



Coastal Erosion at Regional scale



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5th Symposium | Accra, Ghana | 24 – 28 October 2022



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Outline of Presentation

- West Africa Coast
- Erosion: low monitoring of erosion and modeling
- Erosion prevention techniques
- Conclusion



West Africa coastal status

West Africa's coastal areas host about one-third of the region's population and generate 56% of its GDP.

According to a 2019 World Bank study, environmental degradation in the coastal areas of Benin, Côte d'Ivoire, Senegal, and Togo cost \$3.8 billion (5.3%) of the four countries' GDP in 2017

Beyond the economic cost, coastal degradation takes lives and destroys livelihoods.



Erosion is spread in West Africa

Erosion in Benin



From Dec 2021 Jeune Afrique article about WACA



Erosion in Togo



Erosion in Abidjan

Coastal Protection in Senegal by WB Tourism project



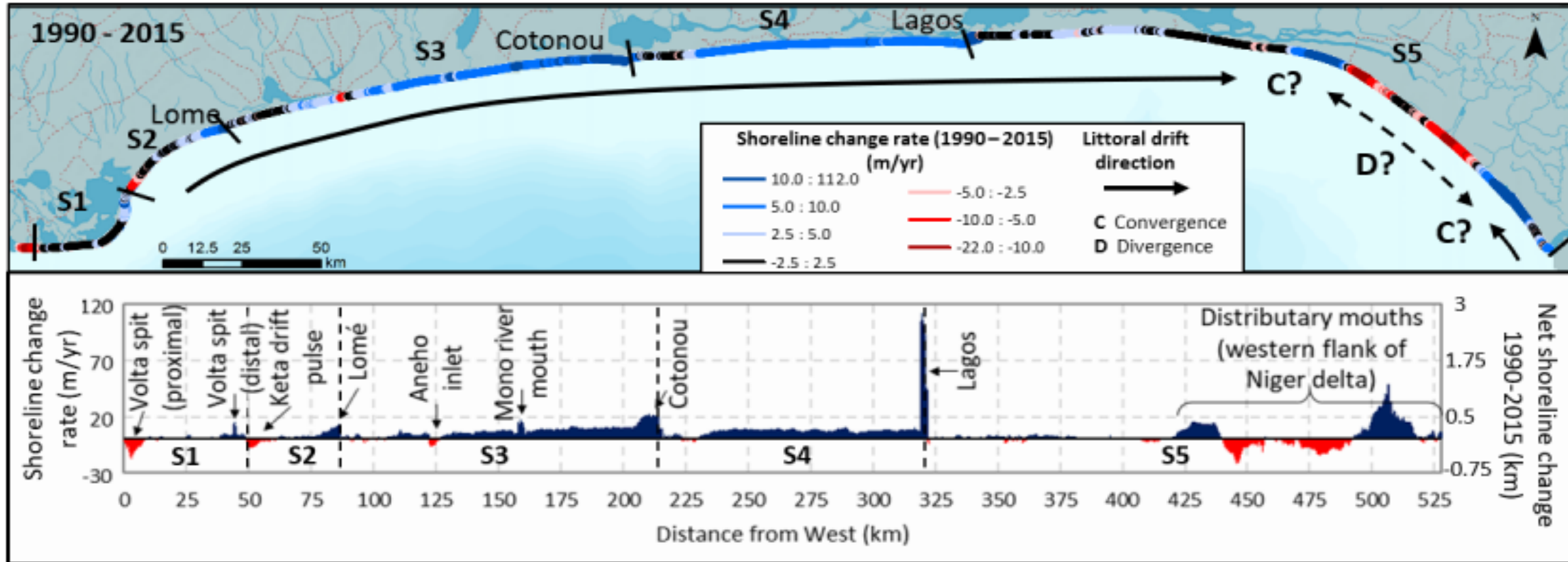
Erosion in Togo



World Bank, 2022

Erosion in West Africa

- Erosion rates can be high at local scales
- Not all sites are eroding
- Changes in some sections seem cyclical; recover ↔ erode

