

# Climate Change Impacts in Coastal Areas

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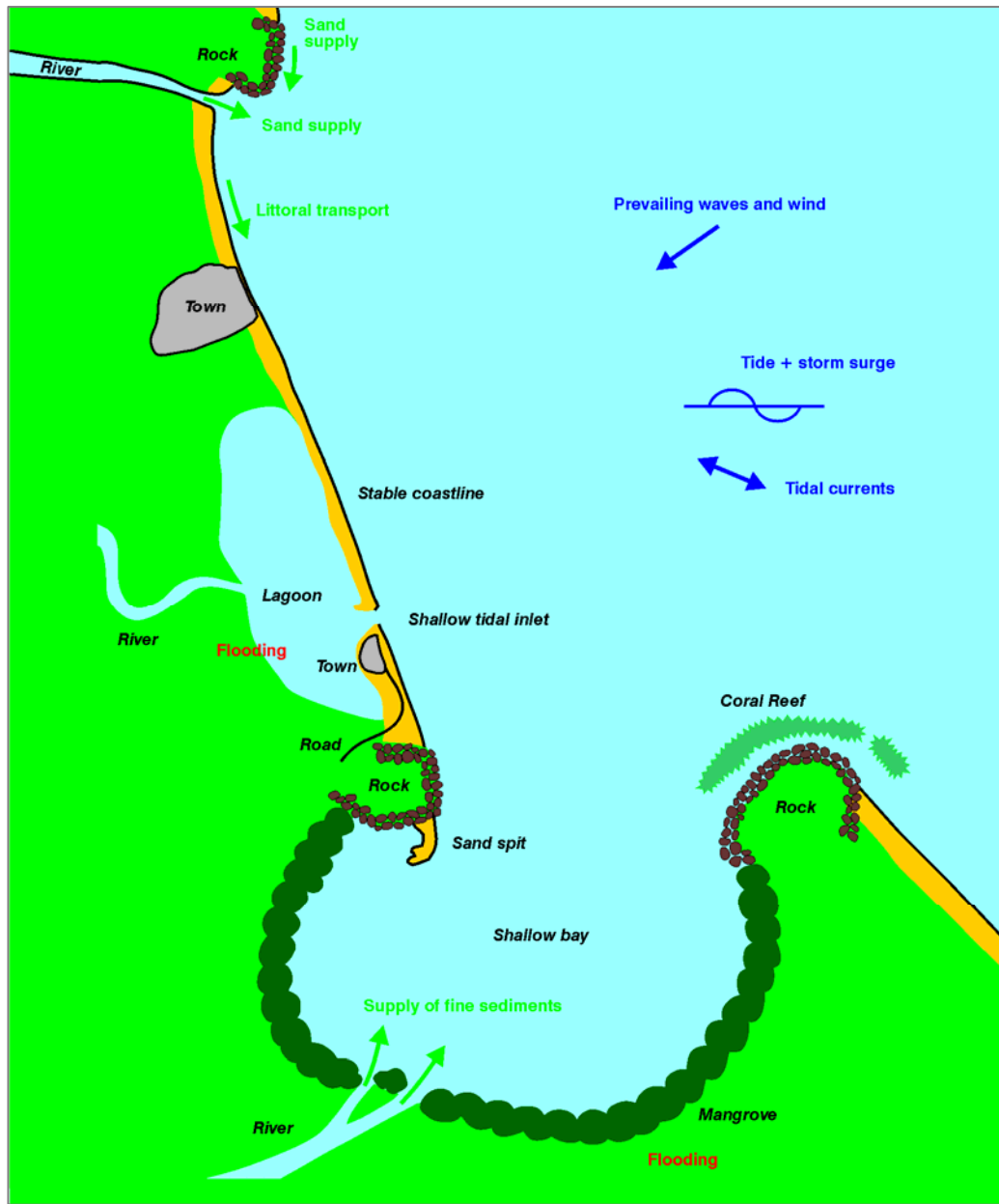
# Natural Processes

