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Touching lives through innovation

MarCOSIO: Supporting Coral Bleaching Monitoring in the Western Indian Ocean

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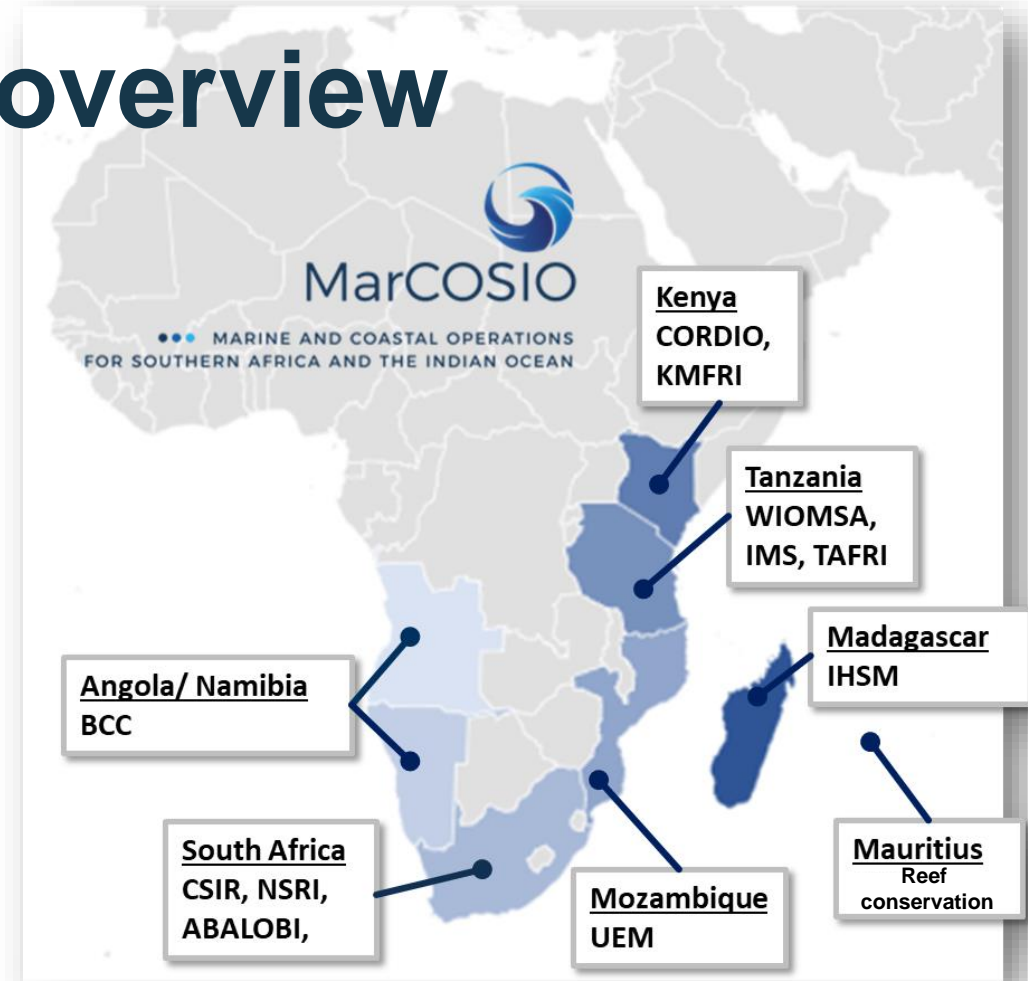
<https://marcosio.org/>

MARINE AND COASTAL OPERATIONS
FOR SOUTHERN AFRICA AND THE INDIAN OCEAN


MarCOSIO

GMES&Africa MarCOSIO overview

- One of 2 marine consortia within the GMES&Africa programme
- The MarCOSIO project is lead by the CSIR (South Africa)
- The project represents 12 partners in 8 countries in Southern Africa and the Western Indian Ocean (WIO) region





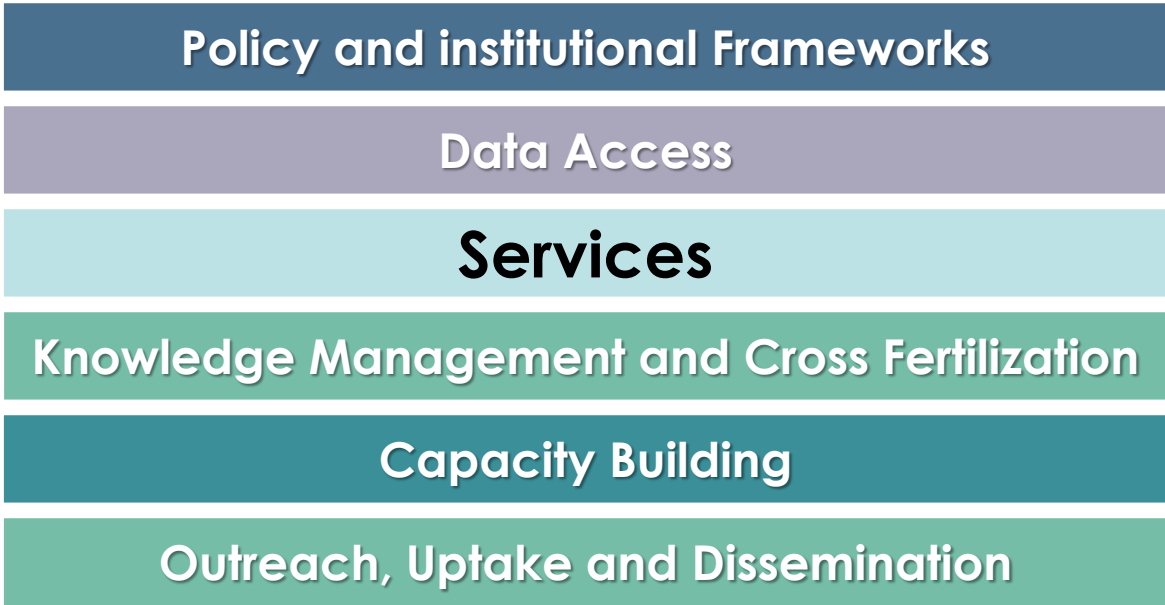
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Project pillars