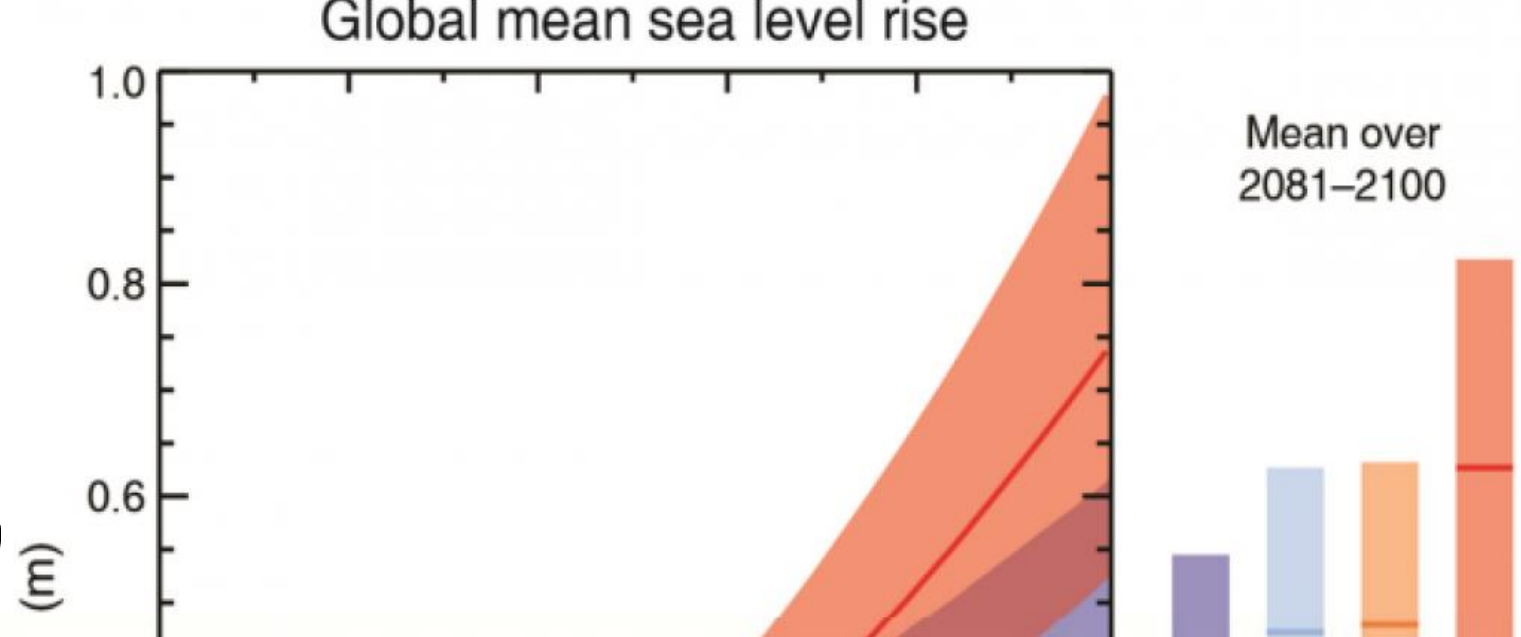


Anthony et al., 2018

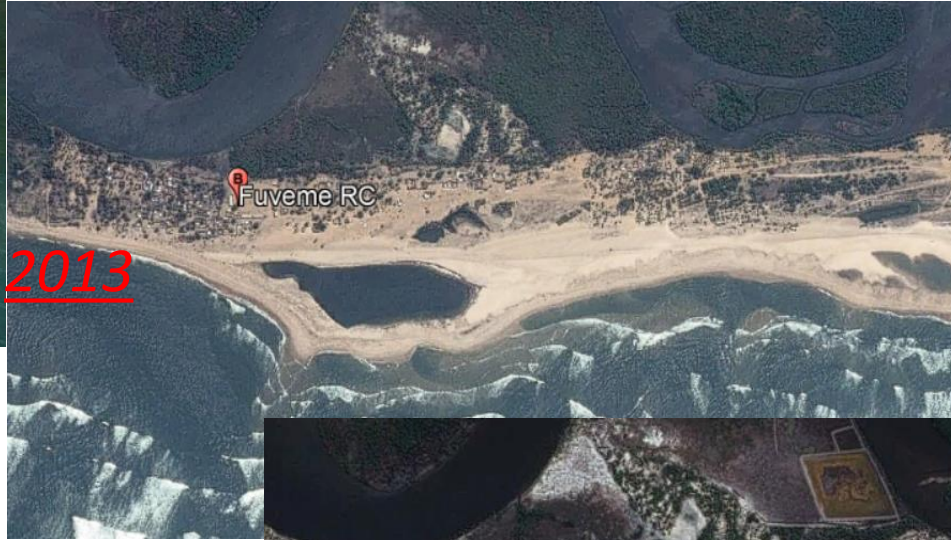
Factors Causing Erosion

Erosion in West Africa has been attributed to several factors including:

- ↳ Shortage of sediment caused by dam construction
- ↳ Flooding
- ↳ Low-lying coastal areas
- ↳ Human activities and infrastructures
- ↳ Poor drainage and planning
- ↳ Poor waste disposal
- ↳ Climatic Sea level rise
- ↳ Deforestation



