



Research, conservation, and education on coral reefs in the North of Mozambique: when Mozambicans discover the Underwater world

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UniLúrio - Univerisdade Lurio
Pemba, Mozambique**





Faculty of Natural Sciences (FCN) - UniLúrio

Academic areas/Research areas

Terrestrial



Marine Ecology



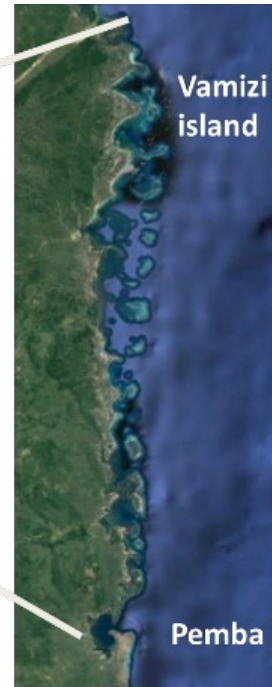
Botanic



Laboratory services



Pemba Campus and Vamizi research station



Pemba Campus and Vamizi research station

CONTEXT:

▣ The terrorist attacks started at 5th October 2017- Mocimboa da Praia;

▣ Spread to northern part of Cabo Delgado

▣ In Vamizi first attack was on 6th and 13th. September 2020

▣ Palma attack on March 2021

More than 2000 people died and 817 0000 refugees;

▣ Basic infrastructures destroyed;

▣ Restricted movement of boats and sea

▣ Militaries established their basis in V



Negative impacts

- **Suspended turtle monitoring activities in Quirimbas National Park (no data);**
- **Refugees moved to Islands possibly are capturing turtles but less fishing;**
- **Vamizi Island data were not recorded in September 2020 and April 2021;**
- **Vamizi Island were not done turtle night patrols;**
- **Challenges for funding and incentives;**

Positive impacts

•Reduced fishing activities:

- Less fisherman, they are afraid of militaries;
- Traders are not coming to buy
- They can't sell their fish

•In Vamizi island

- Sea patrols for terrorists are also fishing enforcement;
- Improved the health of the marine ecosystem;
- Reduction of sea turtle capture/mortality;