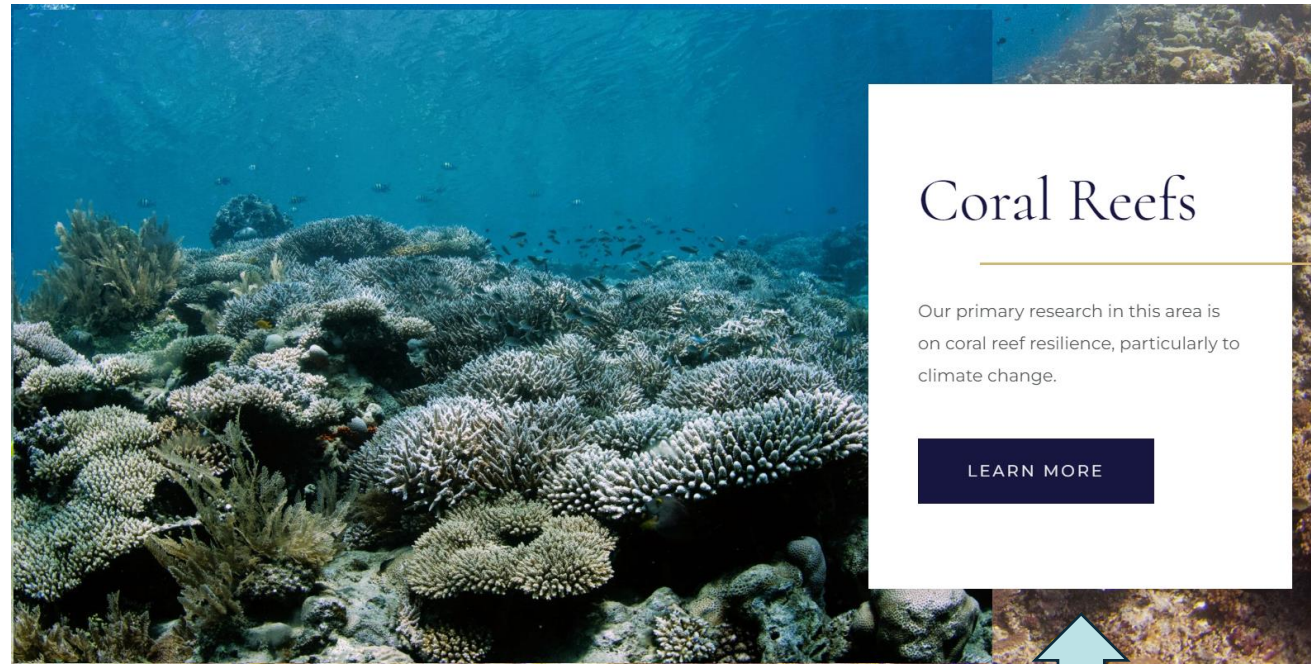


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MARINE AND COASTAL OPERATIONS
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To improve the health and resilience of marine ecosystems and coastal peoples' well-being in the Western Indian Ocean through research, conservation action and support to policy and governance.



Coral Reefs

Our primary research in this area is on coral reef resilience, particularly to climate change.

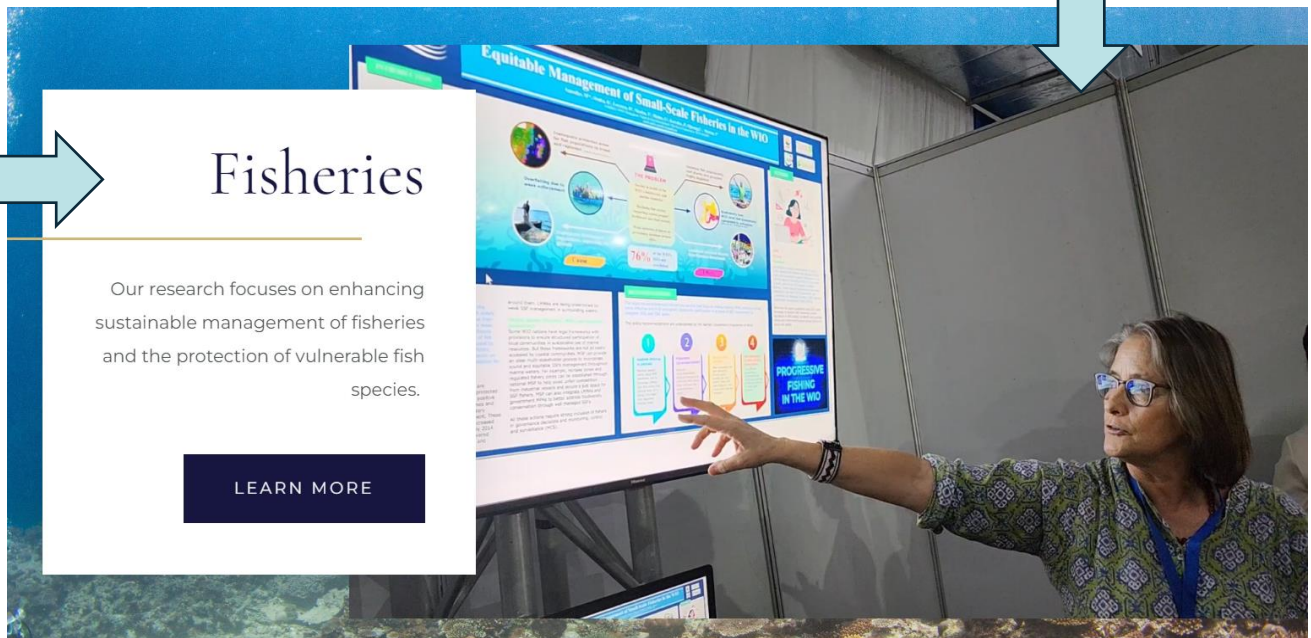
[LEARN MORE](#)



Social Sciences

Our research here builds knowledge on intersection of conservation and society, particularly local coastal communities.

[LEARN MORE](#)