Erosion in Ghana

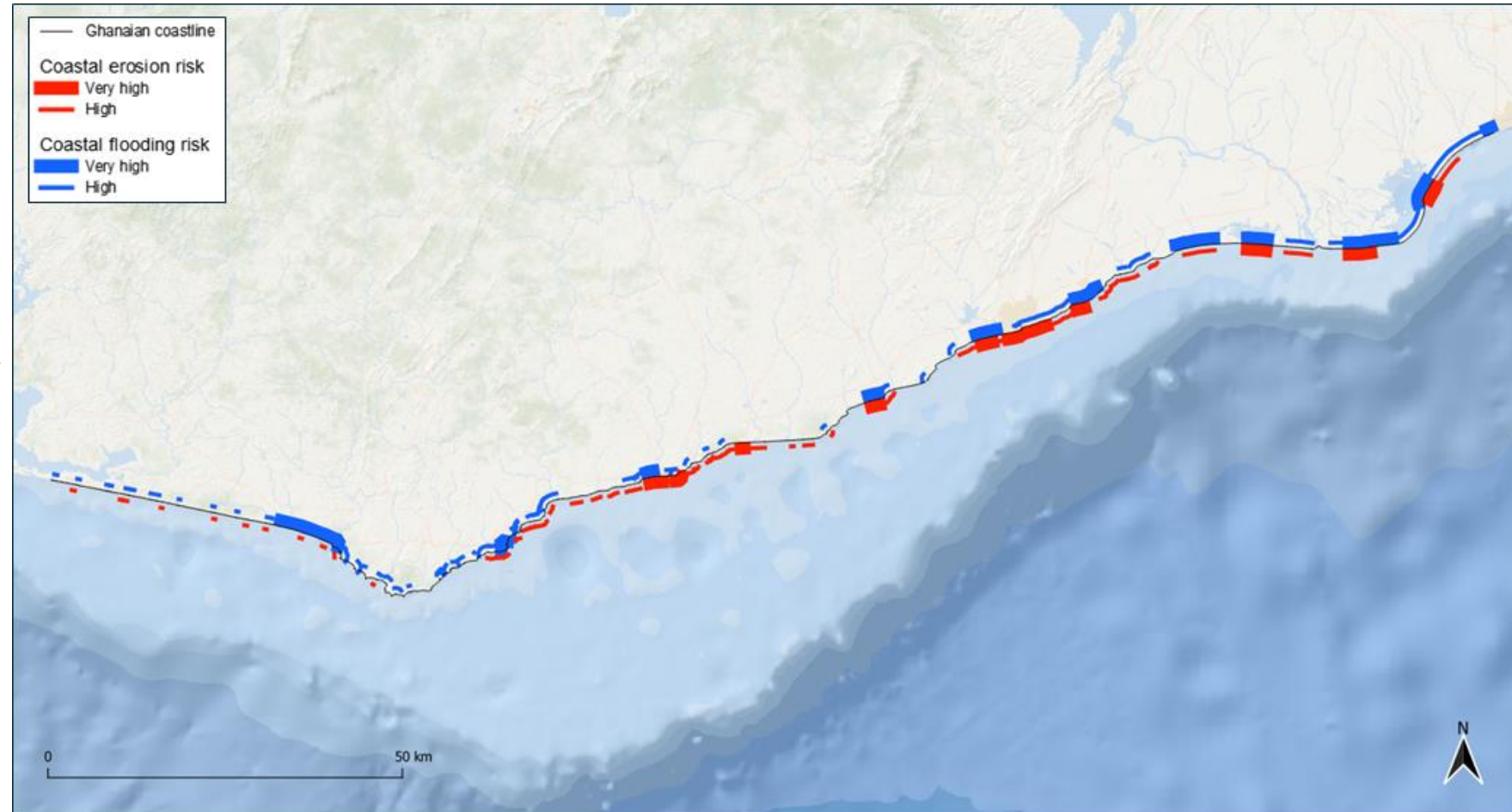


Quite gradual in the country
but is devastating

- Coastal erosion has received significant attention in Ghana
- Currently government could spend about 150 m USD to intervene in coastal degradation

Erosion along the coast

- N1 road – Cape Coast – Takoradi road
- Muni lagoon (Winneba West)
- Densu Delta (Dansoman)
- Accra - Tema beach road / railway
- Songor lagoon
- Keta lagoon (South)
- Dzita – Anloga area
- Keta lagoon (East) – Keta Kedzi area



Briere et al., 2022



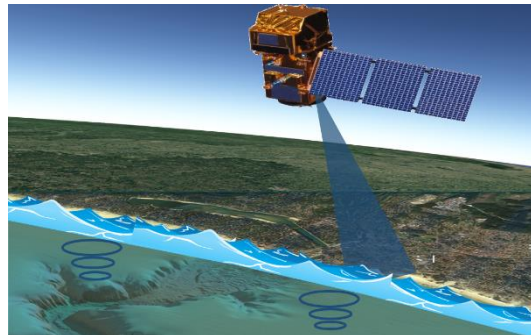
Erosion: Low Monitoring And modeling



~ 57% of the world's coastline has ever been measured, most of it only once!

