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Kelp: Nature's Underwater Forest

What is Kelp?

- Seaweed refers to the type of marine algae that grows in the ocean, characterized by three main types: **red**, **brown**, and **green**.
- Kelp is brown macro (large) algae.

Four Species of Kelp Native to South Africa

1 *Ecklonia maxima*

2 *Ecklonia radiata*

3 *Laminaria pallida*

4 *Macrocystis pyrifera*

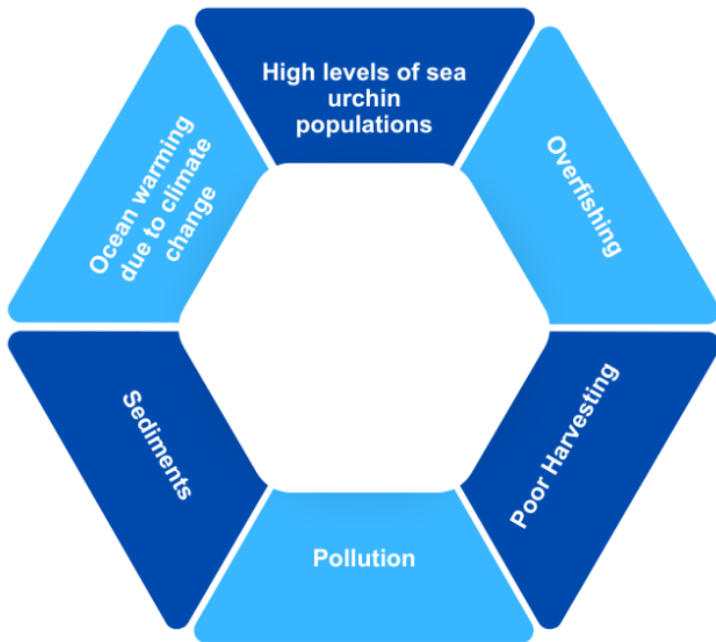
Two of these species, *Ecklonia maxima* and *Laminaria pallida* thrive along the Namakwa coastline of South Africa

The Importance of the Kelp Ecosystem

- ❖ It is a carbon sink.
- ❖ Kelp provides food security:
 - Nutritional cycling with high protein content
 - A nutritional supplement for people and animals (e.g **abalone feed**).
- ❖ An important habitat and a food source for fish(**sardine ,hake, rock lobster**) .
- ❖ Serves to protect the coastlines by slowing the power of waves during storm surges.
- ❖ Used for fertilizer, bioplastics, and other pharmaceutical products.

Threats to Kelp Ecosystem

Kelp forests are predicted to decline in abundance by 1.8% per year globally, due to several main drivers.



Restoration and Management

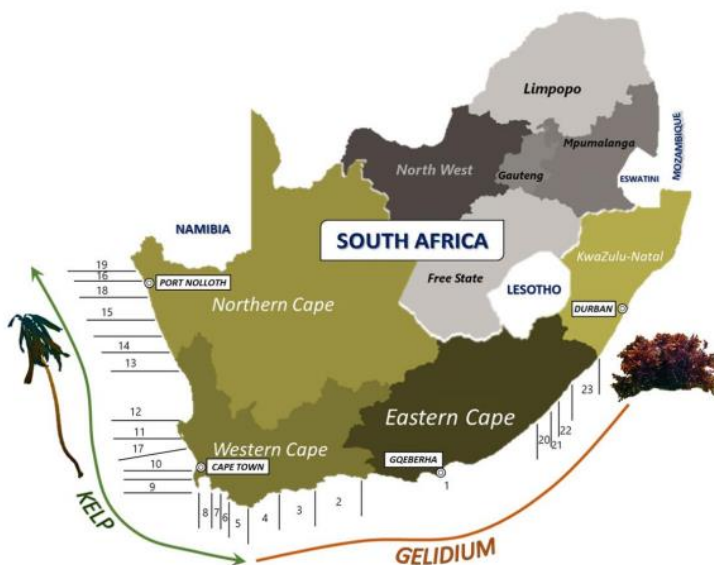
Sea urchins (grazers) are crucial to the kelp ecosystem because they break down kelp into small pieces that can be consumed by detritivore species for nutrients, but can become problematic where their numbers exceed normal levels. Managing sea urchins involves methods such as culling and harvesting.

Restoration Techniques:

Seeding involves cultivating or spreading kelp seeds or gametophytes in the ocean. This method is beneficial because it requires fewer resources and can be grown in large quantities.

Transplanting is the introduction of mature kelp into the ocean. This approach is advantageous because kelp that is at an older life stage is more resistant to stressors resulting in higher survival rates.

The Seaweed Industry in South Africa



Map of seaweed concession areas in South Africa by Dr. Mark Rothman

Currently, the estimated total market worth of kelp in South Africa stands at ZAR 56.5 million. There are 23 Seaweed concession areas, with 13 having kelp rights (areas 5-9, 11-16 and 18-19). The harvesting of fresh kelp in South Africa started in the 1980s for biostimulant production and expanded in the 1990s to include kelp fronds and fresh beach-cast kelp harvesting for abalone feed. Initially, the focus was mainly to collect beach-cast kelp but now wild-harvested kelp is also being processed into fertilizers, animal feed, and biostimulants. Beach cast kelp is milled and sent for export to produce alginate.

The Namakwa Coast and Kelp

The Namakwa Coast is home to four Marine Protected Areas (**Orange Shelf Edge**, **Child's Bank**, **Namaqua National Park** and **Namaqua Fossil Forest**) that help to protect and preserve some of the crucial biodiversity and species; including kelp in the region.

Influence of The Benguela Current on Kelp

- Kelps are predominantly cold-water species, that flourish in nutrient-rich waters and are commonly found in temperate, arctic and sub-antarctic areas.
- Namaqua coast is located along the Benguela current which is a cold, slow-moving current propelled by prevailing winds that create a coastal upwelling. It is the cold, nutrient-rich waters from this current that fuel high rates of phytoplankton growth; which nurtures the marine ecosystem resulting in kelp thriving in this region.

Blue Carbon Gaps and Opportunities for Kelp

There is a growing interest in the carbon sequestration of underwater ecosystems, with mangroves, tidal marshes, and seagrasses known as blue carbon ecosystems. Kelp is emerging as a significant contributor due to its ability to sequester and store carbon. However, further research is needed to measure carbon quantities, study movement, and deposition dynamics, and assess emissions from disturbances. Once these evaluations are understood, kelp could qualify as an actionable ecosystem.

Discovery of a “Lost Species” in the Kelp



The critically endangered De Winton's Golden Mole, previously believed to be extinct and known only in Port Nolloth, has been rediscovered in McDougalls Bay after 86 years. These underground insectivores appear to feed on invertebrates found in washed-up kelp, however further research is needed to confirm this interaction.

The Future of the Kelp Market in South Africa

To date, the kelp market in South Africa is focused on fresh kelp and beach-cast kelp harvesting. However, there is a growing interest in diversifying through methods such as kelp aquaculture; with the total market value of kelp as abalone feed currently estimated at ZAR 9.8 million. Studies indicate the potential for sea-based farming of kelp particularly in Saldanha Bay on the West Coast. While commercial kelp farming does not exist yet in South Africa, ongoing experiments in Saldanha Bay may lead the way for its future development.

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