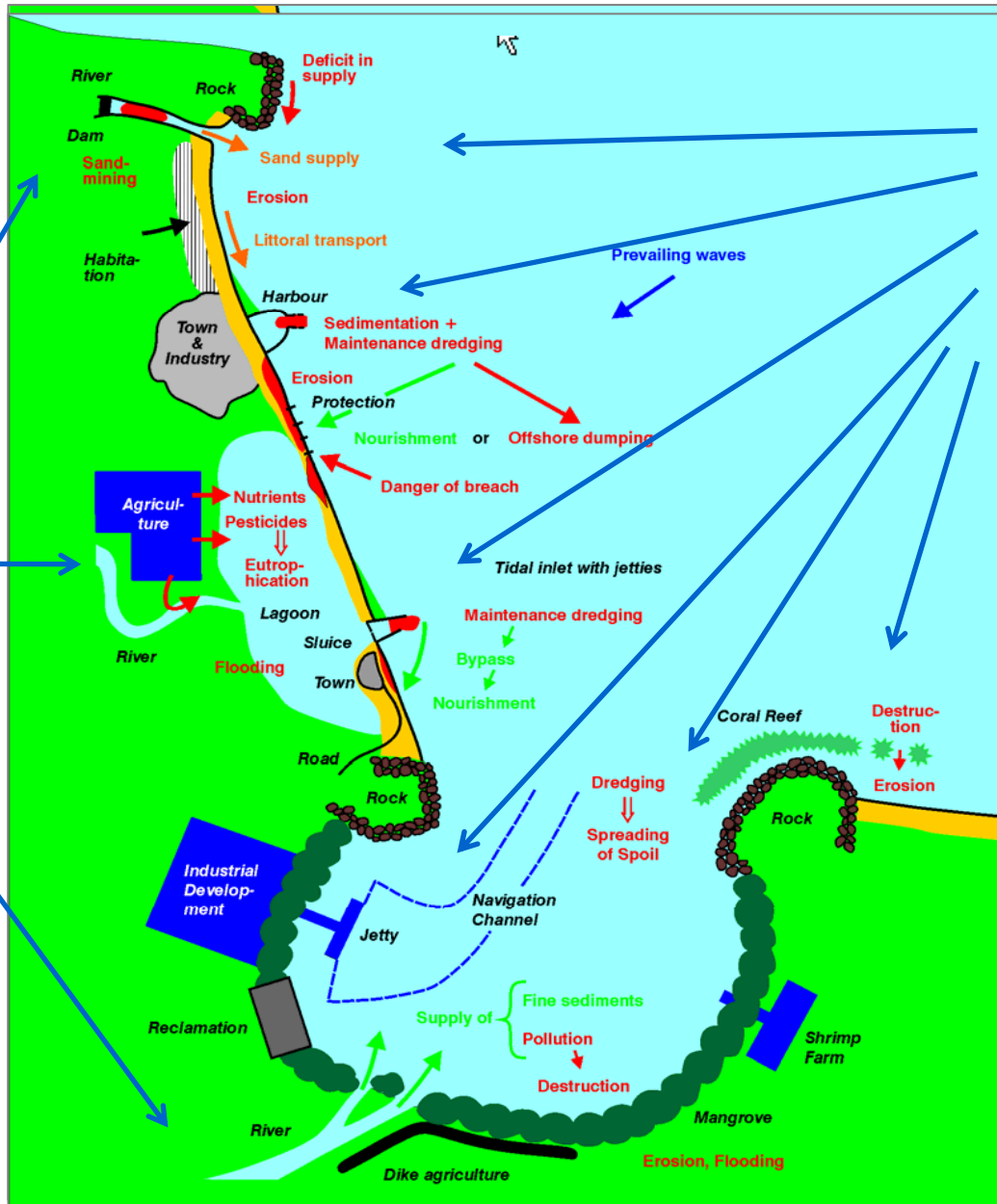
## Key sea processes at the coast

- currents
- tides
- waves
- storm surges
- flooding
- erosion/accretion littoral transport

## Key catchment processes influencing the coast

- river water flows
- sediment transport
- flooding





Response to complexity and interrelated problems is increasing focus on Integrated Coastal Zone Management (ICZM)

Increasing focus on Integrated Water Resources Management in catchments

Increasing realization on the need to link the management of catchment with the management of the coastal zone through Integrated Coast and River Basin Management (ICARM)

# Climate Change Impacts

Global warming

sea level rise due to:

- mass exchange in the water cycle (predominantly melting of glaciers and ice caps)
- expansion (thermal)