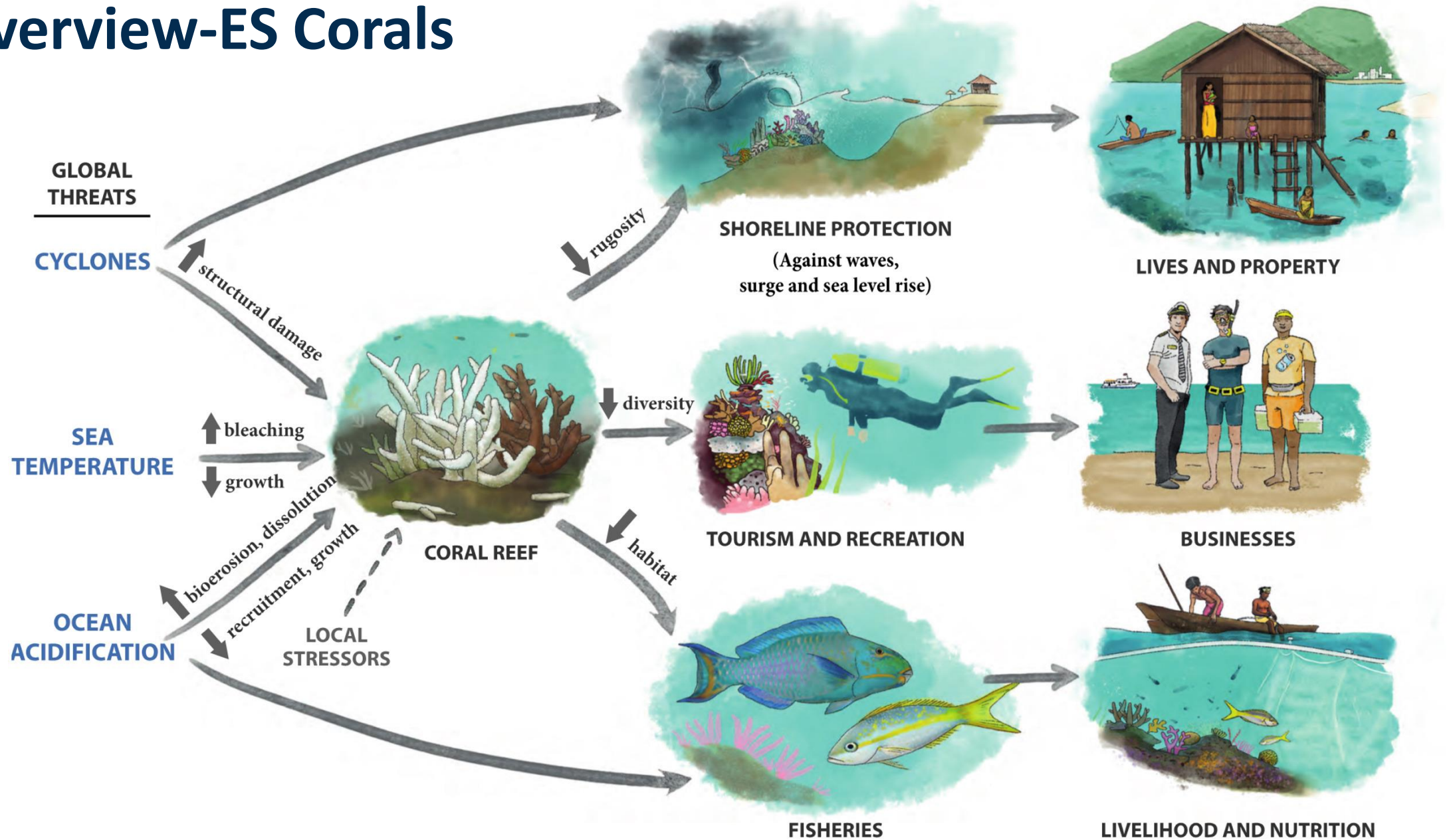


Fisheries

Our research focuses on enhancing sustainable management of fisheries and the protection of vulnerable fish species.

[LEARN MORE](#)

Overview-ES Corals



Coral Bleaching Alert Service

What is it?