Satellite imagery:

Sentinel
Landsat
Pleaides
Planet



Beach monitoring by Drones



There is the need to have in situ surveys including the following at vantage beaches :



Satellite imagery is also a potential alternative tool, but its low temporal resolution makes it unsuitable for detecting daily or event-based beach changes, and is of low accuracy for practitioners and management decisions.



Video cameras

The need to develop an innovative low-cost observation technique

The African coastal video camera network (Abessolo et al. 2022).



Saint Louis, Senegal
Activity period: Since Jan 2021



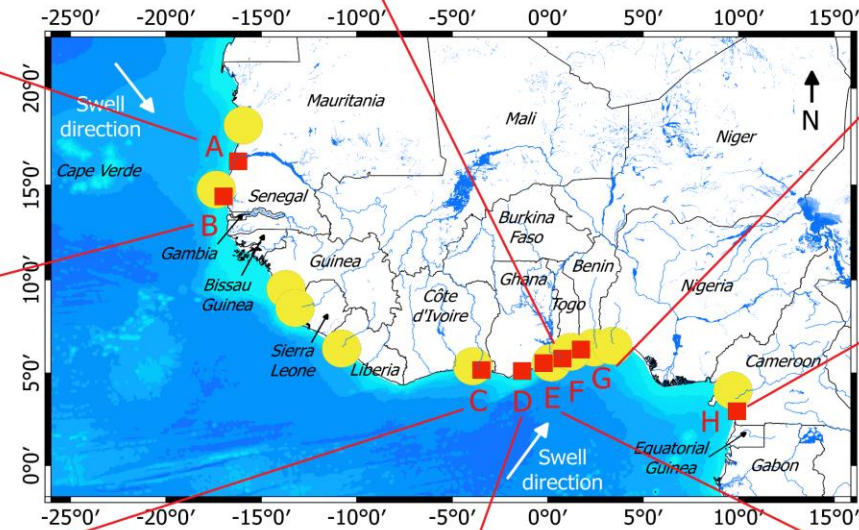
Dzita, Ghana
Activity period: Apr 2018 - Dec 2020