FCN Outreach

Beekeeping
Green house

Collection room



Swimming

Community development and environmental education





Dive&snorkell&swim

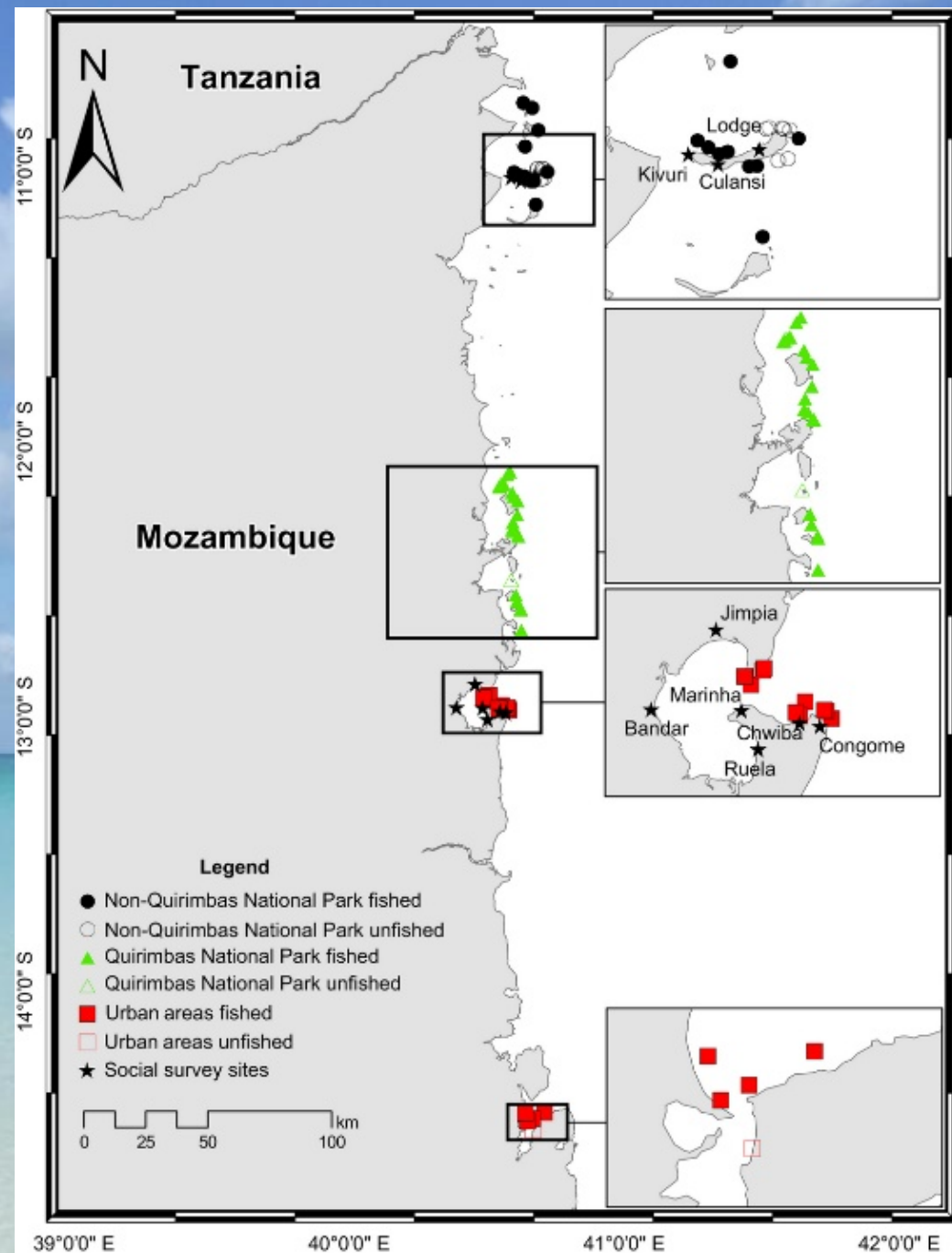


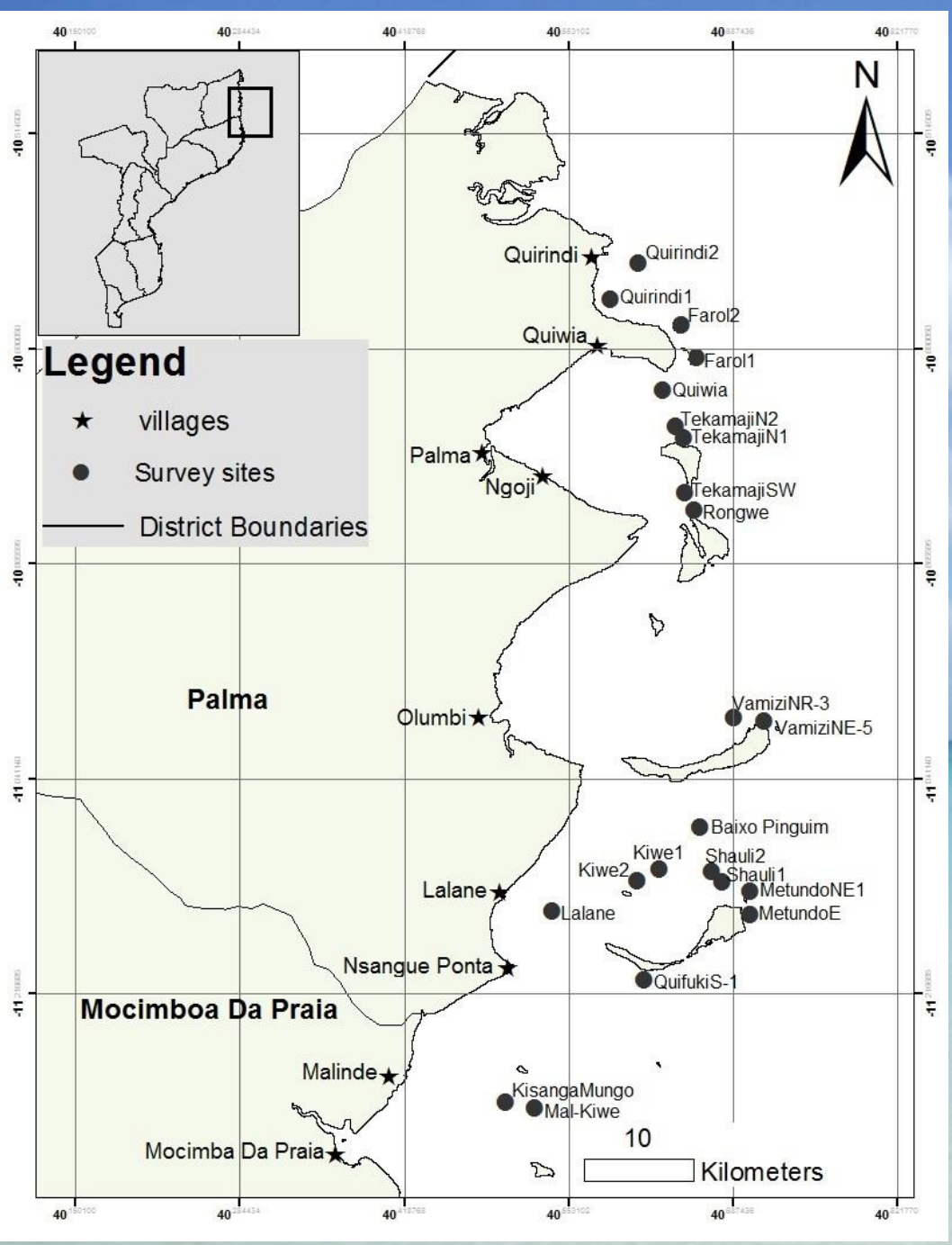
Coral reefs

- High Biodiversity
- Most sensitive corals in the north Quirimbas.... but resistant to bleaching
- Kituculo - mass spawning of corals
- Oceanographic currents



McClanahan, T. R., & Muthiga, N. A. (2017). Environmental variability indicates a climate-adaptive center under threat in northern Mozambique coral reefs. *Ecosphere*, 8(5).