Not a conservation tool

Early warning system

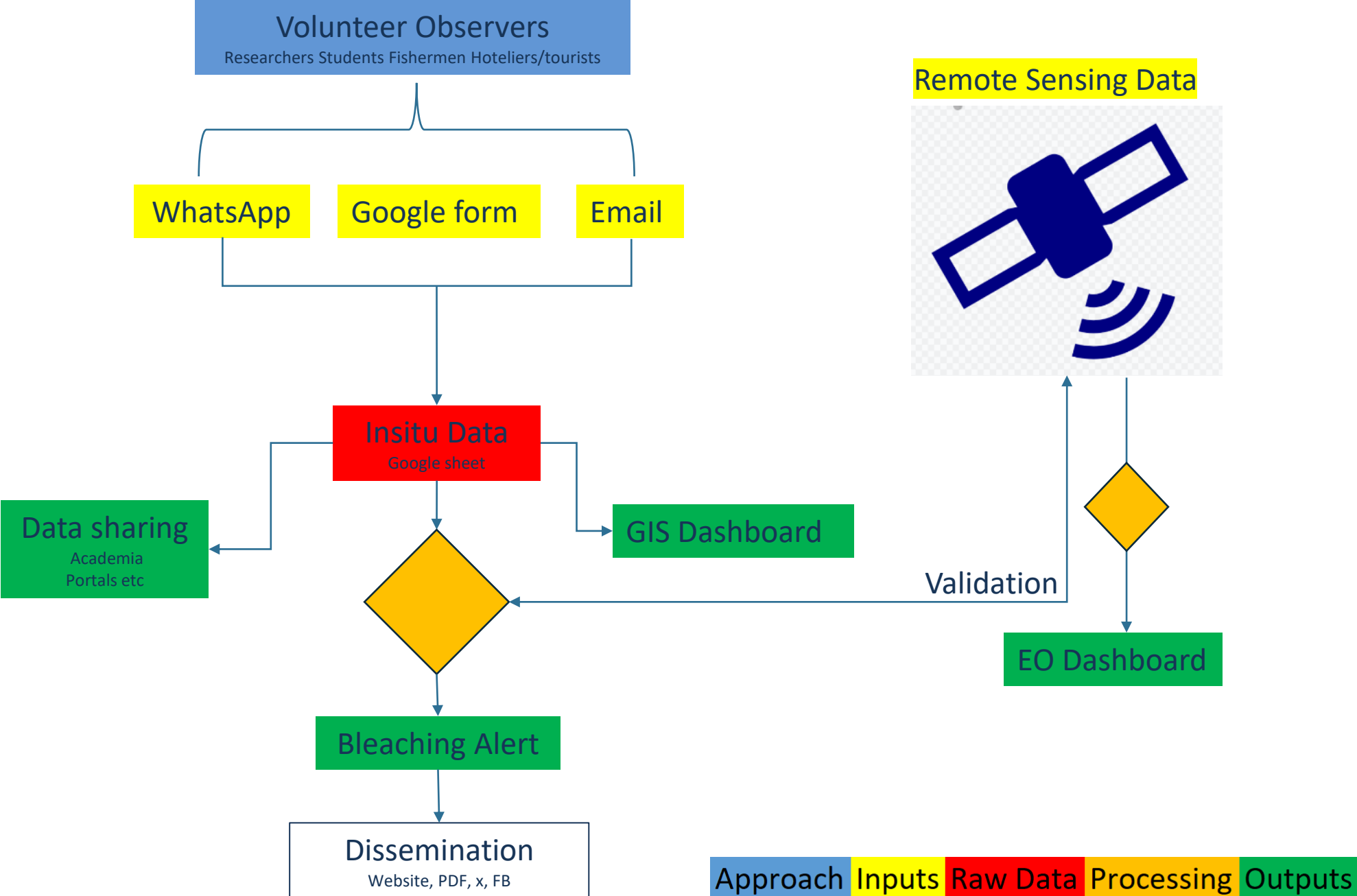
Multiple frameworks-one service

Co-developed

Utilises different data sources

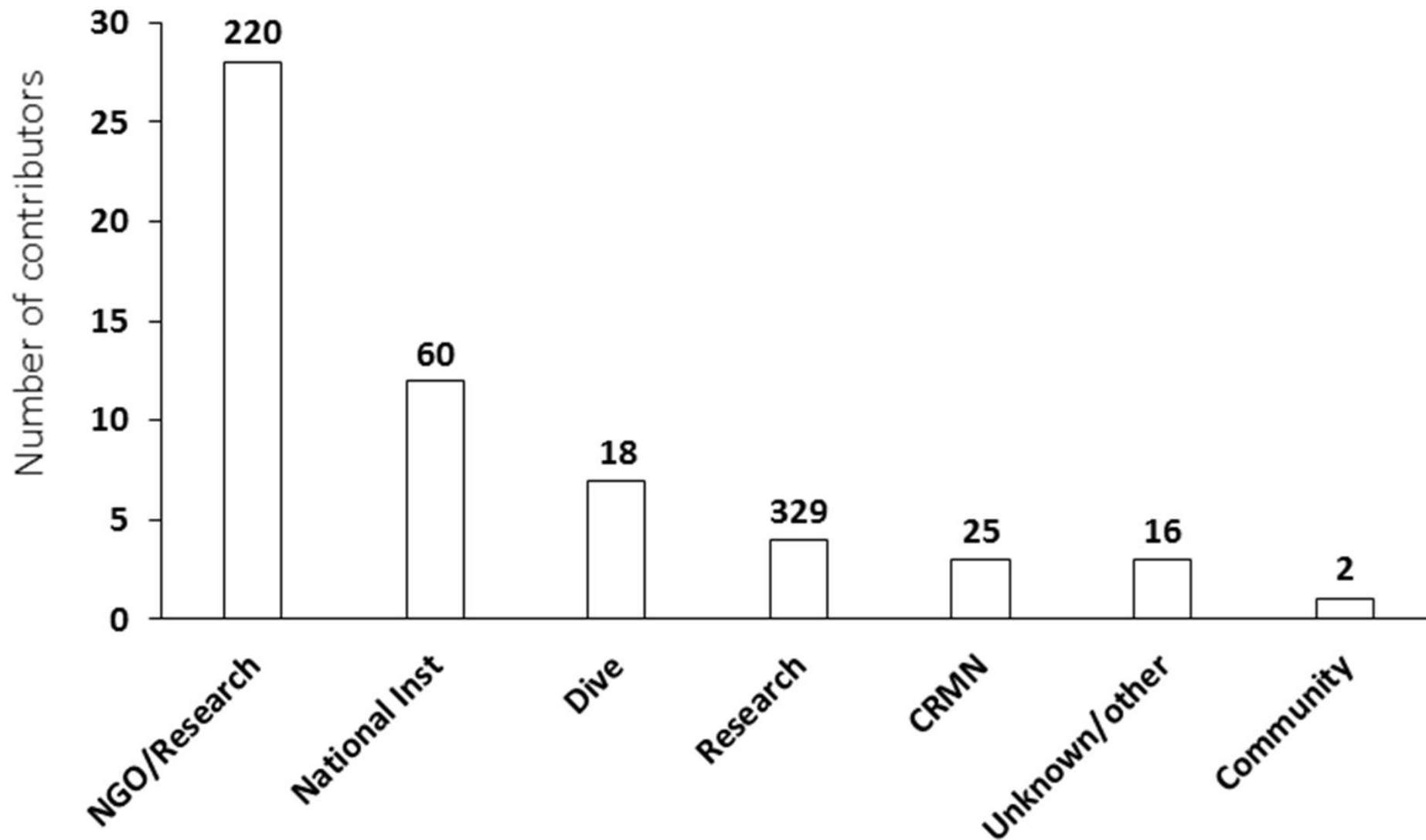
- ✓ Decision support tool that promotes **sustainable management** of marine resources
- ✓ Allows managers to **enforce regulations** that reduce further stress on the environment
- ✓ Different stand-alone applications that work together
- ✓ CSIR, CORDIO East Africa, and communities
- ✓ Satellite & citizen science data

Bleaching Alert Service flow



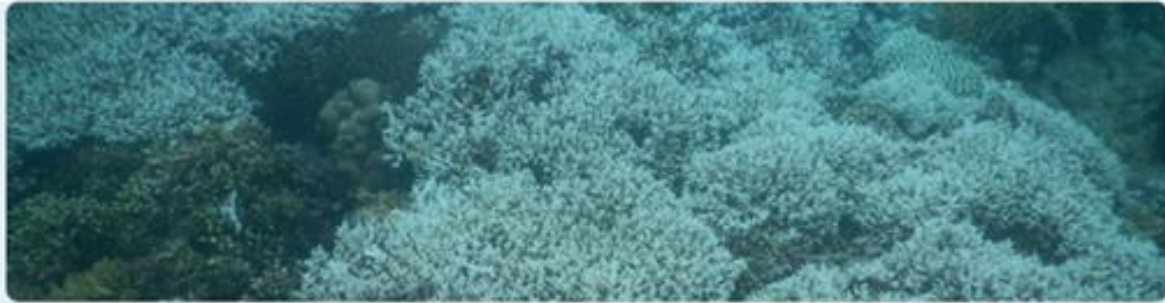
Users

And data contributors



Inputs

Google form



Indian Ocean Coral Bleaching Reporting Form

Dear partners,

In our efforts to better understand the impacts of coral bleaching events in the region, we are seeking consistent, basic-level coral bleaching data from our partners across the region. Please use this form to contribute to this initiative. When you dedicate approximately 15 minutes to applying the method outlined below, please submit this form.

Method:

- Conduct a 5-minute timed swim and observe the reef.
- Examine all visible hard corals, noting their growth shape (refer to the list below).
- Estimate the percentage of coral cover bleached in the area.



<https://cordioea.net/coral-reef-research/vulnerability/indian-ocean-coral-bleaching/>



Inputs

In situ data collection form



BLEACHING DATA ENTRY KEY

26 attributes across 4 thematic sections

<u>COLUMN</u>	<u>COLUMN DESCRIPTION</u>
OBSERVER	Name of the person who made the observation
ORGANISATION	Name of the institute or organisation affiliated with the observer
ORGANISATION TYPE	Description or classification of the organization where observer is affiliated (Govt, NGO, University, hotel, diving club)
EXPERIENCE	Experience of the observer in terms of coral bleaching observation(Pro, Intermediate, beginner)
COUNTRY	Country names (following Reefbase convention at: http://www.reefbase.org/global_database/default.aspx?section=r1)
LOCATION	The state, town or nearest community
SITE_NAME	Name of the dive site, if available, or the local community
LATITUDE	In decimal degrees
LONGITUDE	In decimal degrees
DATE	Date of observation (where available)
MONTH	Month of observation (where available)
YEAR	Year of observation
DEPTH	Depth of survey (where available) (m)
BLEACHING_SEVERITY_CODE	See Bleaching Severity key (on right)
PERCENT_BLEACHED	Percent of coral bleached (where available)
MORTALITY_CODE	See Mortality Severity key (on right)
PERCENT_MORTALITY	Percent mortality, as a fraction of coral cover (where available)
% METRIC USED	% of total survey area, coral area, or number of colonies
SURVEY_TYPE	Survey type (e.g. random swim, PITs, etc. where available)
WATER TEMPERATURE	Water temperature at depth of observation (°C)
TEMPERATURE DEPTH	Water depth at which temperature was taken (m)
SOURCE	Initial source of the report (e.g. individual)
CITATION	Manuscript or report describing the observation (if applicable)
COMMENTS	Any additional comments on the record
PERMISSION TO SUBMIT DATA	Does NOAA have your permission to submit your data to the coral bleaching database being compiled by the University of British Columbia?
DATA POINT OF CONTACT	Name of primary contributor (i.e. name of person NOAA can contact with any questions about the data)