Increase in water temperatures

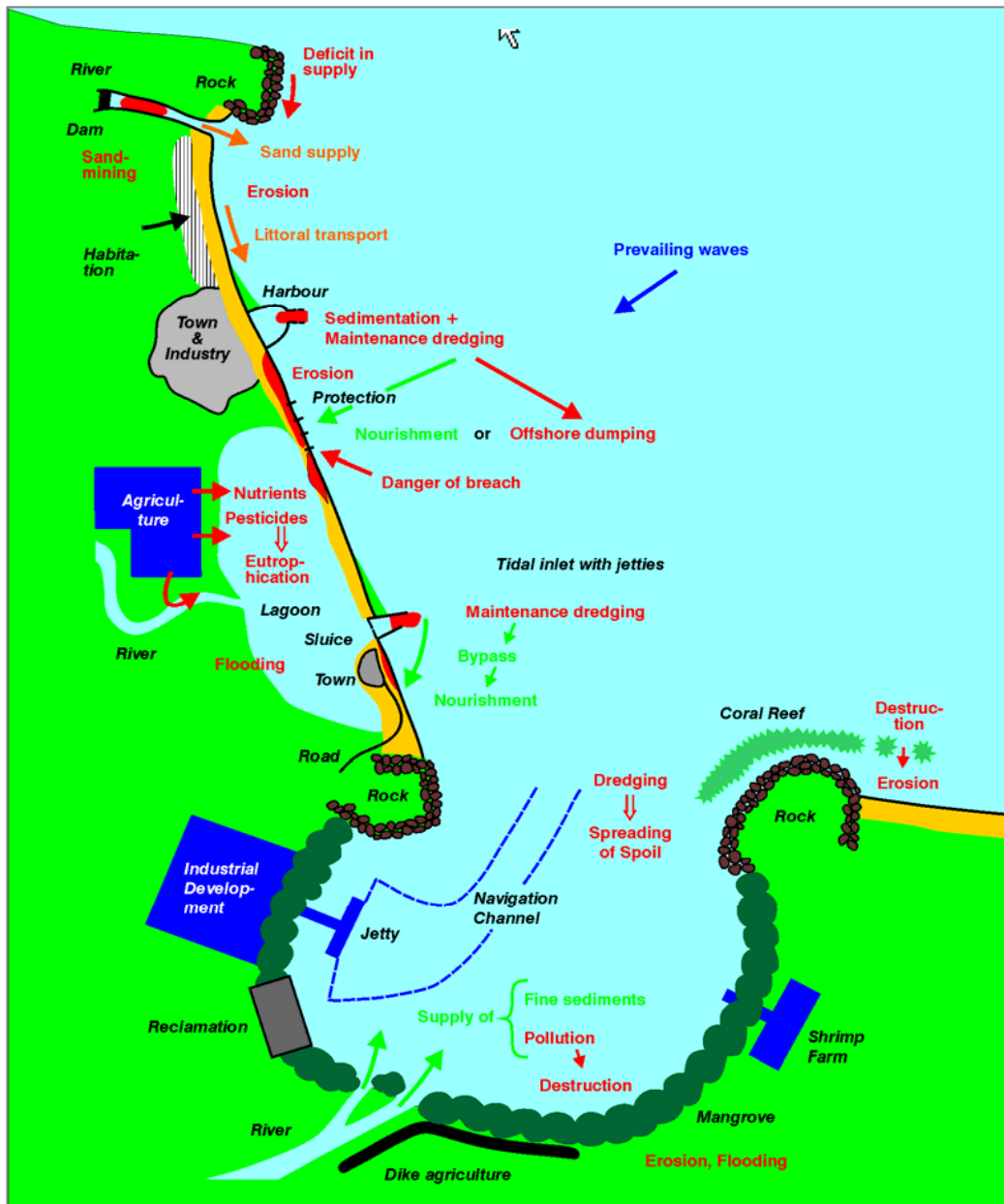
Increase in atmospheric concentration of carbon dioxide  
acidification

