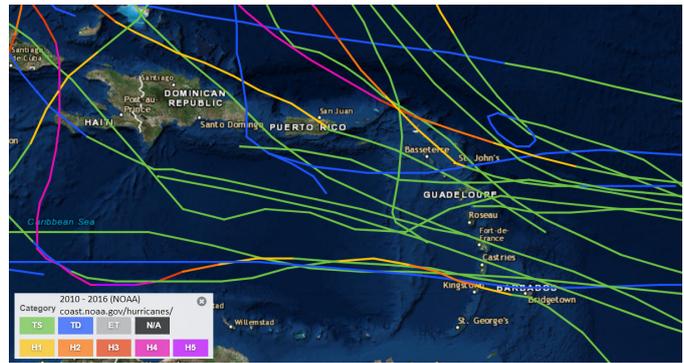
Early warnings, collective action, co-designed responses, coordinated voice



Outputs

The generation of shared, regionally relevant data and actions that can address climate change impacts

Regional Reality



Caribbean islands are extremely vulnerable to climate change despite the fact that they contribute a very small portion of global greenhouse gas emissions. Changes in climate parameters, such as increased temperature, rainfall variations, and sea level rise, expose the islands to potentially damaging hazards and significant risk.

Identifying and coping with climate risks needs increased regional collaboration and data sharing

Designing complimentary national and regional policies creates more comprehensive solutions

Climate Impacts



- Average temperatures have increased 0.1° to 0.2°C per decade for the last 30 years
- Decreasing range between min and max daily temperatures
- Less consecutive dry days
- Drier wet seasons and lower total rainfall projected
- More intense rainfall during extreme weather events
- Sea level rising faster than the global average ($\sim 1.8\text{mm yr}^{-1}$)

Challenges



- National finance and budget limitations
- High levels of indebtedness
- Local and regional capacity
- Local political barriers
- Social attitudes and behavioural norms
- Data and knowledge gaps
- Limited access to necessary technological advances

The Role of EO



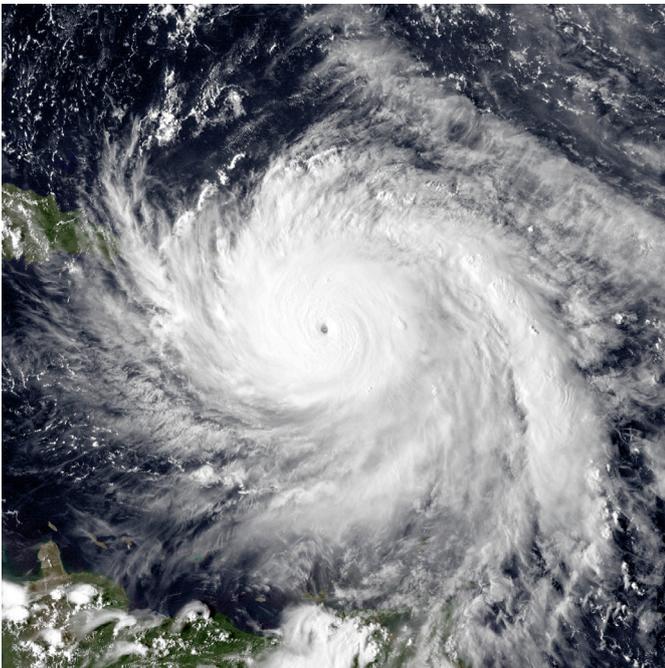
- Climate risk mapping
- Greenhouse gas modelling
- Surge modelling
- Storm monitoring
- Ocean temperature monitoring
- Sea level monitoring
- Ocean circulation
- Wave climate history and characterisation
- Bathymetry mapping
- Coastal defence siting
- Coastal erosion and sedimentation mapping
- Monitoring of defensive coastal vegetation coverage



Priority Research Needs

- Regional and local sea level rise projections and sea surface temperatures
 - Early warning systems for multiple impacts of extreme events
 - Social and infrastructure risk and vulnerability maps
- Health and extent of natural coastal defences (e.g. mangroves & coral reefs)

Key Actions



- Develop historical flood maps and spatial trend analysis to guide long term planning for critical infrastructure placement
- Investigate the prospect of retrieving near real-time EO data from multiple sources during extreme weather events
- Develop Caribbean-centric EO processing tools and altimetry products and digital elevation models
- Examine data needs for improved poverty assessments, migration patterns and supply chain security



Climate change is not a future problem, it is here now. We are experiencing it and we are committed to taking action to protect our vulnerable islands and our way of life.