Personal/organisational information

Spatial temporal attributes

Biological/ecological attributes

Attribution

GIS Dashboard

In situ data

<https://www.arcgis.com/apps/dashboards/99a8c1212f264cbab7a3adb2982e0b6f>



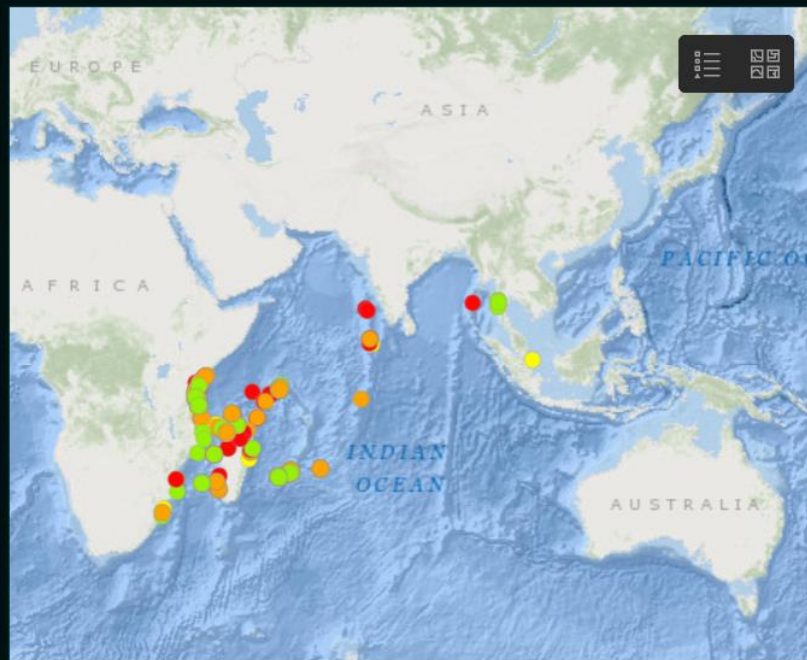
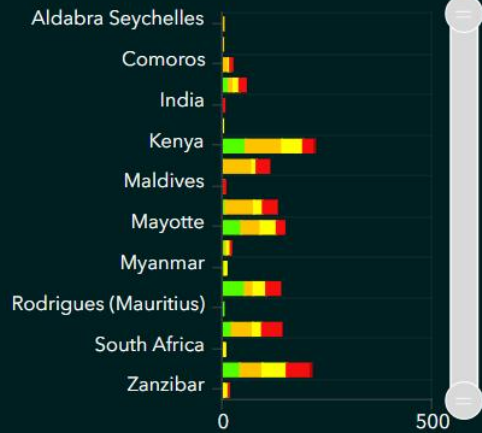
Western Indian Ocean Coral Bleaching Observations 2009-2024

Filter By Year
All Years

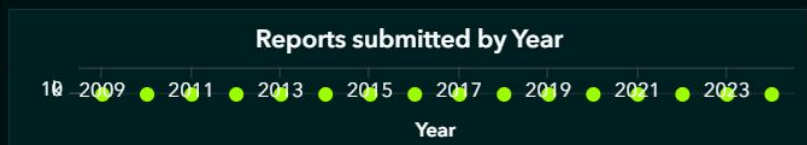
Filter By Country
All Countries

Total reports
1.2k

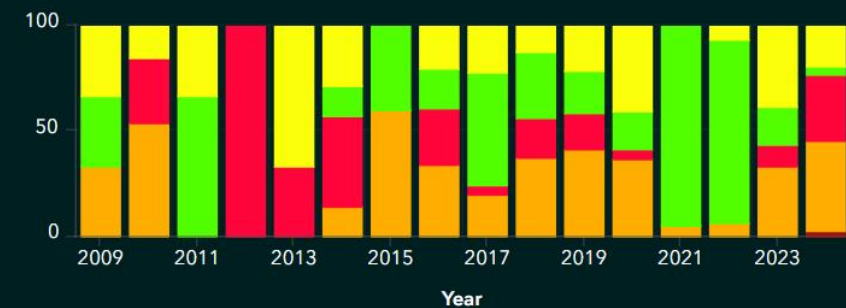
Reporting countries/Territories



Esri, GEBCO, Garmin | Esri, GEBCO, NGS Powered by Esri

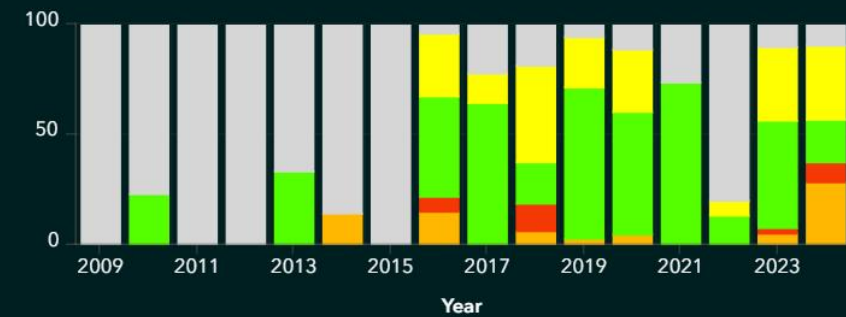


Regional % Bleaching observation

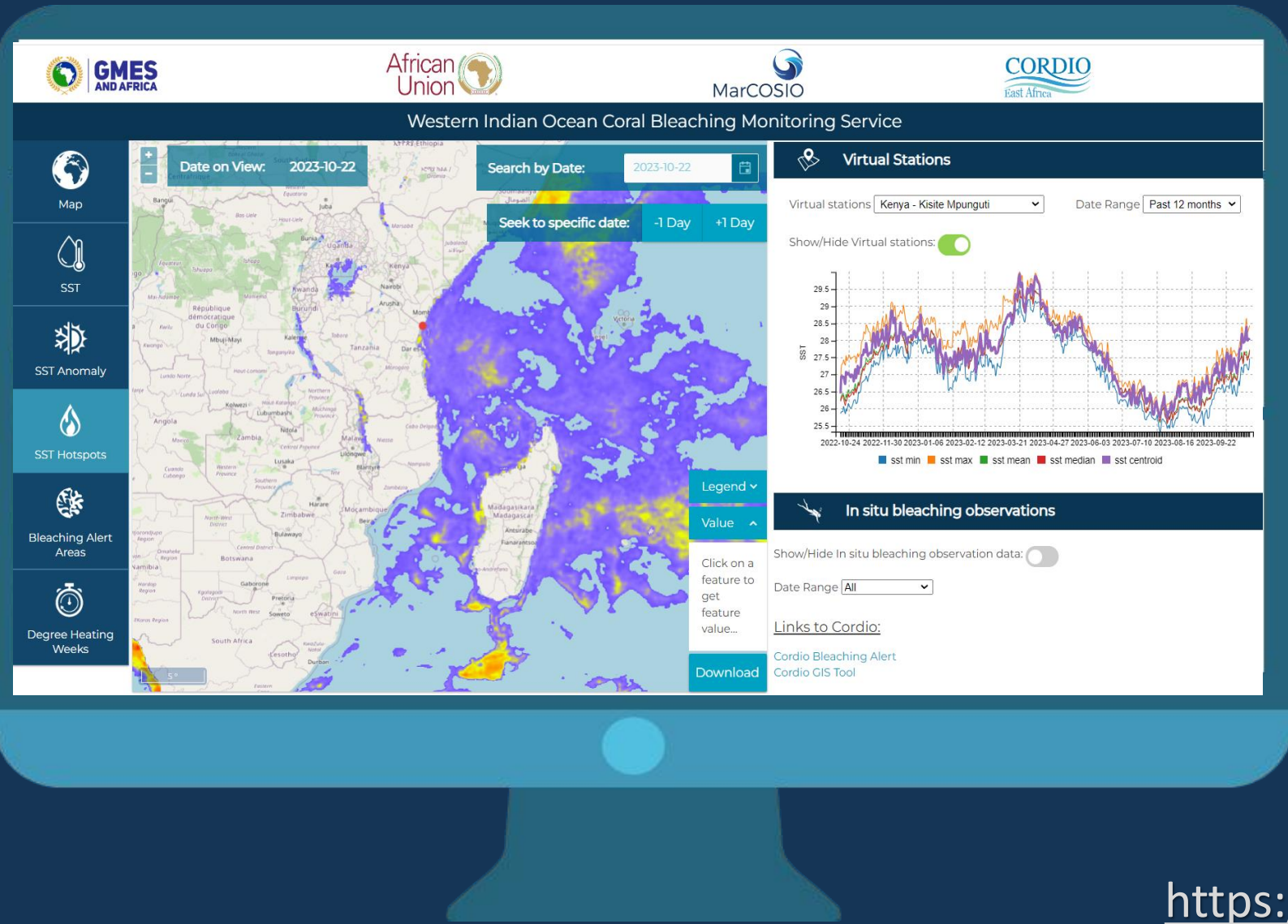


Last update: 3 seconds ago

Regional % Mortality Observation.