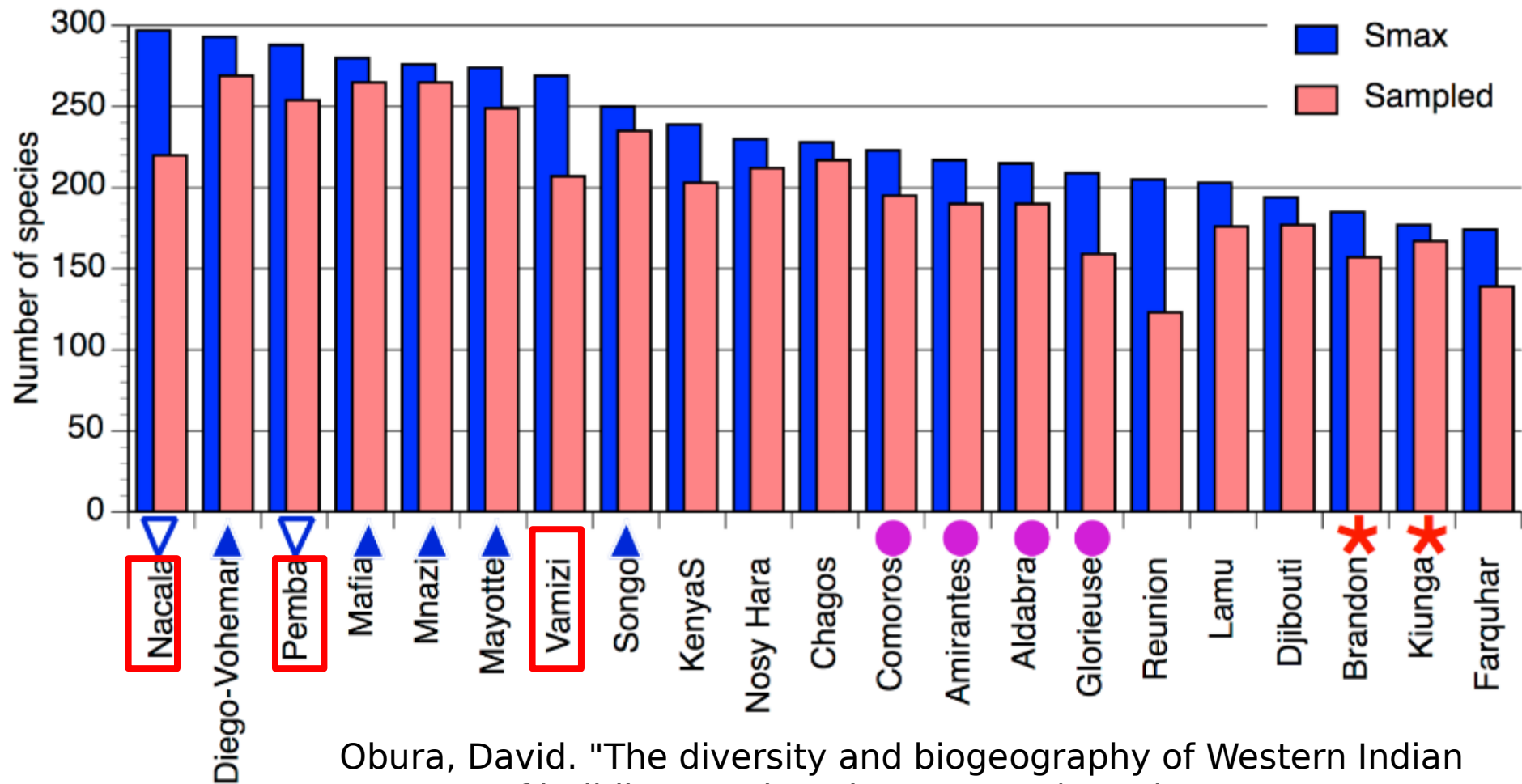


Samoilys, M., Obura D., and Osuka K. (2016). Marine biodiversity survey of coral reefs in Cabo Delgado in March 2015.

This study confirms a center of species richness between Madagascar and the East African coastline or the Mozambique Channel. (McClanahan, 2015).