Weather patterns

temperature

precipitation

extreme events



## Sea Level Rise

1870-2004: ~ 20 cm

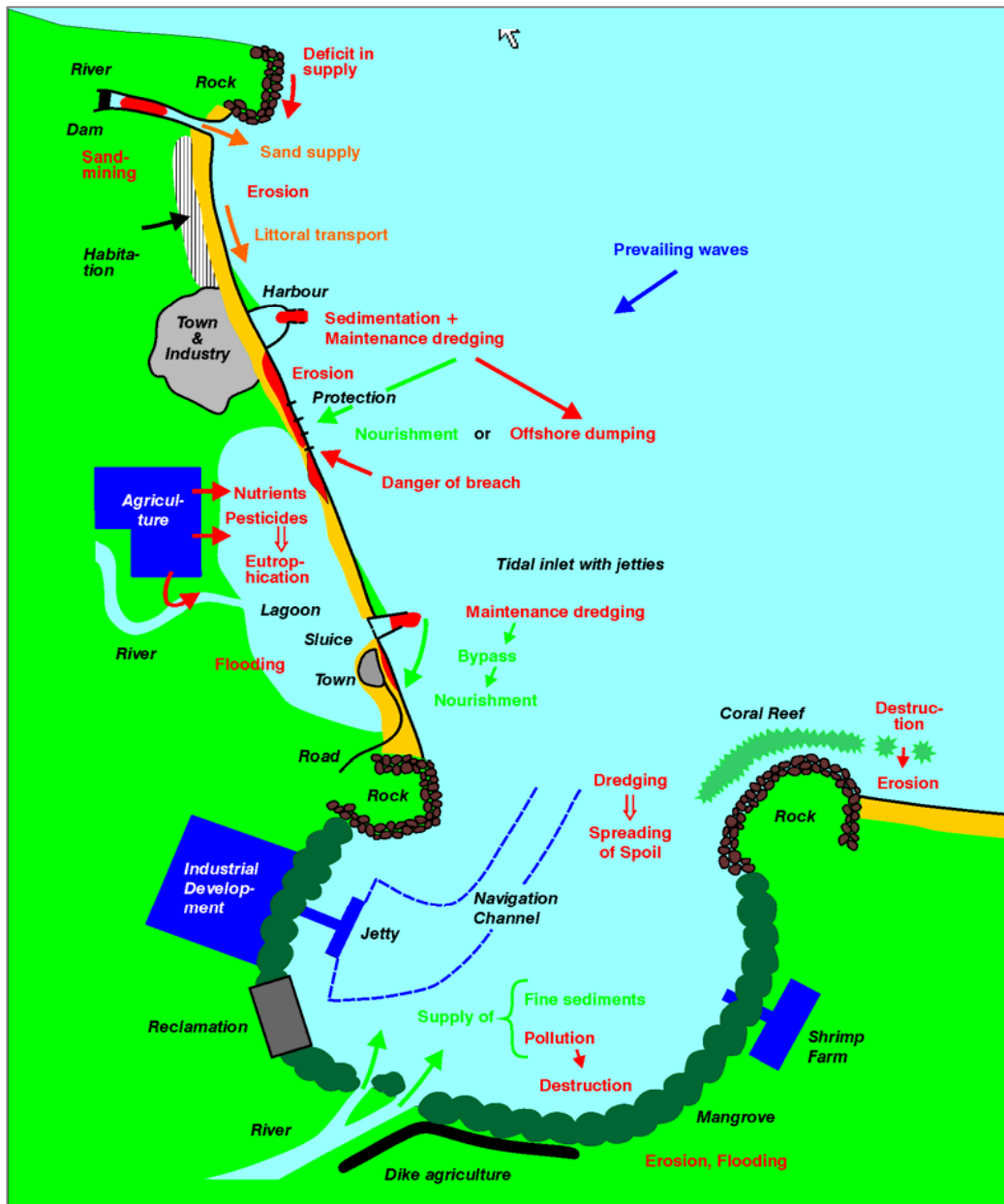
Current rate: 3 mm/year

Projections for 2100 vary

- IPCC 2007: 18 – 59 cm global average
- Recent information suggest that it may exceed 1 m
- Large differences regionally

At lower range predictions 10% of the global population reside in low lying areas which will be impacted by flooding.