[Click here for the latest Bleaching alert](#)



Coral Bleaching Alert Map Viewer



<https://ocims.csr.co.za/coralbleaching/>



<https://marcosio.org/>

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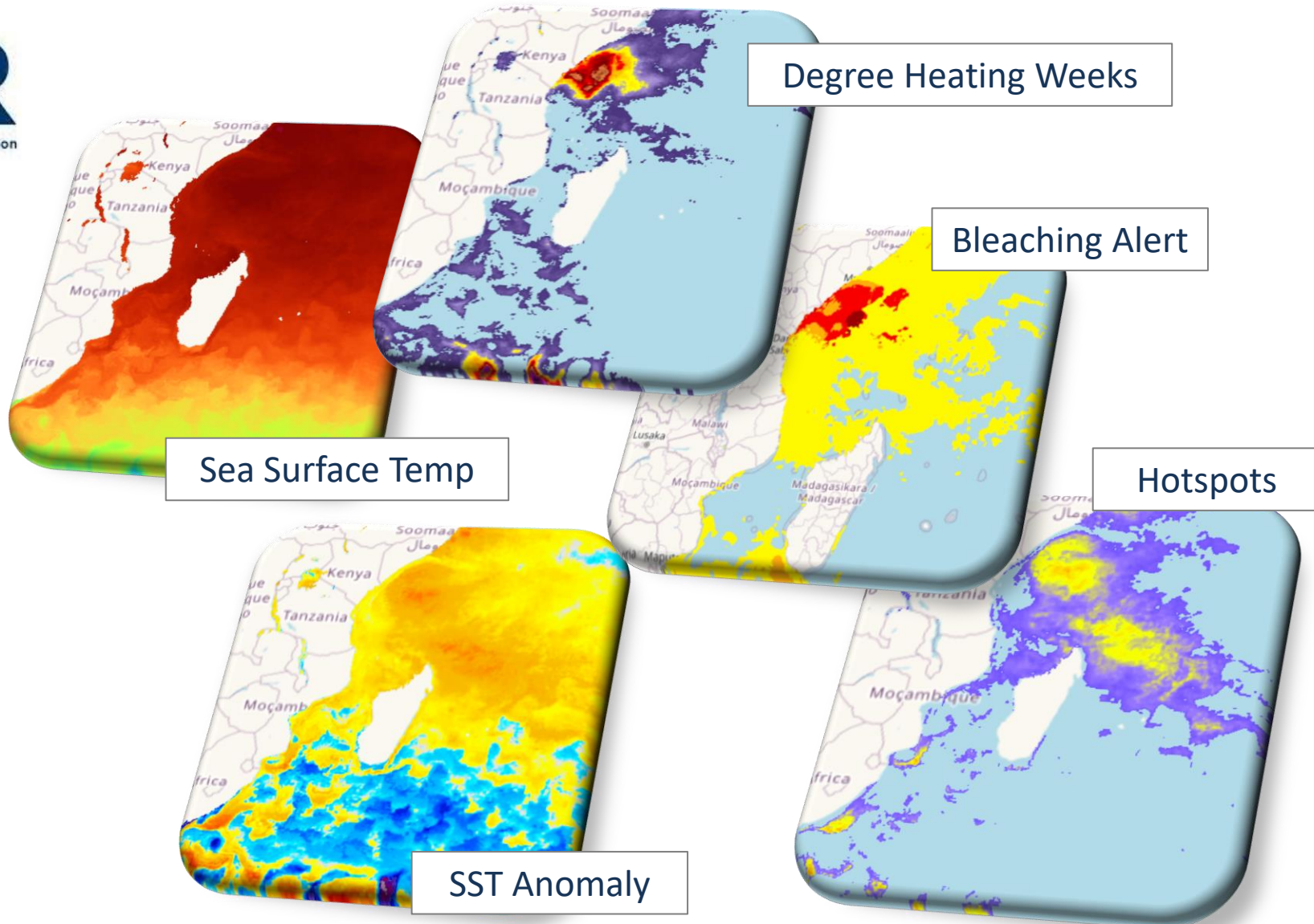
The Earth Observation Dashboard

Web-based map viewer



Thermal stress products

- Gap-free satellite products derived from SST (5km resolution), providing information on potential bleaching alerts, **immediate** and **accumulated** thermal stress
- Derived from Copernicus Marine Services OSTIA product