Grand Popo, Benin
Activity periods - Camera 1: Since Feb 2013
Camera 2: Since July 2018



Mbour, Senegal
Activity period: Dec 2014 - Dec 2016



Kribi, Cameroon
Activity period: May 2015 - May 2018



Assouindé, Côte d'Ivoire
Activity period: Since Jul 2022

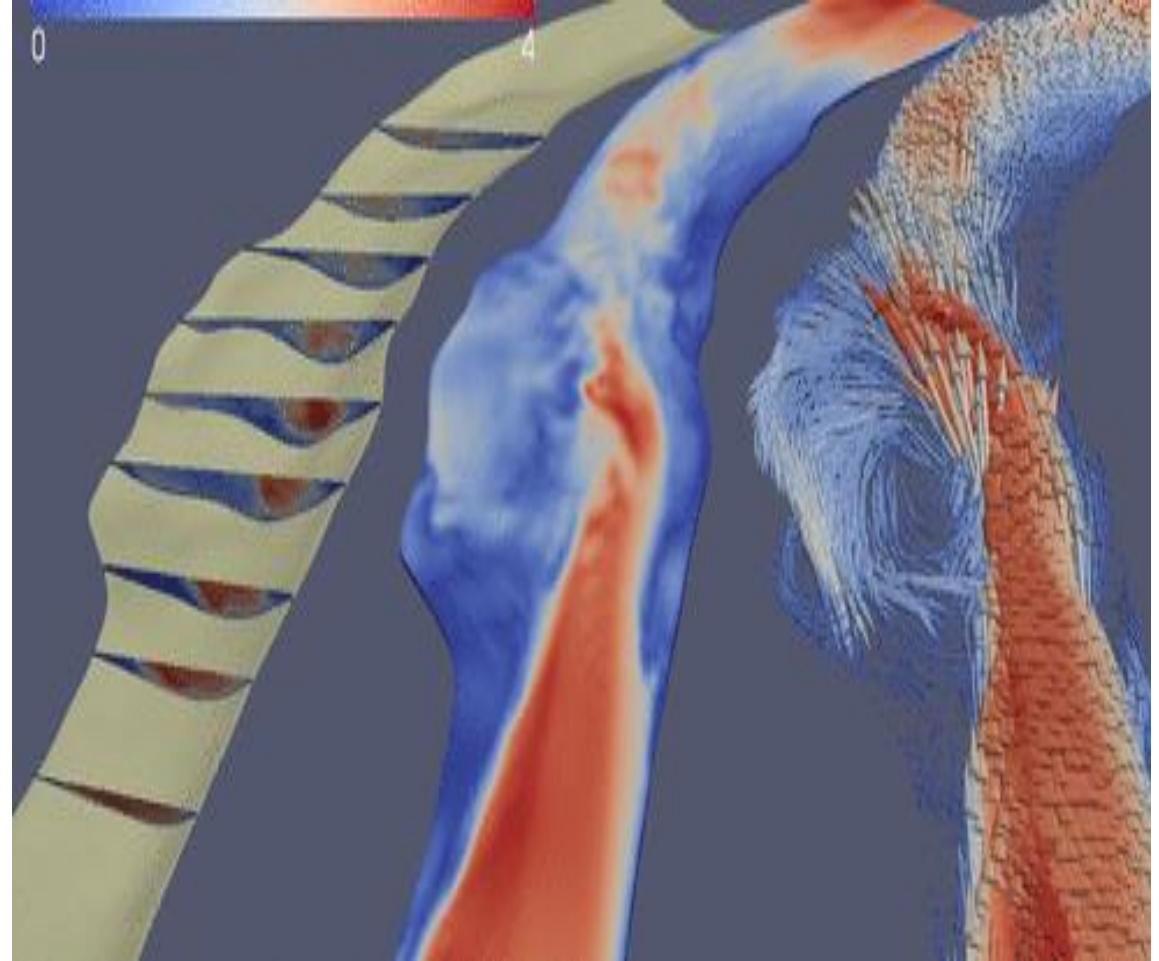
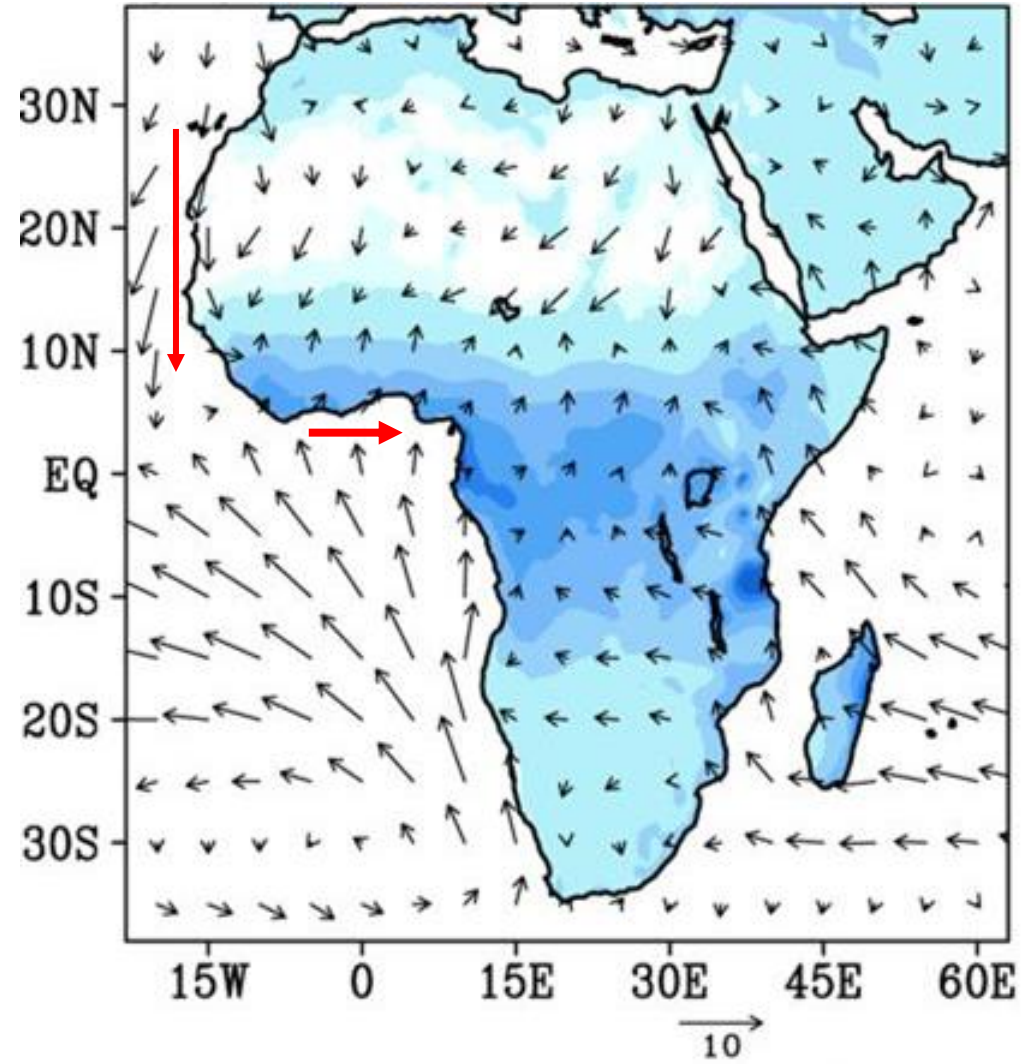


