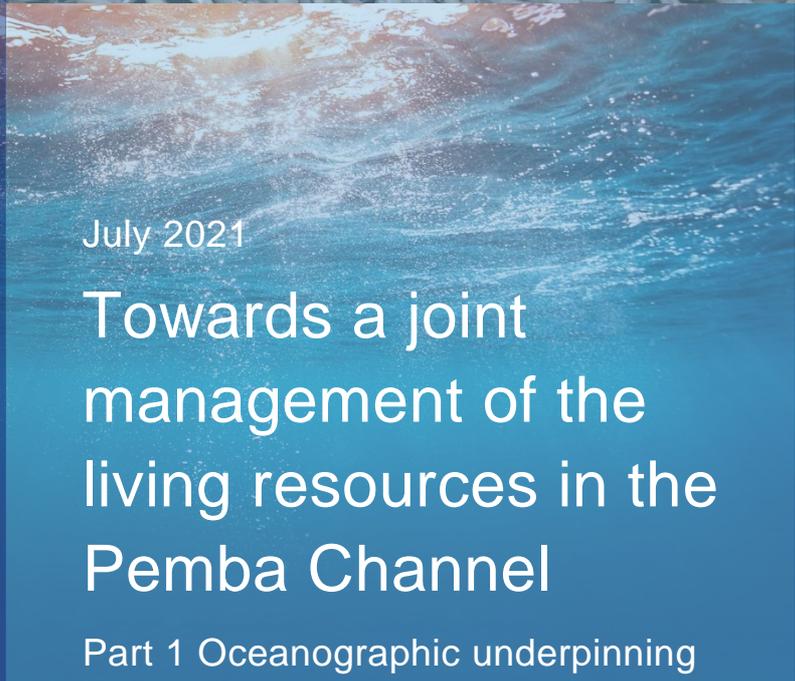
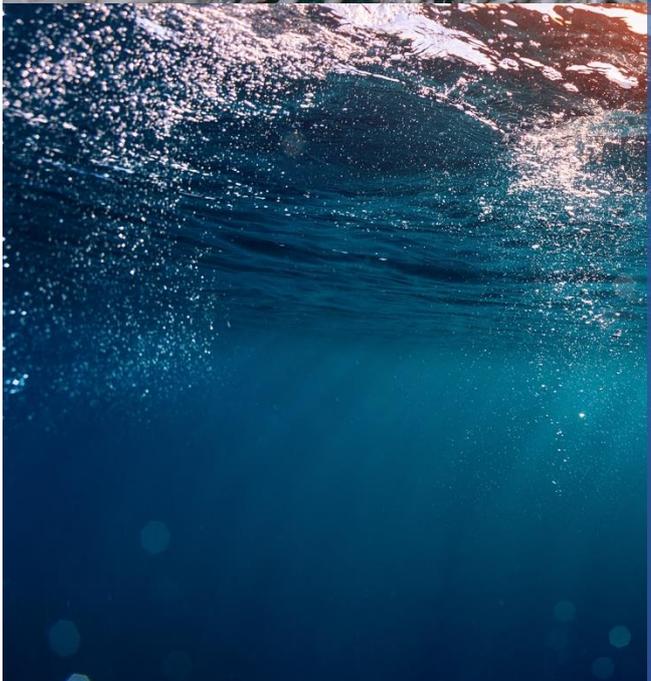




# SOLSTICE

## SAPPHIRE PROJECT



July 2021

## Towards a joint management of the living resources in the Pemba Channel

Part 1 Oceanographic underpinning



# SUMMARY OF POLICY-RELEVANT INFORMATION

## Towards a joint management of the Pemba Channel

Oceanographic underpinning<sup>1</sup>

### Key Messages:

Strong oceanographic connectivity of the Pemba Channel and common processes call for joint management of living marine resources

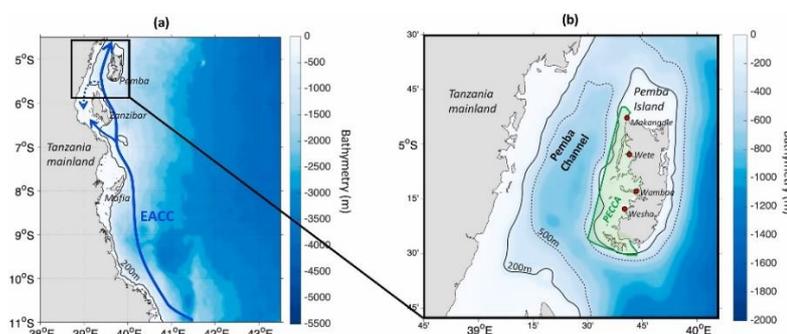
Ecosystems and fish stocks in the Pemba Channel are shared resources strongly influenced by upwelling

Prepare for the accelerating negative impacts of climate change on Pemba Channel ecosystems and fisheries

Climatic drivers of marine ecosystems will equally impact both sides of the channel. Their communities will benefit from common climate change adaptation strategies and sharing of information.