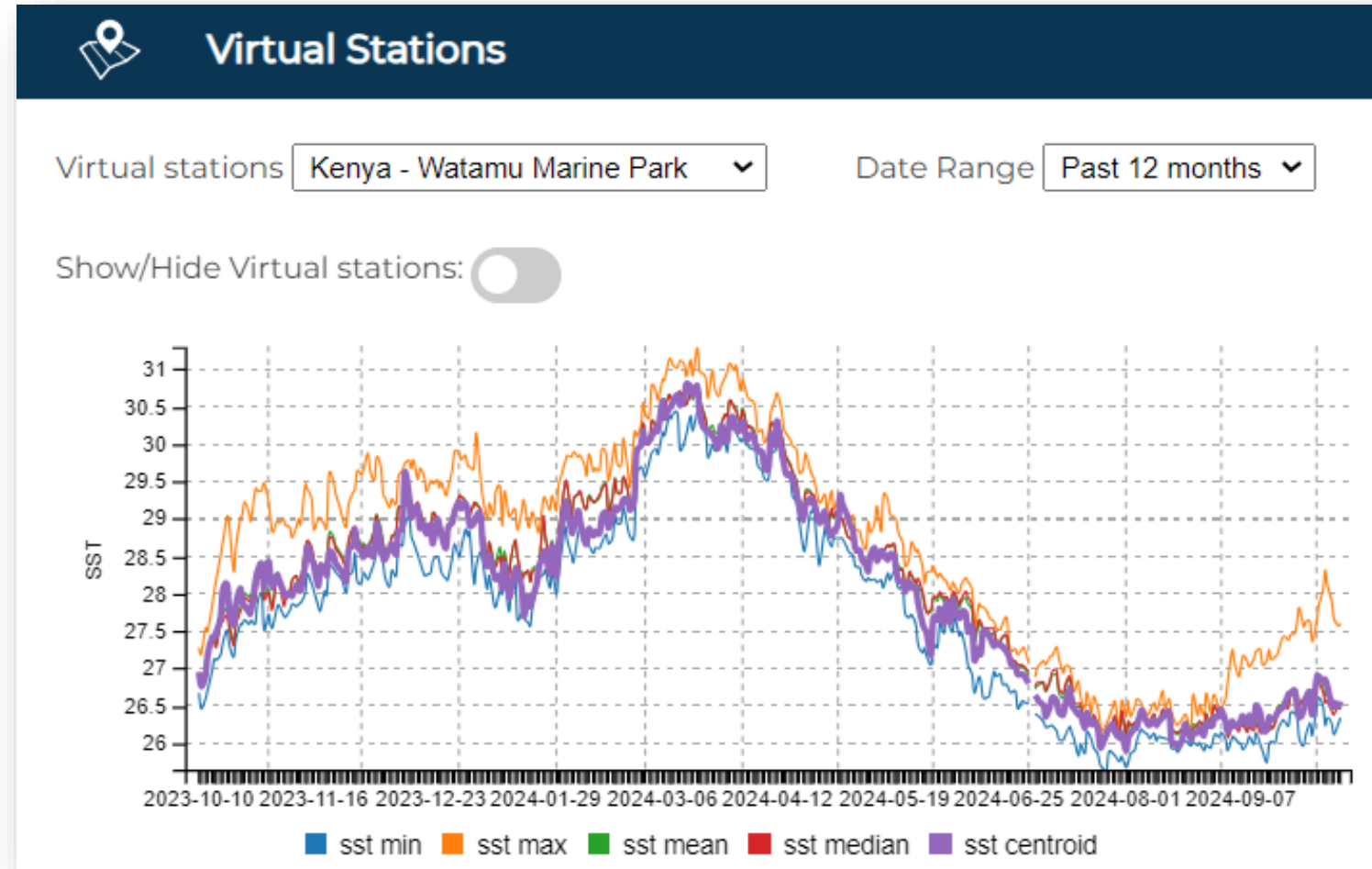
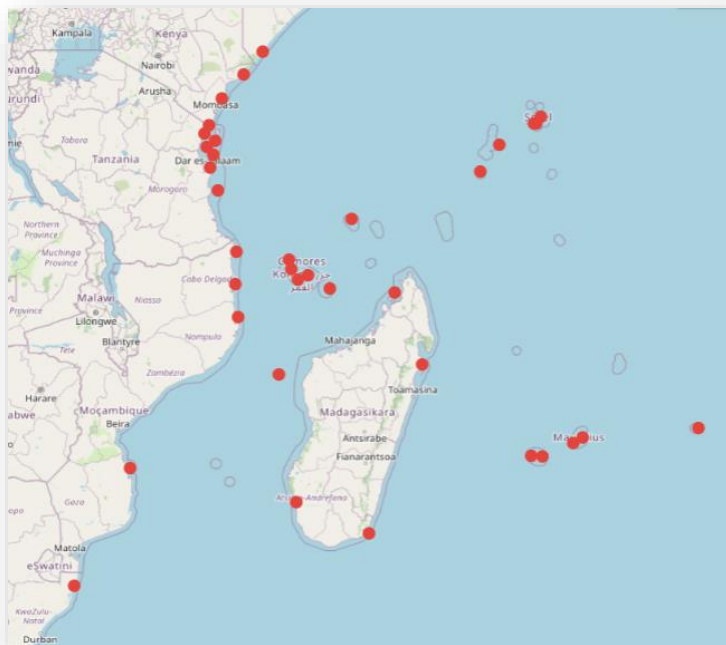
The Earth Observation Dashboard

Web-based map viewer

Virtual stations

- Interactive graphical presentations of key monitoring sites showing historical information on SST within the past 12 months

<https://ocims.csir.co.za/coralbleaching/>



Outputs

Bleaching alert bulletins (pdf)

WESTERN INDIAN OCEAN – Regional coral bleaching alert

DATE OF THIS ALERT: 01 January 2023
<http://www.cordioea.net/bleachingalert/>
 Contact: bleaching@cordioea.net

1 January 2023 – Coral bleaching forecast – Western Indian Ocean

Area	Region	Alert	Bleaching observations
S. Moz/S Africa	Cool, south (D1)	none	
S/ROE Madag	Cool, south (D2)	none	
SW Madagascar	Hot, south (A1)	none	
South Equat Cur	Moderate, central (C)	none	
East Moz Cha/Comoro	Hot, central (A2)	none	
NW Moz Cha IC Tans	Warm, central (B)	none	
NW Seychelles	Hot, north (A3)	none	
Kenya/Somalia	Variabile, north (E)	none	

Bleaching Alert Level

- Warning – indicators of warmer conditions that may result in some bleaching
- Level 1 – moderate bleaching possible
- Level 2 – severe bleaching likely

Letters in the brackets under the 'region' column refer to the WIO climatology regions, depicted in the map in the top right corner.

Given low levels of bleaching in recent years and neutral/negative ENSO and IOD, the overall bleaching risk is likely to be low. However, the early buildup of heat, particularly in the Mozambique channel, warrants a 'warning' level across the region.

Global & Regional Indicators

The long protracted La Niña event that began in 2020 is gradually ending. Decadal prediction anticipates 2023 to be hotter than 2022 (UK Met office).

ENSO and Indian Ocean Dipole forecasts

Cyclones

In 2022, a total of 12 tropical storms were formed but only 5 developed into cyclones in the WIO region.

At the beginning of 2023, the WIO basin is relatively calm, and no cyclone or storm has formed so far.

No bleaching observations to date

REPORT ALL BLEACHING (AND NON-BLEACHING) OBSERVATIONS HERE
<https://go.gl/forms/P3e9e5m3V59403>

Incoming observations will be updated on this dashboard: <https://www.cordioea.net/bleaching>

NOAA Products – 1st January 2023

SST Anomaly Virtual stations Season outlook (Jan-Apr 2023)

Left: At the beginning of January, temperatures across most of the WIO basin are already 1-2°C warmer than baseline and Center most of the stations (17/21) are on bleaching watch though there is no significant buildup of heat stress. Right: The seasonal outlook predicts moderate to high bleaching in the southern WIO with greater than 60% probability.

الإنذار الإقليمي لأبيضاض الشعب المرجانية في البحر الأحمر- المملكة العربية السعودية

تاريخ الإنذار: 04 سبتمبر 2024

يرجى منكم إرسال أي صور أو تعليقات حول مشاهدات ابيضاض الشعب المرجانية علي: RedSeaReefWatch@shams.gov.sa

04 سبتمبر 2024 - توقعات ابيضاض الشعب المرجانية - البحر الأحمر (المملكة العربية السعودية)

ملاحظات ابيضاض	أضرار	منطقة
ابيضاض شديد	المنطقة 2	أقصى شمال البحر الأحمر
ابيضاض شديد	المنطقة 2	شمال البحر الأحمر
ابيضاض شديد	المنطقة 2	وسط البحر الأحمر
ابيضاض متوسط	المنطقة 1	خفاف فرسان
ابيضاض متوسط	المنطقة 1	جزر فرسان



إذا رأيت ابيضاض الشعب المرجانية، يرجى الإبلاغ عن ذلك إلى شمس من خلال استبيان عبر الإنترنت. يمكنك الوصول إلى الاستبيان عن طريق مسح رمز الاستجابة السريعة هذا.

المؤشرات العالمية والإقليمية: أعلن العلماء في الإدارة الوطنية للمحيطات والغلاف الجوي (NOAA) عن حدوث رابع حث عالمي لابيضاض الشعب المرجانية في 15 أبريل 2024. كانت متوسطات درجات حرارة سطح البحر على مستوى العالم هي الأكثر دفئاً على الإطلاق لكل شهر بين أبريل 2023 ويونيو 2024. شهدت الأرض الحرارة على مستوى العالم في 13 أغسطس 2016، والذي تزامن مع حث ابيضاض الثالث على مستوى العالم. تتراوح اختلافات درجة حرارة سطح البحر في البحر الأحمر من 0.5 درجة مئوية في الجنوب إلى أكثر من 3 درجات مئوية في الشمال.