E. Crispin d’Auvergne



Data Needs, Education & Training

Brief 1.



Guiding Principles

Assisting Island States to enhance blue growth and risk reduction activities across scales by increasing technical and political engagement with supplementary high resolution Earth Observation data

Goal

Regional Cooperation, Local Advances



Opportunity Identified

The potential exists to augment currently collected in-situ social and biophysical datasets with additional data from EO sources. The benefits of using EO technology as an operational support tool for project planning, implementation, and monitoring are clear. However, effective use requires both training and forethought.

Key Action Areas

Mapping & gap identification

- Expand existing regional knowledge on what potential EO applications can provide relevant information for specific research areas
- Conduct a data mapping exercise, identifying data relevant to research priorities in the Caribbean, including location, ownership and quality
- Develop and distribute a suite of baseline satellite imagery in GIS databases

Infrastructure, access, & sharing

- Create a conversation space for stakeholders to discuss a regional data sharing policy to clarify data privacy and the use of commercially sensitive data
- Explore the potential for the development of a Caribbean data portal for high resolution EO and in-situ data
- Source data needs that are not currently met by existing free data and identify potential avenues for acquisition

Mainstreaming capacity building & training

- Establish a key contact point within each nation who has a holistic view of all GIS and EO efforts
- Deliver a range of trainings through multiple platforms including video and online resources for repeated use
- Explore with multiple EO organisations and product providers the potential to hold an EO expo which delivers a range of information and products targeted at: politicians, tourism, fishermen, farmers, recreational boaters



Challenges to overcome



Barriers to effective data sharing, management, storage, and usage are numerous and complex. Understanding issues around data sensitivities as well as current limitations for effective use of data can help provide solutions and enhance applications

Regional Momentum, Local Action

Uptake of EO as an information provision tool has been increasing across the Caribbean States. For instance, many GIS systems are in place, however, there are still requirements for data, training, equipment and software. Overcoming such barriers requires cooperation as well as investment in staff, infrastructure, and policy

- **Data Security:** data privacy and sharing issues including acquisition, utilisation, storage, collection, architecture on multiple scales (inter-departmental, regional, international) impact the effective distribution of both data and data derived products. A comprehensive data sharing policy for the region is a critical need
- **Cooperation:** The use of consultants in the region, whilst productive and helpful, often means that data are freely supplied during the lifespan of externally managed projects. These data are frequently not returned in a format that is unusable by island technicians which impedes long term research goals
- **Finance:** Access to data, processing hardware and software, and infrastructure are often costly for national departments and research institutions in the Caribbean. Restricted budgets also means that funds are not usually available for staff training. Increased cooperation with the space sector may provide innovative solutions to some of these issues



Geographical Information Systems (GIS) are hugely important for monitoring various trends over various spatial and temporal spectrums in the Caribbean. Spatial reference allows governments to highlight correlations between environmental, economic and social factors

Christopher Williams



Expected outcomes

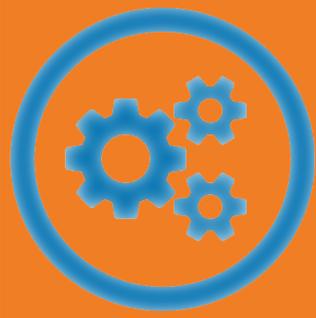
Improved access and capacity to fully realise the potential for EO data to supplement research activities across the Caribbean, helping to support on-going efforts to ensure a more sustainable future for islanders