North Mozambique corals



Obura, David. "The diversity and biogeography of Western Indian Ocean reef-building corals." PloS one 7.9 (2012): e45013.



Coral taxonomy: *Acropora* of Vamizi Island

Erwan Sola*
*University of Zululand, School of Life Sciences

Species	Whole Colony	Branch detail	Skeleton	Skeleton detail	The Island: Vamizi
<p>A. cyathes</p> <p>White corymbous corals with finely structured branches. Axial corallites are stout and tubular. Radial corallites are short and uniform in size.</p>					<p>Fig. 1. Vamizi Island showing the location of 20 study sites and 100 sample sites.</p>
<p>A. hyacinthius</p> <p>Large plates of thin subclones with the opening projecting branches. Axial corallites are small but conspicuous. Radial corallites form rosettes and are cup-shaped.</p>					
<p>A. digitifera</p> <p>Digitate colonies with possible sub-branches and small rounded axial corallites. Numerous radial corallites are tubular uniform and have a flaring lip.</p>					<p>The Island</p> <p>Vamizi is a tropical island situated to the east of Mozambique, between Mozambique and Madagascar, it is approximately 100 km long and 20 km wide, extending on a north-south axis. It is situated at 40 km and 100 km from Inhambane respectively. These remote islands are not directly visible to the main islands from most directions. The island also lies within the South Equatorial Current (SEC) and the north-flowing East African Current (EAC), making it an important location for coral reef studies in both the Indian and Pacific.</p> <p>Fig. 2. Aerial view of Vamizi Island.</p>
<p>A. humilis</p> <p>Digitate colonies with thick dome-shaped branches and a large prominent axial corallite. Radial corallites are short and aligned in rows giving colony a smooth appearance.</p>					
<p>A. tenuis</p> <p>Usually corymbous with fine branched and tubular axial corallites. Radial corallites have a flaring outer lip and are arranged in clear rows.</p>					<p>The Reef</p> <p>The island is surrounded by a fringing reef with wide reef flats where corals are interspersed with sandy patches. The most diverse and healthy communities of corals are found on the edge of platform on the northern board of the island.</p> <p>Fig. 3. Coral community from the reef.</p>
<p>A. formosa</p> <p>Colonies are arborescent with large, straight-like branches. Axial corallites are small and tubular. Rounded and tubular radial corallites may vary in size and either in rows or not.</p>					
<p>A. austera</p> <p>Irregularly arborescent with tapered branches. Axial corallites are tubular with thick wall and small opening. Radial corallites are irregular. Subular to arborescent with wide opening.</p>					
<p>A. nasuta</p> <p>Irregularly corymbous. Tubular axial corallites. Radial corallites are typically uniform and arranged in rows down the colonies.</p>					
<p>A. polytoma</p> <p>Irregularly corymbous clumps. Irregularly taper and have small axial corallites. Radial corallites are truncated or tubular giving spiny appearance to colony.</p>					

The Coral Diversity

These reefs host over 100 species of hard corals. The genus *Acropora* alone is represented by 44 species. Along with the those displayed here, *Acropora* species found at Vamizi include:

A.A. <i>arborescens</i>	16.A. <i>gracilis</i>	31.A. <i>cyathes</i>
2.A. <i>arabica</i>	17.A. <i>perrottae</i>	32.A. <i>nasuta</i>
3.A. <i>arabica</i>	18.A. <i>perrottae</i>	33.A. <i>nasuta</i>
4.A. <i>arabica</i>	19.A. <i>perrottae</i>	34.A. <i>nasuta</i>
5.A. <i>arabica</i>	20.A. <i>perrottae</i>	35.A. <i>nasuta</i>
6.A. <i>arabica</i>	21.A. <i>perrottae</i>	36.A. <i>nasuta</i>
7.A. <i>arabica</i>	22.A. <i>perrottae</i>	37.A. <i>nasuta</i>
8.A. <i>arabica</i>	23.A. <i>perrottae</i>	38.A. <i>nasuta</i>
9.A. <i>arabica</i>	24.A. <i>perrottae</i>	39.A. <i>nasuta</i>
10.A. <i>arabica</i>	25.A. <i>perrottae</i>	40.A. <i>nasuta</i>
11.A. <i>arabica</i>	26.A. <i>perrottae</i>	41.A. <i>nasuta</i>
12.A. <i>arabica</i>	27.A. <i>perrottae</i>	42.A. <i>nasuta</i>
13.A. <i>arabica</i>	28.A. <i>perrottae</i>	43.A. <i>nasuta</i>
14.A. <i>arabica</i>	29.A. <i>perrottae</i>	44.A. <i>nasuta</i>
15.A. <i>arabica</i>	30.A. <i>perrottae</i>	45.A. <i>nasuta</i>

Sola, E., Silva, I. M. D., & Glassom, D. (2015). An annotated and illustrated checklist of species of the coral genus *Acropora* (Cnidaria: Scleractinia) from Vamizi Island, Mozambique. *African Invertebrates*, 56(2), 807-844.

