RESEARCH FOR A SUSTAINABLE OCEAN ECONOMY

The Mauritius Oceanography Institute

Voluntary Commitment – SDG 14

18th May 2017
EEZ OF MAURITIUS
A sustainable Blue Economy is one that...

- Provides economic benefits for current and future generations
- Provides social benefits for current and future generations
- Restores, protects and maintains the diversity, productivity and intrinsic value of marine ecosystems

...contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity, tourism and political stability.

...the natural capital upon which its prosperity depends.

THE BLUE ECONOMY CONCEPTUALISES OCEANS AS DEVELOPMENT SPACES
RESEARCH FOR A SUSTAINABLE OCEAN ECONOMY

Ecosystem-based management

Protect, manage and development of marine resources

Scientific studies

Baseline surveys and Monitoring plan
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PHYSICAL BASELINE DATA
RAW BATHYMETRIC DATA AVAILABLE FOR THE FOLLOWING SITES

TROU AUX BICHES
MON CHOISY
LA PRENEUSE
BELLE MARE
PALMAR
POINTE AUX CANNONIERS
GRAND BAY
PEREYBERE
POUDRE D’OR /POINTE DES LASCARS
ALBION
BLUE BAY /POINTE D’ESNY /LA CAMBUSE
BAIE DU TOMBEAU
RIVIÈRE NOIRE
CAP MALHEUREUX
BAIN BŒUF
RIVIERE NOIRE
CASE NOYALE
LA GAULETTE
LE MORNE
MACONDÉ
BAIE DU CAP
TAMARIN
FLIC EN FLCA
Bathymetric charts produced for a few sites

Rodrigues:
- Site visit done in April 2012 (J. Mosaheb, V. Ramchandur, R. Runghen & C. Samyan)
- Data acquisition was performed in November 2013 (V. Ramchandur, O. Pasnin & C. Samyan)
Temperature network

- **Data capture:** *In-situ* HOBO Pendant® Temperature/Light Data Loggers 64K
- **Sites:** Lagoon (<2.5m) / Offshore (7.0m & 12.0m)
- **Sampling Frequency:** 15 minutes-interval
- **Data format:** Mean (± SD) day/night temperature (°C)
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CHEMICAL BASELINE DATA
SGD SITES AROUND MAURITIUS

SST temperature differential imagery shows 37 potential SGD sites. Each of which was investigated for $^{222}\text{Radon}$, salinity, pH and temperature. 28 sites were positive for $^{222}\text{Radon}$ and are confirmed SGD sites.

- Confirmed SGD site
- Negative for Radon
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• 28 sites identified
• Verification for potential source of marine pollution in the lagoon
• Model the distribution and dispersion of the nutrients/pollutants
• Development and management of aquaculture sites.
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BIOLOGICAL BASELINE DATA
Port Biological Baseline Survey (PBBS)

A PBBS is a scientific survey of the port’s biological communities and ecology focusing on the presence and absence of non-indigenous species.

Sampling sites:
- Cores & Quadrats (8)
- Plankton tows (2)
- Traps (9)
- Beach seine (3)
- Qualitative (numerous)
ACHIEVEMENTS

2012: Development of Ballast Water Risk Assessment Decision Support system

2014: Final Project report submitted to the Shipping division

2014: In Globalballast Monograph Series Number 21 and 22, Mauritius has been mentioned as a case study

2015: Marine invasive species - A regional action plan adopted under the aegis of Indian ocean Commission, July 31st, 2015
Assessment of marine living resources in Mauritian waters using a DNA-based approach

1. Fish DNA barcoding (Feb 2010 – Oct 2013, completed)

- 41 species previously not reported in Mauritius
- 3 potentially new species

![Diagram showing % of reported, unreported, and unknown species.]

Figure 2: % of unreported and potentially new species
2. Sea cucumber DNA barcoding (Oct 2013 – to date, ongoing)

- 23 specimens analysed using DNA
- Identified 9 species from 5 genera and 2 families
- Species analysed belonged to two major families: Holothuriidae (5 species) and Stichopodidae (4 species)

Figure 3: Distribution of sequenced sea cucumber specimens within their families (%)
 Creation of an online marine diversity and genetic database (www.mdgdb.com)

Morphological and genetic data gathered from the project uploaded on the database

Creation of posters and field guides of local marine organisms of commercial importance.
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REMOTE SENSING & GIS

- PRIMARY PRODUCTIVITY
- POTENTIAL FISHING ZONE
- HAZARD
Available Data

4 Km Chl-a for South West Indian Ocean Region since 2002 (referential database of Chl-a data in the SWIO region)

Sea surface colour reveals the abundance or not of chlorophyll-a (blue-green pigment), which is an indicator of the presence of phytoplankton.
RE-ANALYSIS DATA

Temperature (50 levels)
Salinity (50 levels)
Sea surface height SSH
Current Patterns U, V
Mixed Layer Depth MLD

![SST](image1)
![SSS](image2)

![SSH](image3)
![MLD](image4)
![Currents](image5)
AVAILABLE DATA: HAZARD MITIGATION

- Tsunami modelling and preparedness map
- Harmful algal blooms
- Sea Surface Temperature fluctuations
- Significant wave height
AVAILABLE DATA: INSTRUMENTATION AND IN-SITU PRODUCTS (NEAR-SHORE)

Water current speed and direction

Wave and Tidal variability

Temperature - turbidity and Kinetic energy of the ocean

Temperature

Turbidity

Kinetic energy
AVAILABLE DATA: GIS PROCESSING AND MAPPING

Surveys both coastal and deep waters:
- Understanding of SST and salinity interaction, defining thermocline variation.
- Coastal developments/ habitat assessment.
- Thermocline variation important for fishing.
- Habitat mapping and distribution.
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An accurate knowledge of potential fishing zones (PFZ) off lagoon has several applications:

- optimise fishing effort
- Control fishing grounds
- FAD mooring
- Potential for aquaculture:
  - identification of suitable sites for aquaculture
  - issuing warnings on potential water quality threats (e.g. pollution and HAB)
- monitoring the environmental impact of sea farms
GIS MAP OF THE SELECTED SITES FOR MARICULTURE

Parameters

• Current patterns
• Water quality
• Bathymetry
• Nature of sea bed
• Benthic cover
Corresponding Targets

14.7

By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

14.c

Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want
Title: Research for a sustainable Ocean economy

- Basic information:
- Time-frame: 2017 June - 2018 December
- Website
- Partners
- Ocean Basin: local
- Beneficiary countries
- Other beneficiaries: Small-scale fishermen, tourism sector, ecotourism, diving, conservation scientists, policy makers, MPA managers
- Contact information:

Other SDGs:
- See more at: https://oceanconference
Thank you