At lower level predictions frequency of flooding events will increase drastically (today's 100 year events in 2100 will be exceeded every few years)



## Sea Level Rise

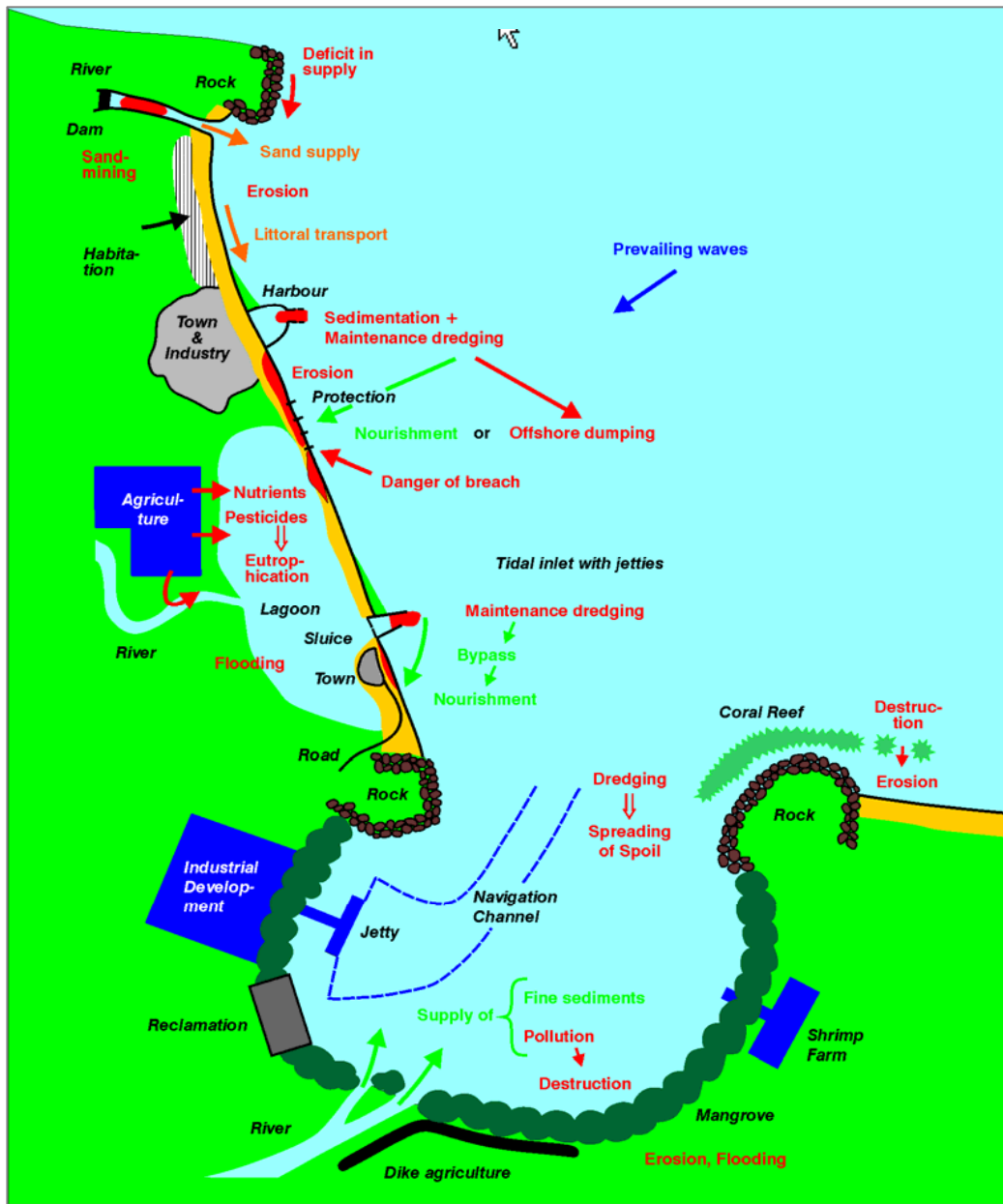
Effects will be most profound during storm surges (strong winds and falling pressure).

Storm surges occurring on higher mean sea levels will enable inundation and damaging waves to penetrate further inland (risks to coastal settlements and infrastructure)

Coastal wetlands and low lying areas will be inundated (by 2080 more than 30% of current coastal wetlands projected to open water)

Increased beach erosion.

Increase salinity of rivers, bays and groundwater tables.