Regional Integration, Local Effectiveness

Providing avenues to allow government and civil actors and innovators to develop and harness commercial advances in the maritime-space arena, as well as integrate EO potential into a trans-island network of expertise can ensure targeted policies and programs that can be linked to socio-economic and administrative data

- **Standardisation:** Realising goals associated with improving the availability of data, strengthening links with academic institutions, and building capacity. In order for EO data to be useful, they need to be applicable and relevant to the region, with clear protocols for how data are collected and received
- **Capacity:** Improved, accessible, and targeted training for multiple technical personnel in the region can increase capacity as well as reduce overdependence on individuals. This capacity redundancy will also ensure improved ability to process data and use products to answer research questions
- **Availability:** Having access and ownership of high resolution EO data to support existing in-situ data collection throughout the region will allow the goals of sustainable blue growth and risk reduction to be realised more effectively





Brief 2.

Adopting a Systemic & Holistic Approach

Guiding Principles

Assisting Island States to identify, adopt, and implement policies to promote blue growth and risk reduction across scales, based on informed, transparent, and participatory processes and systems of governance

Goal

Regional Solutions, Local Relevance



Opportunity Identified

The potential exists to advance supportive policy frameworks across the Caribbean that embed legislation, funding, and activities to harness Earth Observation applications. National, regional and international collaboration and knowledge transfer are critical to realising this opportunity

Key Action Areas

Strategic discourse across the region

- Provide a conversation space for all relevant stakeholders to discuss what support, products and services are needed from the EO industry

- Ensure a participative island-led approach, where stakeholders iteratively co-design and co-develop products and services

- Create a vibrant, trans-national pool of island expertise, integrated with global EO networks and thematic applications

Regional research prioritisation & approach

- Identify country specific research priorities that EO activities could support and develop a collective regional research agenda

- Enshrine a comprehensive participative approach in all new research activities

- Ensure that future research funding calls, approaches and evaluation recognise effective stakeholder engagement and regional priorities

Framework development & implementation

- Develop a framework for ocean observation to strategically guide resource acquisition, research and data gathering, and provide sector-specific data access points tailored to Caribbean needs

- Ensure that any product and service development efforts satisfy the needs of state governance agencies responsible for policy implementation



Challenges to overcome



Barriers to successful engagement with, and adoption of, new policy frameworks are many and varied. Generating political will and support from policy makers is crucial to creating momentum to overcome technological and social road blocks

Regional Momentum, Local Action

Given its critical role in establishing a framework within which innovation can be animated, the implementation of policy measures and the establishment of policy principles should not be done on an ad-hoc basis: it must be coordinated using national and international strategies

- **Understanding:** Decision makers are often reluctant to use data they don't understand in decisions. This calls for improved communication and knowledge transfer between politicians and technical staff including the development of decision support systems that decision makers can interact with
- **Communication:** Often difficult on both intra and inter island levels, closer technical collaboration can increase political cooperation across the region. Utilising lessons learned between stakeholders can help shift public perceptions
- **Capacity:** While short term gains can be made by identifying technical capacity across the region and developing a database of expertise, long term capacity can be built by embedding EO training into existing courses in academic institutions (e.g. CERMES and St. Augustine)



Right now, we are unable to communicate to large climate warming countries the scale and seriousness of the problems small island states are adapting and responding to. Collectively, we need to find a message that really resonates and galvanises action. We need the evidence to back this message up

Gale Archibold



Expected outcomes

Once enabling economic, social, and biophysical factors of sustainable blue growth and risk reduction are identified, a strategic regionally relevant plan for action can be developed