### What are the key oceanographic features of the Pemba Channel?

The Pemba Channel is located north of Unguja Island and separates Pemba Island from the mainland by its 50 km width. The Pemba Channel is characterised by a deep (800 m) oceanic setting with direct connectivity to the open ocean but also with adjacent coastal areas that host important coral reef and mangrove habitats that are also exploited by a number of fisheries. The fast-flowing current means that water retention rates are low and residence times are short. Primary production within the Channel is sustained by a set of upwelling systems supplying nutrient rich water from depth. The Channel receives only limited riverine nutrient input.



### Why is the joint management of the Pemba Channel important?

The Tanzanian artisanal fisheries to a large extent rely on small and medium pelagic fish for income, employment, and food security. For these species (anchovy, sardines, herrings etc.), where schools of fish likely forage on both coasts and throughout the channel, some form of collaborative management or partnership across the Pemba Channel is crucial because fishers from Zanzibar and mainland Tanzania target the same fish stocks. The marine fisheries of mainland Tanzania are

<sup>1</sup> This SUMMARY is one of the three documents produced under a series 'Towards a joint management of the living resources in the Pemba Channel'. The other two documents are: Part 2: climate change impacts on Tanzania's marine ecosystems; Part 3: Joint management of the small pelagics in the Pemba and Zanzibar Channels.

managed by the Division of Fisheries in the Ministry of Livestock and Fisheries Development (MLFD) and those of Zanzibar by the Department of Fisheries Development (DFD) in the Ministry of Blue Economy and Fisheries. There is currently no institutional mechanism to support collaboration between the authorities that manage shared stocks of small and medium pelagic fish, although such a mechanism, the Deep-Sea Fishing Authority (DSFA), does exist for the offshore fisheries.

### Why does the Pemba Channel operate as a single ecological domain?

Recent scientific research shows that common environmental mechanisms impact both the mainland and the island sides of the Pemba Channel. These mechanisms include deep ocean upwelling systems which intensify during peak monsoon seasons and lead to elevated primary production and increased fish stocks. The oceanographic connectivity linking both sides of the channel is very strong and the whole system works as a unified biome which is distinctly different from the shallow and riverine-influenced Mafia and Zanzibar channels.

### Recommendations

- Development of area-based management tools such as Marine Spatial Planning must recognise the unique nature of the Pemba Channel as an upwelling-driven ecosystem with its higher resilience to climate change.
- Ocean upwelling impacts both sides of Pemba Channel. Coastal communities will benefit from adoption of common observational approaches and improved sharing of information.
- Oceanic upwelling is a strong predictor of small pelagic fish catch. Development of early warning systems based on operational remote sensing will provide early warning of periods where low catches of key commercial marine species may occur.
- Initiate a regional scientific “upwelling-watch” working group via WIOMSA or the Nairobi Convention to facilitate sharing of information on responses of regional upwelling systems to extreme events. Ensure the Pemba Channel Upwelling is represented in such a group along with Somali, South Madagascar and the North Kenyan Banks upwelling systems.

The information presented in this brief is based on the following open access publications:

B. Sekadende et al., **The small pelagic fishery of the Pemba Channel, Tanzania: what we know and what we need to know for management under climate change.**, *Ocean Coast Manag.*, 197 (2020), p. 105322. <https://doi.org/10.1016/j.ocecoaman.2020.105322>

Y. Shaghude et al., **Seasonal variations of remotely-sensed Chl-a and associated physical conditions in the Tanzanian channels.** *Ocean Coast Manag.*, under review.

Z. Jacobs et al., **Key climate change stressors of marine ecosystems along the path of the East African Coastal Current.** *Ocean Coast Manag.*, <https://doi.org/10.1016/j.ocecoaman.2021.105627>

Jebri, F. et al. **Interannual monsoon wind variability as a key driver of East African small pelagic fisheries.** *Sci Rep.* <https://doi.org/10.1038/s41598-020-70275-9>