Elmina, Ghana
Activity period: Since Nov 2018



James Town, Ghana
Activity period: Sep 2013 - Feb 2015

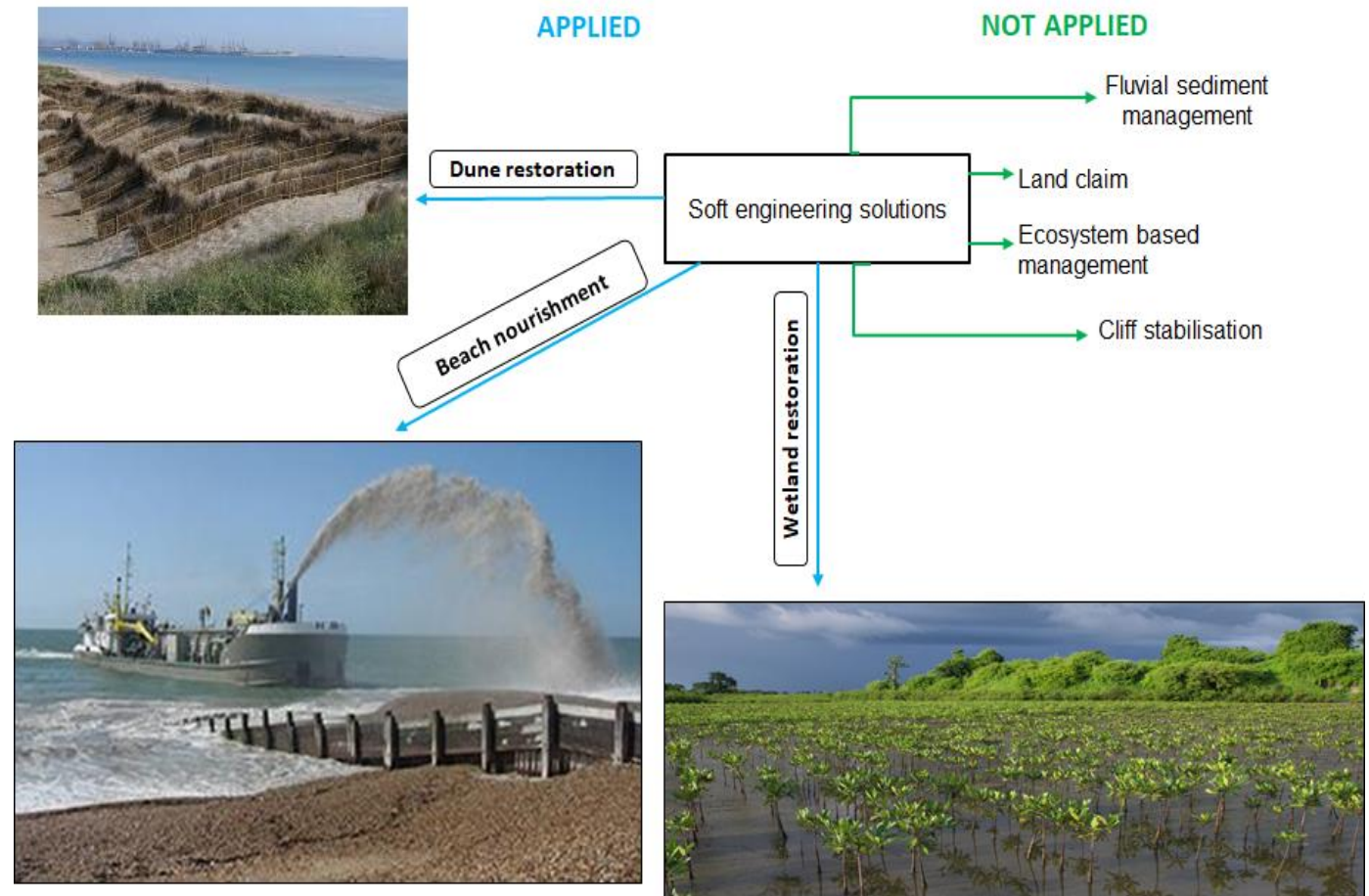
Modeling sediment movement in line with waves and currents



EROTION PREVENTION TECHNIQUES IN WEST AFRICA

Erosion prevention techniques

- ✓ Hard engineering: main solution
- ✓ Soft engineering: hardly implemented
- ✓ Planning: hardly implemented