Regional Integration, Local Effectiveness

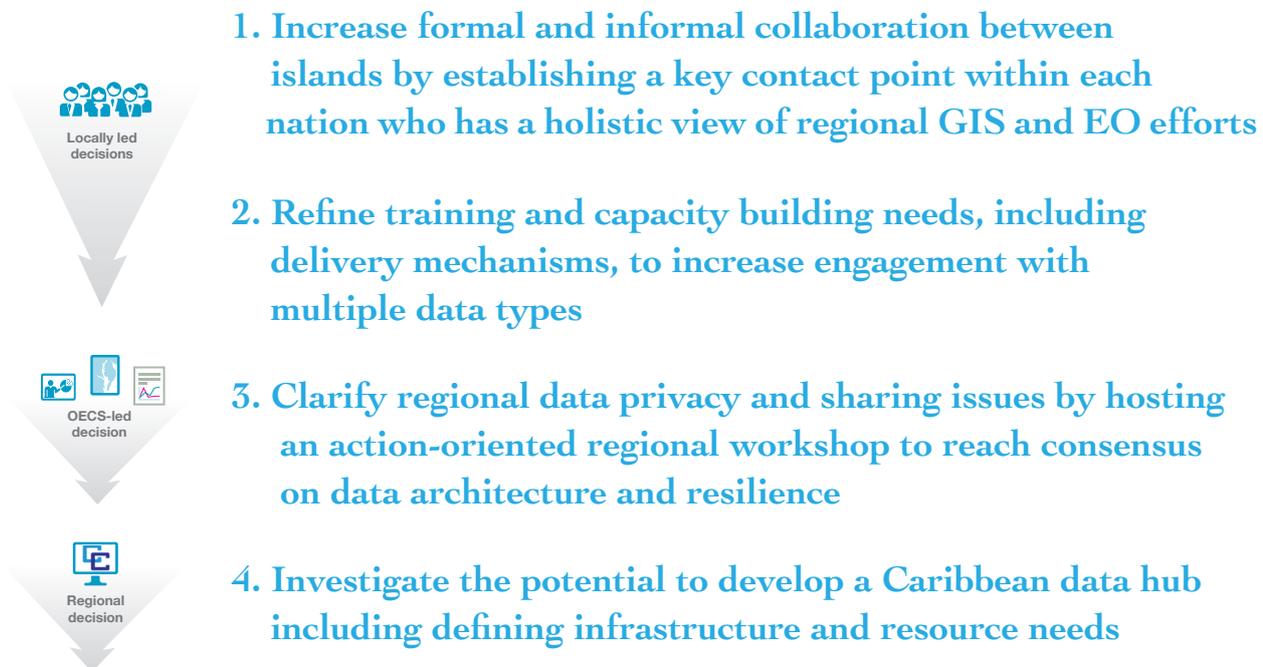
Co-designed policies developed to more fully realise opportunities associated with Blue Growth and the benefits to collectively cope with and reduce climate risks will not only improve the quality of life for islanders across the Caribbean but also contribute to international accords e.g. the UN Agenda 2030 Sustainable Development Goals to which islands are signatories

- **Leadership:** Specific islands have engaged more fully in certain aspects of policy development (e.g. Anguilla's statistical advisory arrangement and Grenada's data use policy). Utilising local expertise and lessons learned to transcend challenges will ensure effective and efficient outcomes across the region
- **Empowerment:** Developing policy frameworks that resonate across the region can potentially strengthen OECS and member state negotiating positions on the international stage (e.g. WTO talks, UN fora) creating a more united voice for action on critical regional and global issues
- **Knowledge:** highlighting the potential and practicalities of increased use of EO data, can act as an advocacy tool to inform policy. Having short, region specific, briefing documents for use at multiple levels (nations, OECS, CARICOM, CLMN) will increase knowledge transfer and foster engagement with a range of issues that can use EO data



Decision Points:

This roadmap is designed to help support Blue Growth and risk management in OECS Member States and the wider Caribbean region. It demonstrates how Earth Observation data can play an important role in supplementing these efforts. A series of opportunities and action areas are identified that provide avenues for collaboration and impactful research across multiple scales. Four logical next steps can be distilled from the information provided in the narratives and briefs of this roadmap:



This roadmap reflects the regional reality of an ever-evolving need for sustainable development and economic security in the face of global changes and advances.