تنبؤات الطقس والتأثير المحتمل على ابيضاض:

من المتوقع أن تتجاوز سرعة الرياح خلال ساعات النهار 20 عقدة في العديد من المواقع وهي أقصى شمال البحر الأحمر وشمال البحر الأحمر ووسط البحر الأحمر حتى 11 سبتمبر 2024. وستتجاوز سرعة الرياح في مناطق خفاف فرسان وجزر فرسان أيضاً 15 عقدة في العديد من الأيام. قد يؤدي ذلك إلى خلط وإبريد مياه السطح وقد تؤدي تعطية السحب إلى تقليل ضغط الإشعاع الشمسي على الشعب المرجانية بشكل عام. قد يؤدي ذلك إلى انخفاض أو الحد من تهديدات ابيضاض الشعب المرجانية.

المحطات الأقراصية لتلحظ العتية. توك، وعتية وعتة العتية في حثه. اتجاه جاري شديد (المنطقة 2) مع أكثر من 20 درجة مئوية وكما أن جاز تحت الضغط عند 5.5 درجة مئوية على مدار الأسبوع الـ 12 الماضية (DHW).

مراقبة الشعب المرجانية من NOAA: الأسابيع الحرارية ببطء (3.1) 5 أيلول 2024. مؤشرات يومياً، 31 أغسطس 2024.

مراقبة الشعب المرجانية من NOAA: الفرق الوبية في درجة حرارة سطح البحر (3.1) 31 أغسطس 2024.

ملخص: درجات حرارة سطح البحر أعلى من المعدل الطبيعي بمقدار 3 درجات مئوية في أقصى شمال البحر الأحمر، وأعلى بمقدار درجتين مئوية على الأقل عن المعتاد من شمال ووسط البحر الأحمر. تم الإبلاغ عن ابيضاض شديد في أقصى شمال البحر الأحمر ووسط البحر الأحمر وخفاف فرسان وجزيرة فرسان في الأسابيع الأخيرة. وتم رفع حالة التأهب لحدوث ابيضاض بمحطات NOAA الأقراصية في خليج العتية، توك والمدنية إلى المستوى 2. من المتوقع حدوث ابيضاض شديد واسع النطاق في العديد من مواقع البحر الأحمر، باستثناء الشعب المرجانية في خفاف فرسان وجزر فرسان كما انخفضت درجة حرارة سطح البحر في المناطق الجنوبية في الأسابيع الأخيرة وما قد يقل الطقس من خطر ابيضاض في الأسابيع المقبلة ومن المحتمل أن تقلل الشعب المرجانية المبيضة من الأسابيع السابقة مبيضة أو توت.

Outreach and training

Online Training Webinars

Preparing, Monitoring, and Responding to Coral Bleaching in the Western Indian Ocean

Climate change • Climate change refers to long-term shifts in temperatures an... [Copy link](#)

Dr. Karin Moejes
Senior Scientist & Manager
CORDIO East Africa

Dr. Derek Manzello
Coordinator
NOAA Coral Reef Watch

Swaleh Aboud
Scientist & Project Manager
CORDIO East Africa

James Mbugua
Project Manager
CORDIO East Africa

Host: Caitlin Lastic, South Florida
Watch on [YouTube](#)

Logos: Reef Resilience Network, The Nature Conservancy, CORDIO, GMES AND AFRICA, NOAA Coral Reef Watch

Predicting and Responding to Coral Bleaching in the Western Indian Ocean

Climate change • Climate change refers to long-term shifts in temperatures an... [Copy link](#)

James Mbugua
Project Manager, GIS & IT
CORDIO East Africa

Dr. Marie Smith
Marine Remote Sensing Specialist
Council of Scientific & Industrial Research

Dudley Tsinganyiu
Warden, Watamu Marine Park
Kenya Wildlife Service

Host: Dr. Elizabeth Shaver
Reef Resilience Network Science Lead
Watch on [YouTube](#)

Logos: Reef Resilience Network, The Nature Conservancy, CORDIO

Community outreach

COMMUNITY DISSEMINATION WORKSHOP

Logos: CORDIO, Klarna, Milkywire, Norad, UN environment programme, The Government, IKI, GMES AND AFRICA, MarCOG

SESSION I: THE STATUS OF CORAL REEFS
Comparing scientific and community coral reef monitoring data, for better practice

SESSION II: FISHING GEAR TRIAL RESULTS
Discussing the impact of modified basket traps and other gears on fish catch and biodiversity

SESSION III: SDG NARRATIVE MODEL OF ACTION
Raising awareness on integrated development action founded on SDG 14

November 27- December 6
In Mlunguni, Murje, Bodo, Wasini, Mtwapa, Kanamai & Kurunwitu

Participatory Management of Marine Resources

CORDIO is sharing the outcomes of its work with Kenyan coastal communities and discussing fronts for continued collaboration. CORDIO will also introduce the communities to an integrated sustainable development model founded on SDG 14.

CONTACTS
CORDIO East Africa
P.O. Box 10135 - 80101
Mombasa, Kenya
+254 736 341 184

More info contact / [Twitter](#) [Facebook](#) [Instagram](#) / cordioea WWW.CORDIOEA.NET

CORDIO East Africa @cordioea · May 27

9th WIO CORAL BLEACHING ALERT

The monsoon winds intensified over the last two weeks, leading to further cooling of the WIO basin. Bleaching season coming to an end with few reports of mortality/recovery from Kenya & Tanzania.

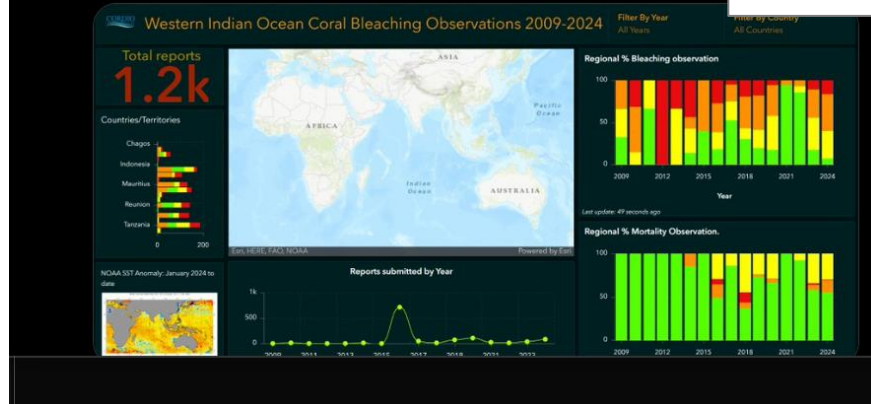
Full bulletin: tinyurl.com/rpj8dk65

CORDIO East Africa @cordioea · Jul 9

Read our summary of the #WIO's coral bleaching in 2024. Many thanks to the 30-plus contributors from around the region.

Tough year for WIO #coralreefs, with ~ 80% of them experiencing moderate to severe bleaching. Full report available here: tinyurl.com/4p863rbv

Social Media



CORDIO

REGIONAL CORAL BLEACHING REPORT

2024



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Thank you!
Baie dankie!
Enkosi kakhulu!
Asante Sana!

Contacts MSmith2@csir.co.za
JMbugua@cordioea.net



<https://marcosio.org/>

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