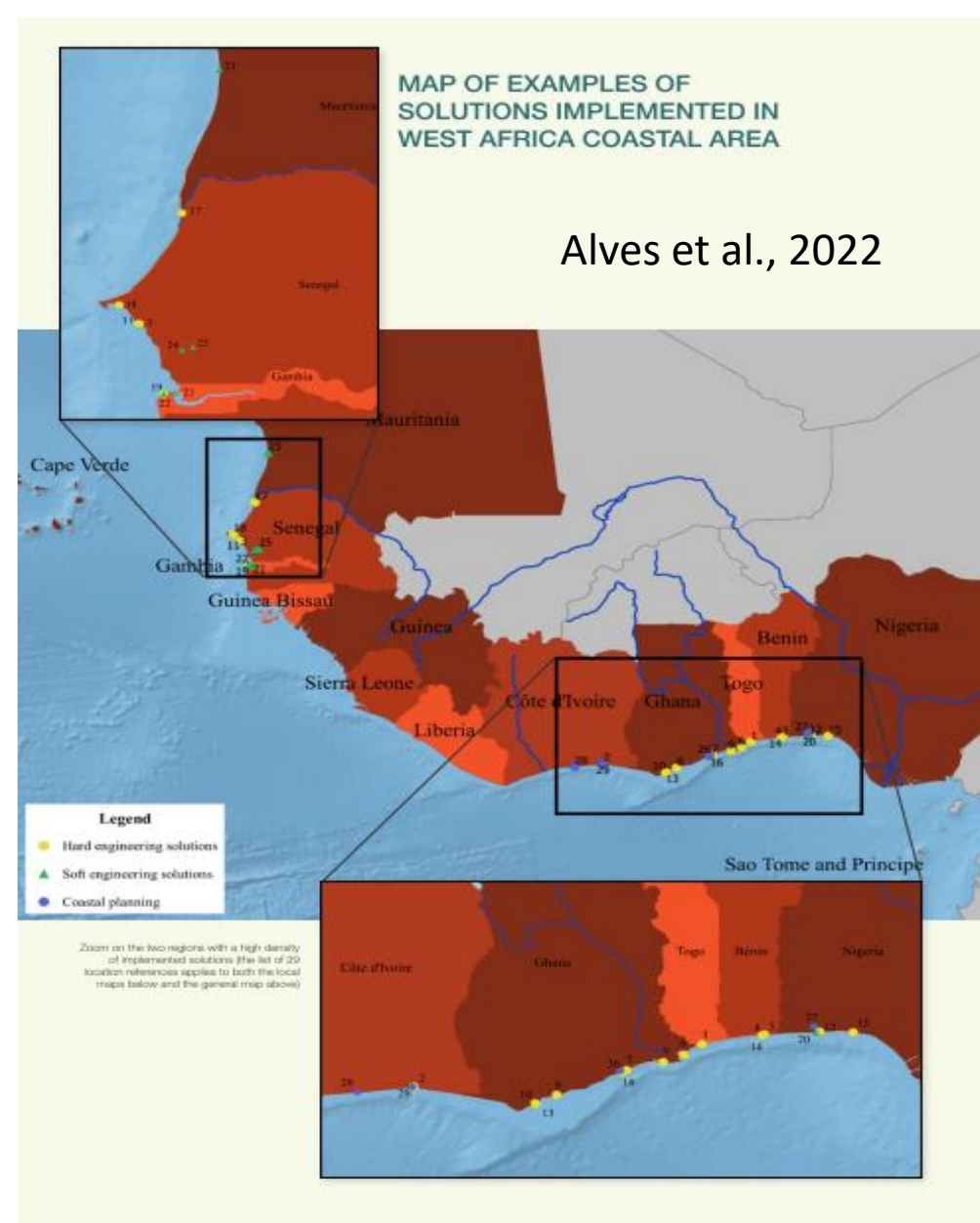
Soft engineering techniques and their application or not along West Africa coastlines



Solutions implemented in West Africa:

Hard engineering
Soft Engineering
Coastal planning

Note: No single solution seems to be 100% efficient. There is the need to integrate solutions



Way forward /Support

To reduce coastal erosion in West Africa, there is a need to have

- quantification of the large sediment budget, with one consistent set of numerical models to make it possible to overcome the fragmentation of information between different countries.
- a form of intervention on highly eroding sites
- equipment for large-scale monitoring
- monitoring stations at the intervention sites.
- develop an early warning system for flooding
- support in capacity development and community engagement





Thank You.
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Oyiwaladon.