Kituculo (Sickness of the sea): Mass spawning

A tropical beach scene with turquoise water transitioning to a reddish-orange hue near the shore, with a sandy beach and trees in the background. The sky is blue with some clouds. Two people are visible walking on the beach in the distance.

Sola, E., I. Marques da Silva, and D. Glassom.(2005) Spatio-temporal patterns of coral recruitment at Vamizi Island, Quirimbas Archipelago, Mozambique." African Journal of Marine Science 37.4 : 557-565.

Sola, E., Marques da Silva, I., & Glassom, D. (2016). Reproductive synchrony in a diverse Acropora assemblage, Vamizi Island, Mozambique. Marine Ecology Progress Series, 537(1-3), 1-12.

Research Center for Environmental Conservation

(CICA) <https://fecn.unilurio.ac.mz/en/cicaen/>

- **More fish, Less conflict:** FAD – Fish Aggregation devices (for CLN-Vale)
- **OSOL** (with ZSL)
- Community Development and Biodiversity Protection (for ERB-Eni) and Vamizi island Conservation project (for CDBT)
- **PRORES** (ERB-Eni)
- **Prontidão** (UE)
- **CoReS** (TOTAL)



More fish, Less conflict: FAD - Fish Aggregation devices

<https://youtu.be/tAtOdPcs7rw>

<https://youtu.be/9mQ7LS06-vc>



The Our Sea Our Life approach to community-based conservation includes:

1. Our Sea Our Life Locally Managed Marine Area (LMMA) standards in Community Conservation Areas
2. Local governance and management mechanisms
3. Sustainable livelihoods and financing linked to the 'opportunity costs' of conservation



For more information, please visit our website:
zsl.org/conservation/regions/africa/our-sea-our-life
Check out our twitter: @OurSeaOurLife
Or please contact us at: Jeremy.Huet@zsl.org

Thanks to all our partners



And our funders



We're ZSL, an international conservation charity working to create a world where wildlife thrives. Join us at zsl.org

ZSL is a registered charity in England and Wales no: 208728

ZSL | LET'S WORK FOR WILDLIFE

Our Sea Our Life

Building resilience for coastal communities and marine biodiversity





Sustainability Plan (Social responsibility) for the South Coral Project (FLNG)

Community Development and Biodiversity Protection on the Island of Vamizi

March 2019

Community development and education



Capacity building of the University

- 22 PhD certification courses: open water (8), advanced (6), rescue (6) and leader (2)
- Offering 8 degree thesis in Environmental Education and 4 professional internships

<https://youtu.be/oCwLPkMfNkOw>
<http://fecn.unilurio.ac.mz/videos-da-fcn-2/>
Dive video

Sustainable fishing training

- Training of the Community Fisheries Council (CCPs) on issues related to good conservation practices, endangered species and



Women empowerment

- Supports the handicraft group of the local women's



Education

- Support 200 elementary school children
- Environmental education
- In substitution we made the distribution of basic food baskets

<https://youtu.be/IAEGkOUwv8E>

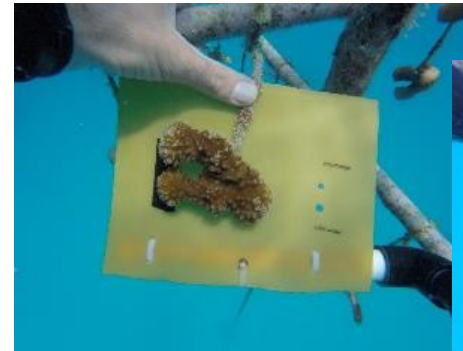


Figure 5. Distributed cestas basicas (Basic basket) products

Biodiversity protection



- <https://youtu.be/ZHtGVWf1sIY>
- <https://fecn.unilurio.ac.mz/videos-da-fcn-2/>
- *Verify the feasibility of transplanting live coral fragments*
- *Test different locations (physical factors) and identify sustainable areas for reef restoration*
- *Testing innovative and feasible techniques for coral restoration*
- *Measuring coral growth, rate of colonization process, species-specific site adaptation, survivability*



Machambas short



ERB under the implementation of the South Coral FLNG Project Sustainability Plan will support UniLúrio students and faculty and research staff to implement the “**Programa de Resiliência Às Mudanças Climaticas Nas Comunidades De Cabo Delgado**”

PRORES

Component UniLúrio

Contribute to the protection and restoration of mangroves’ ecosystem in the District of Mecufi

Component CESAL

Develop sustainable agroforestry systems in synergy with previous experiences in the District of Mecufi.

Component OIKOS

Contribute to the improvement of water, sanitation and hygiene infrastructures and practices in the District of Mecufi.