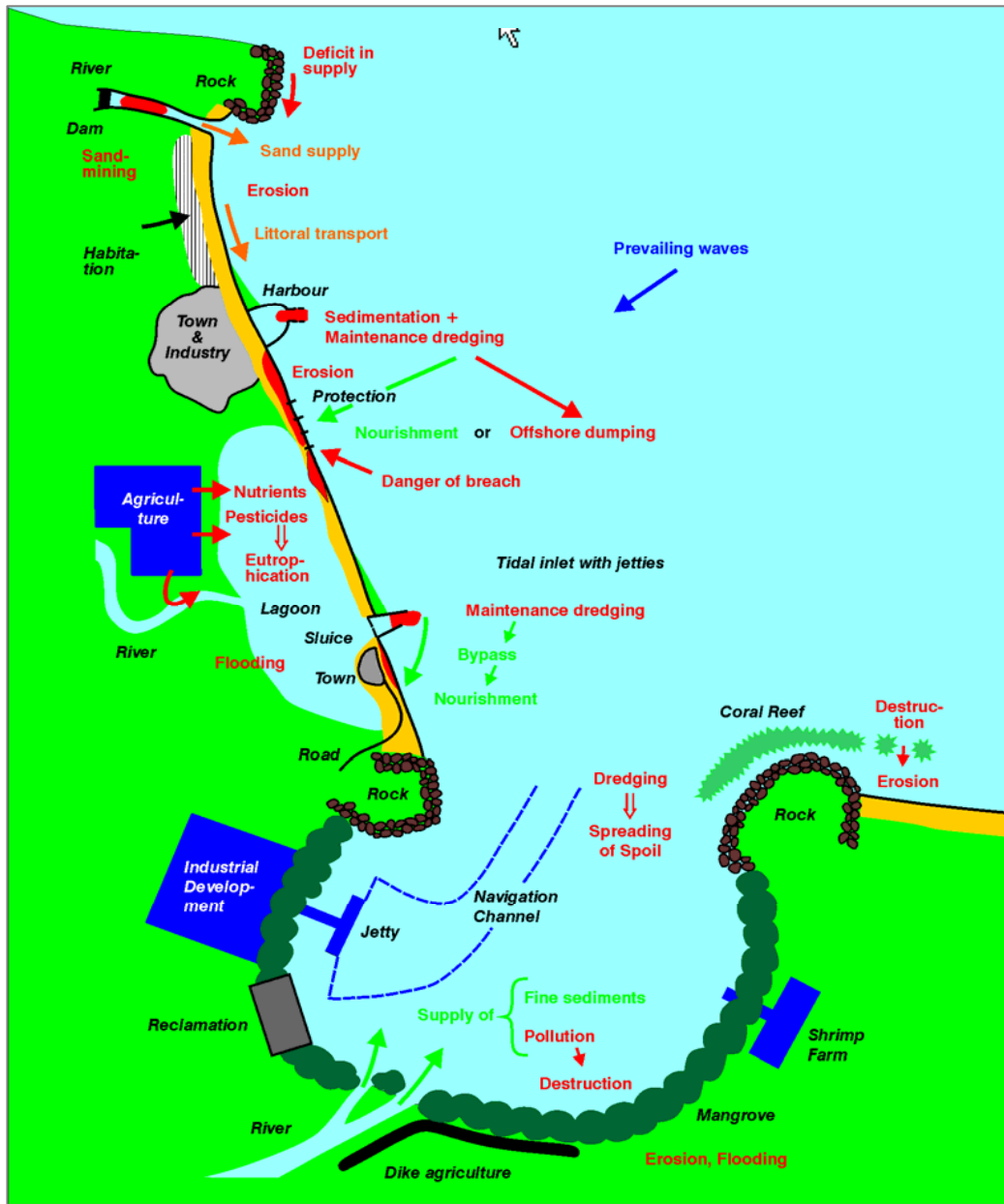


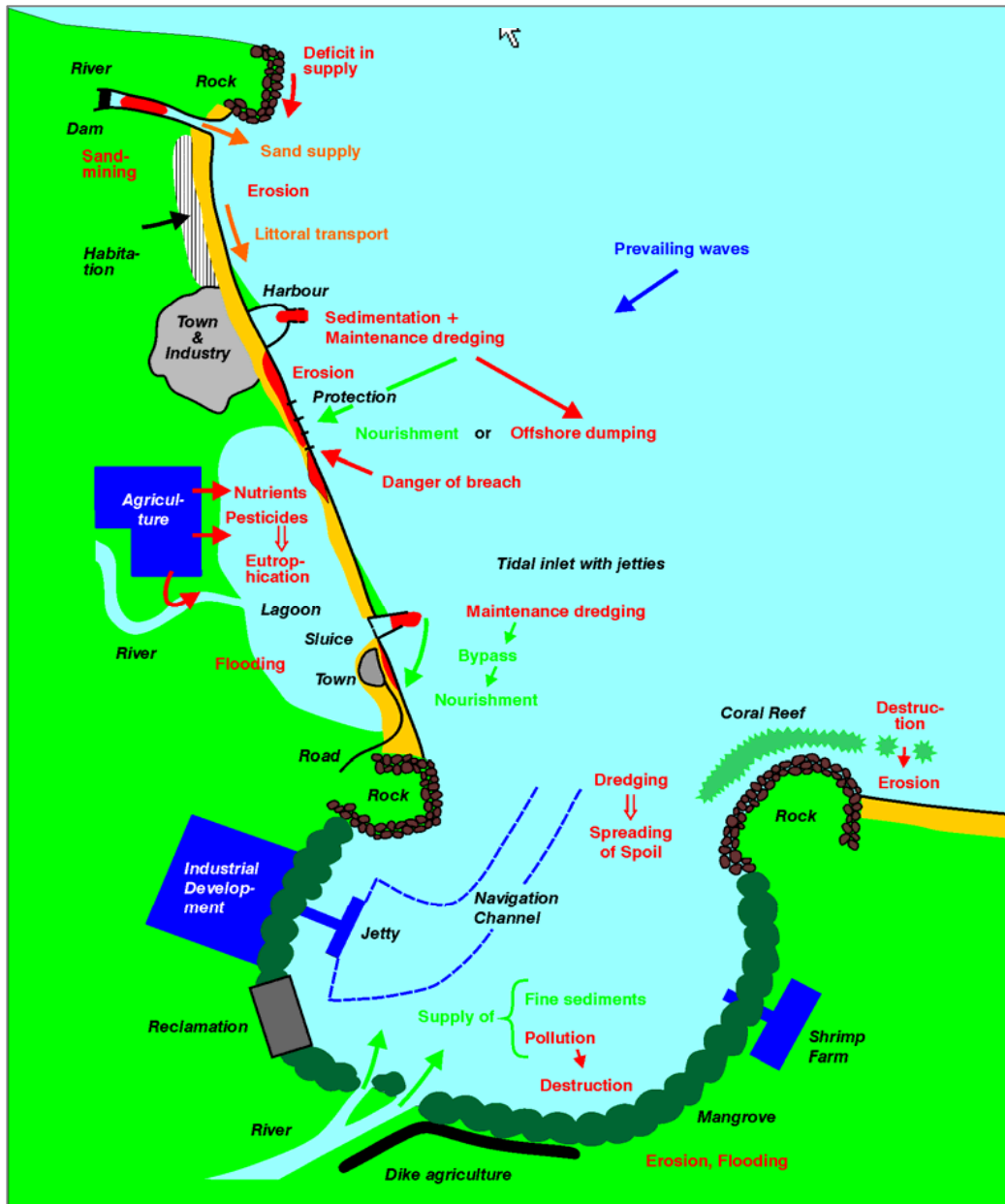
Water temperature  
 Disturbance in coastal ecosystems.  
 Coral bleaching

# Acidification

Ecological impact effecting calcifying organisms, including corals and crustaceans.

It has been forecast that ocean pH will fall by between 0.14 and 0.35 units over the 21st Century, adding to the present decrease of 0.1 units since pre-industrial times.





## Weather patterns

### Temperature:

Disturbance of ecosystem

### Precipitation:

- River flows
- Sediment nourishment
- Salinations

### Extreme events

- Flooding
- Erosion

# Conclusion

- The very dynamic and continuous interaction between the sea and landforms shapes the coastline, which also relies on nourishment with material from rivers.
- Coastal zones are already today under considerable development pressure from an expanding coastal population and economic activities a situation which is projected to be further pronounced over the next decades.
- Hinterland activities interfere with river flow and sediment transport to the coast adding to the stress of the coastal environment
- Impacts of climate change projected over the coming period are significant and adds to the stress already faced in the coastal zone.
- Unless improved management incorporating measures to address climate change impact, particularly related to sea level rise, the outlook for the coastal zone is further deterioration of natural resources and habitats and loss of economic development potential.



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Thank you for your attention