We are now faced with the fact that tomorrow is today. We are confronted with the fierce urgency of now. In this unfolding conundrum of life and history, there “is” such a thing as being too late. This is no time for apathy or complacency. This is a time for vigorous and positive action

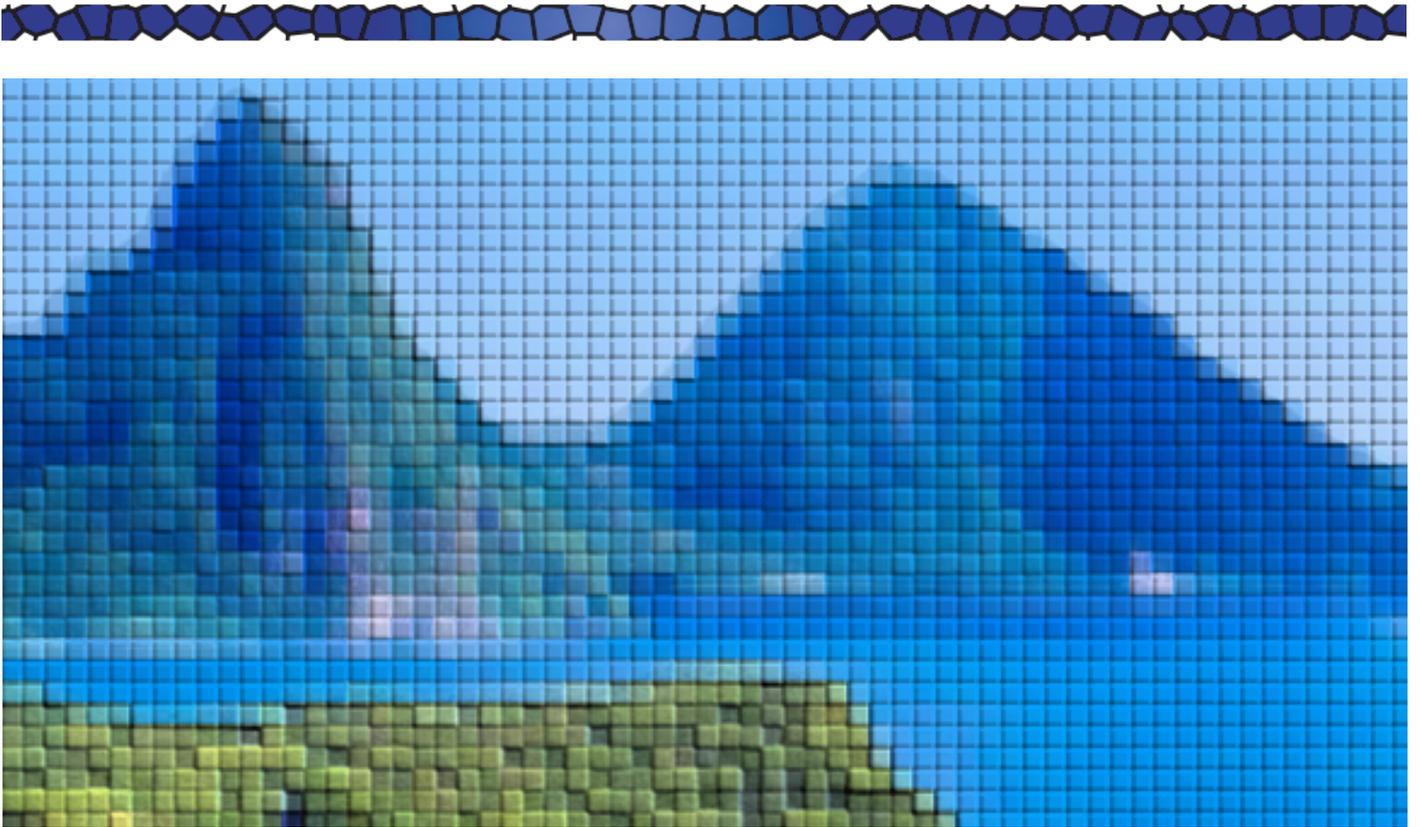
Martin Luther King Jr

as quoted by

Dr. Didacus Jules

at COP 23





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