PRONTIDÃO





Study on the current state of mangrove ecosystems

In 20 years the Metuge district lost about 161 ha of Mangal, corresponding to 8.05 ha/year. Of the area lost, 60% was converted to grassland, 30% to cultivated areas, and 10% to urban areas.

Choosing the right species for the right



Understanding the history of:

- Tides of the region
- Precipitation of the region

Reconciling knowledge:

- Local and scientific



INGD, CEPAM, SPAE
CCPs



Religious Leaders



Local Schools



**Involving diverse
groups in the
mangrove
replanting**





•Mussel Aquaculture

- We are working with vulnerable women in the community of Nangua and Bandar;
- The idea is to train communities in mussel production as a source of income to reduce mangrove pressure





2012



2016



2019

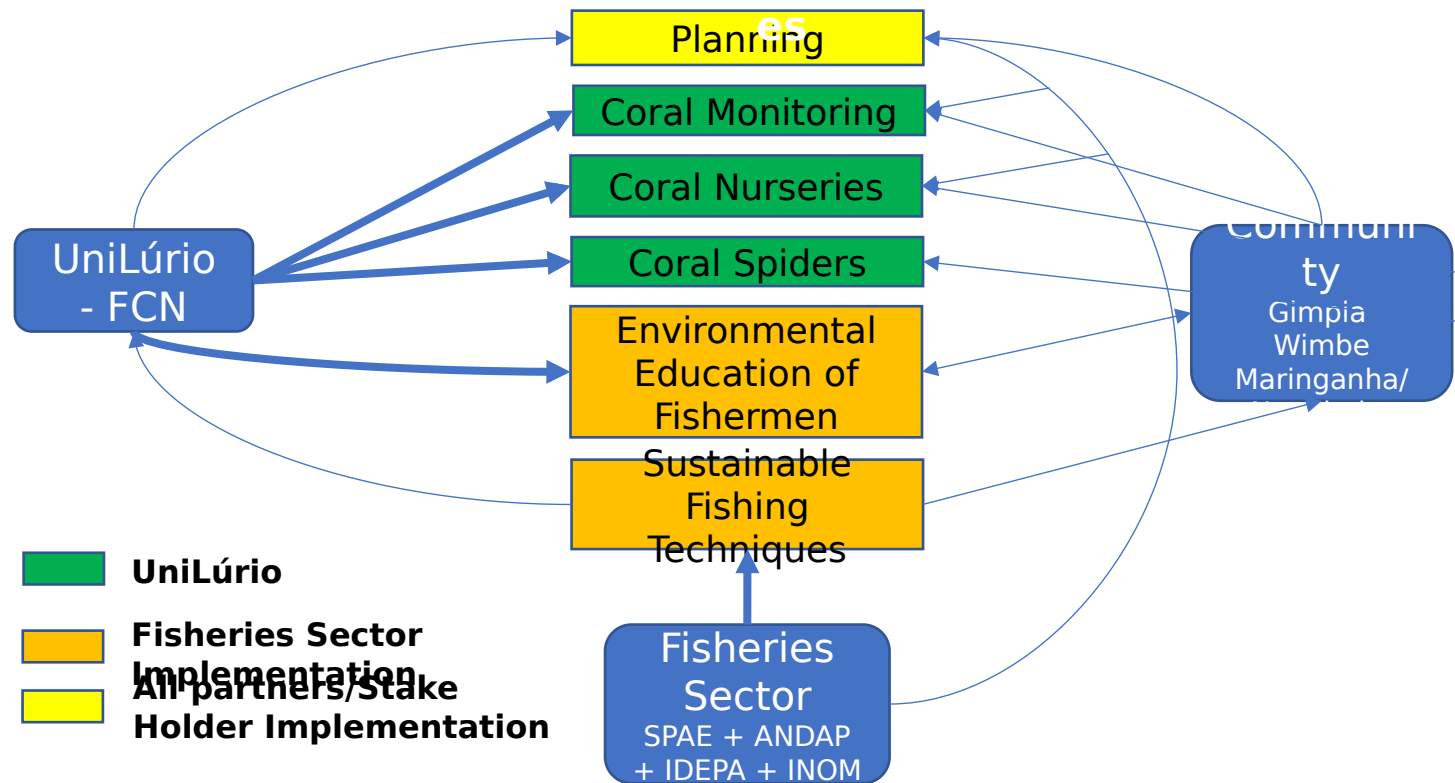
**Kauri
Pemba**



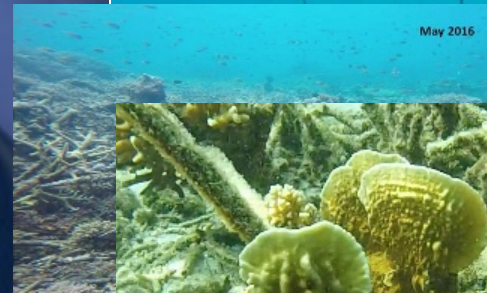
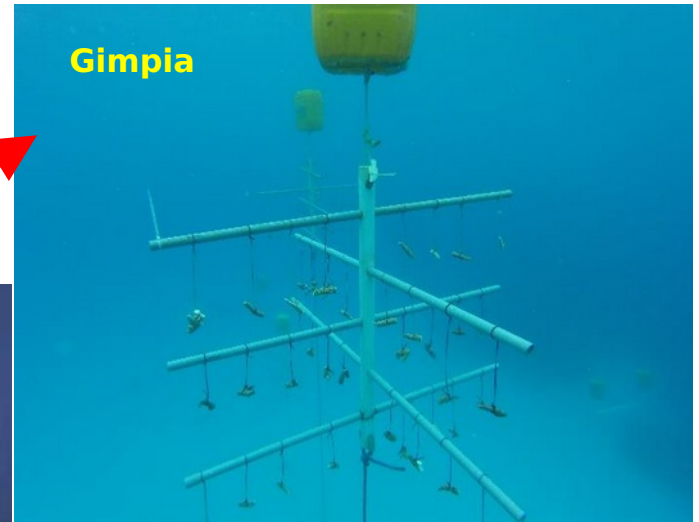
Coral Reefs Restoration and Sustainable Fisheries Program

February 2022

Partners/Stake Holder vs Activities



Implementation Area, Pemba,
Cabo delgado, Mozambique





**AFRICAN
marine waste
NETWORK**
A programme of Sustainable Seas Trust

WIOMSA MARINE LITTER MONITORING PROGRAMME



MOZAMBIQUE

Universidade Lúrio & Fisheries Research Institute



79 003

TOTAL LITTER ITEMS

614

TOTAL RUBBISH BAGS

50%

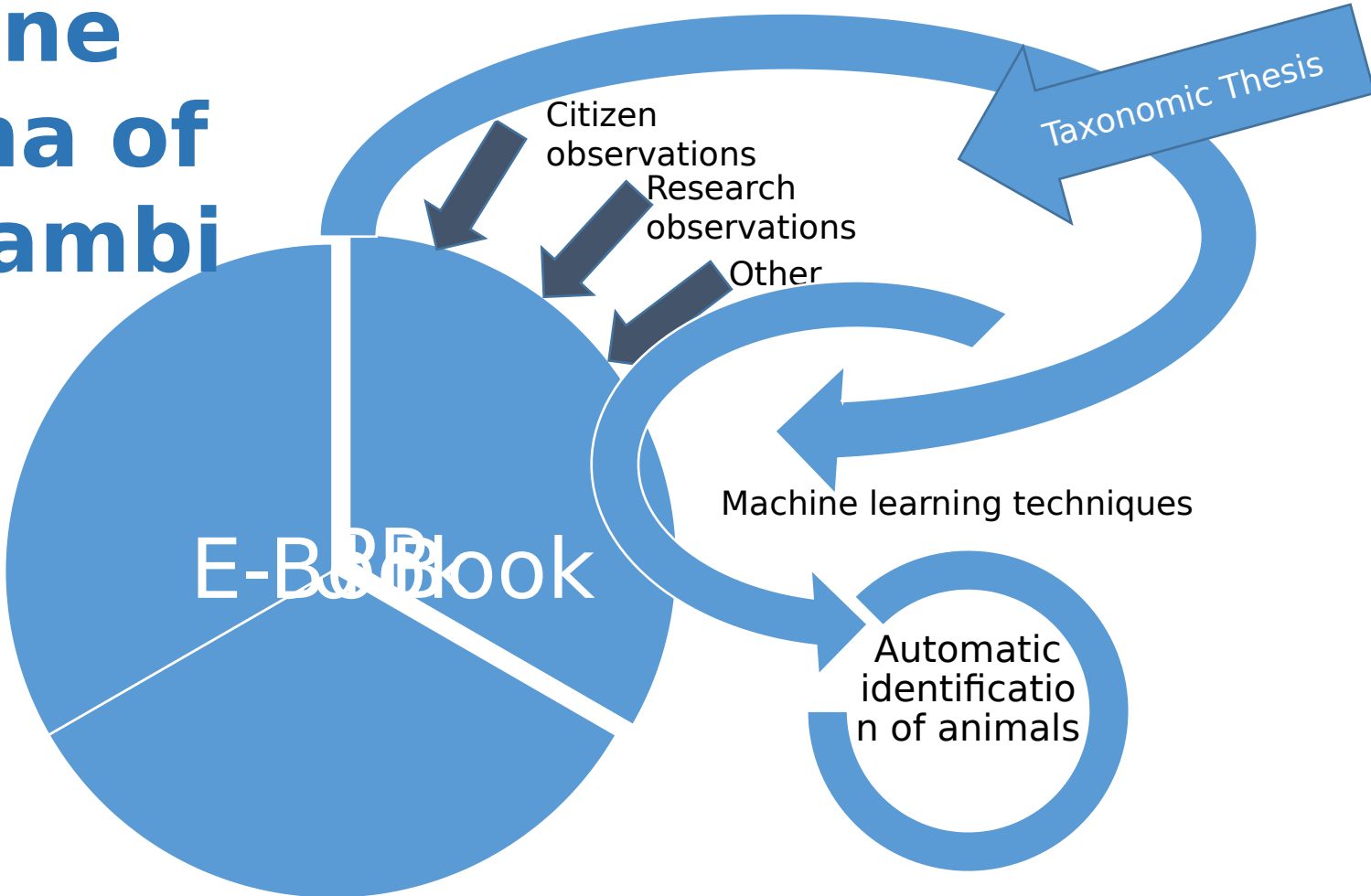
PERCENTAGE OF LITTER
THAT IS PLASTIC

1 590 kg

WEIGHT OF ITEMS

Litter Monitoring Statistics as of June 2019

Marine Fauna of Mozambi que



E-Book

Citizen observations
Research observations
Other

Taxonomic Thesis

Machine learning techniques

Automatic identification of animals

Enguias, Congros & Moréias

Muraenidae



Echidna nebulosa
Starry Moray

LC



Enchelycore pardalis
Barred Moray

YT



Gymnothorax breedeni
Blackcheek Moray

LC



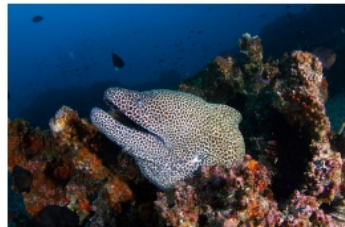
Gymnothorax chilospilus
Lipspot moray

LC



Gymnothorax eurostus
Salt Peper Moray

YT



Gymnothorax favagineus
Honeycomb Moray

DD



5

Sharks & Rays



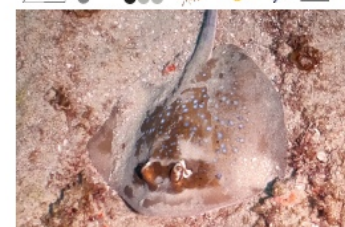
Bathythosia brevicaudata
Shorttail Stingray

WCS



Megatrygon microps
Smalleye Stingray

JK



Neotrygon caeruleopunctata
Bluespotted Maskray

JK



Taeniura lymma
Bluespotted Ribbon-Tailed Stingray

AM



Taeniurops meyeri
Blotched Stingray

AM



Urogymnus asperrimus
Porcupine Ray

AM



4

Esponjas



Callyspongia (Callyspongia) pulitseri FT



Niphatidae



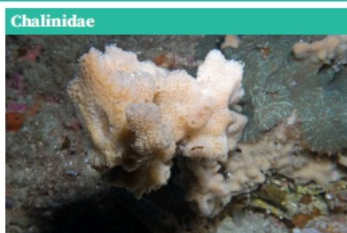
Amphimedon brevispiculifera FT



Petrosiidae

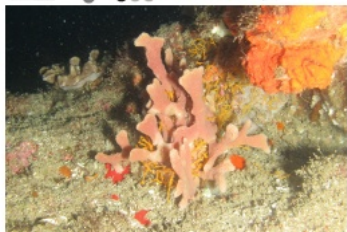


Xestospongia testudinaria LC



Chalinidae

Haliclona sp. FT



Amphimedon palmata CC



Phloeodictyidae



Oceanapia ramsayi CC



3

Lesmas do Mar – Nudibrânquios

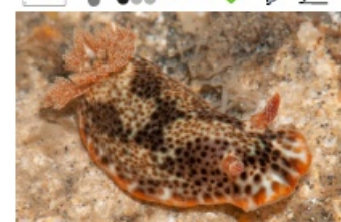


Chromodoris hetium



Chromodoris lochi

Loch's Chromodoris

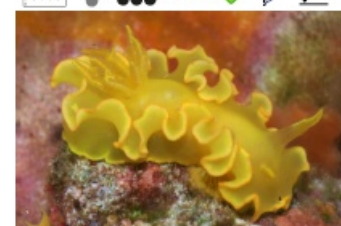


Chromodoris mandapamensis

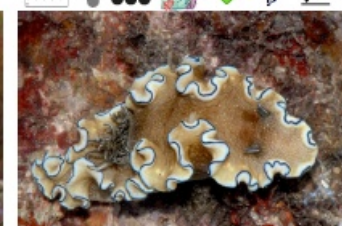


Chromodoris strigata

Streaked Chromodoris



Diversidoris crocea



Doriprismatica cf. atromarginata



15