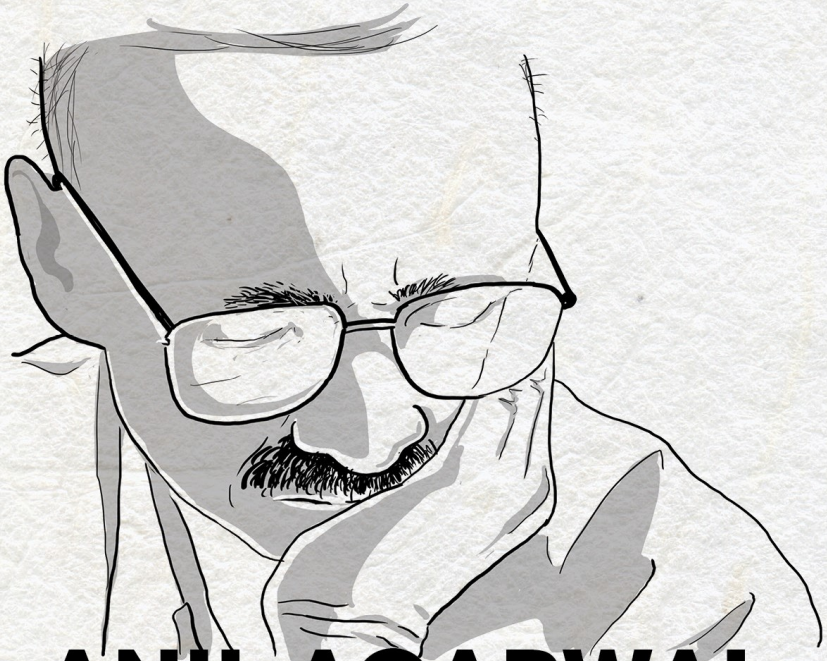

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Collapse of the Coral Reefs

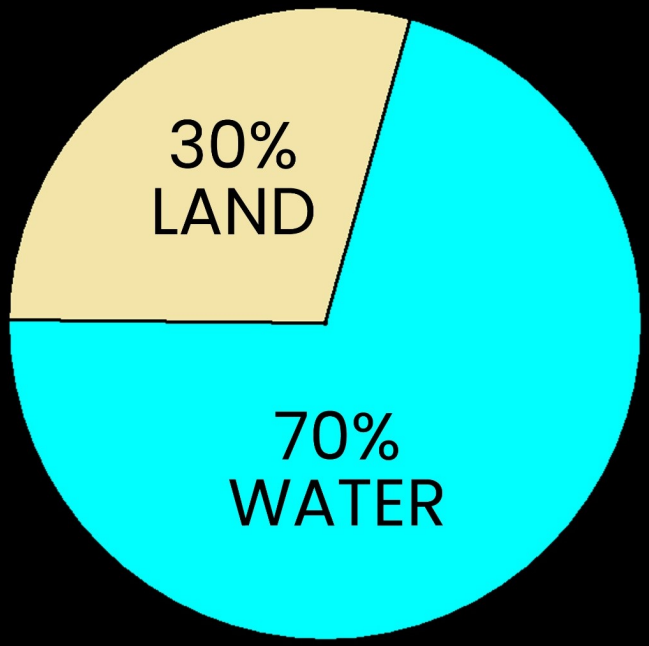
Sajan John
Co-Principal Investigator
Marine Projects
Wildlife Trust of India

Why should we protect species and habitats?

- Plants and animals maintain the health of an ecosystem and, when species become endangered, it's a sign that an ecosystem is out of balance.
- So the balance within an ecosystem isn't always easy to maintain: the loss of one species often triggers the loss of others

Species can go extinct

Passenger pigeons were one of the most abundant birds on our planet. They went extinct 100 years ago


30%
LAND
70%
WATER

Species

Habitats/
Ecosystem

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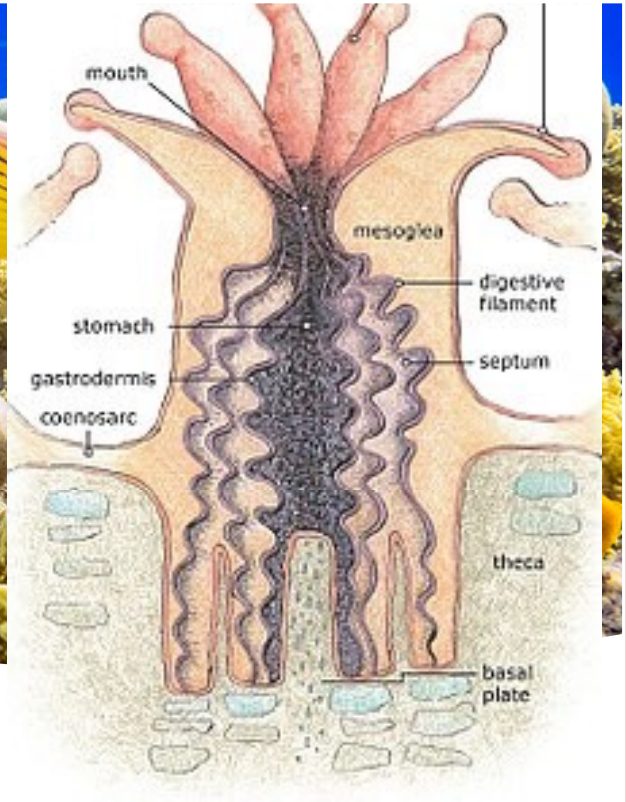
Coastal & Marine Ecosystems

MANGROVES

SEA GRASS

CORAL REEFS



They are marine invertebrates

Each individual is called a **polyp**

Secrete calcium carbonate exoskeleton

Polyps fuse together to form colonies

What are Corals?

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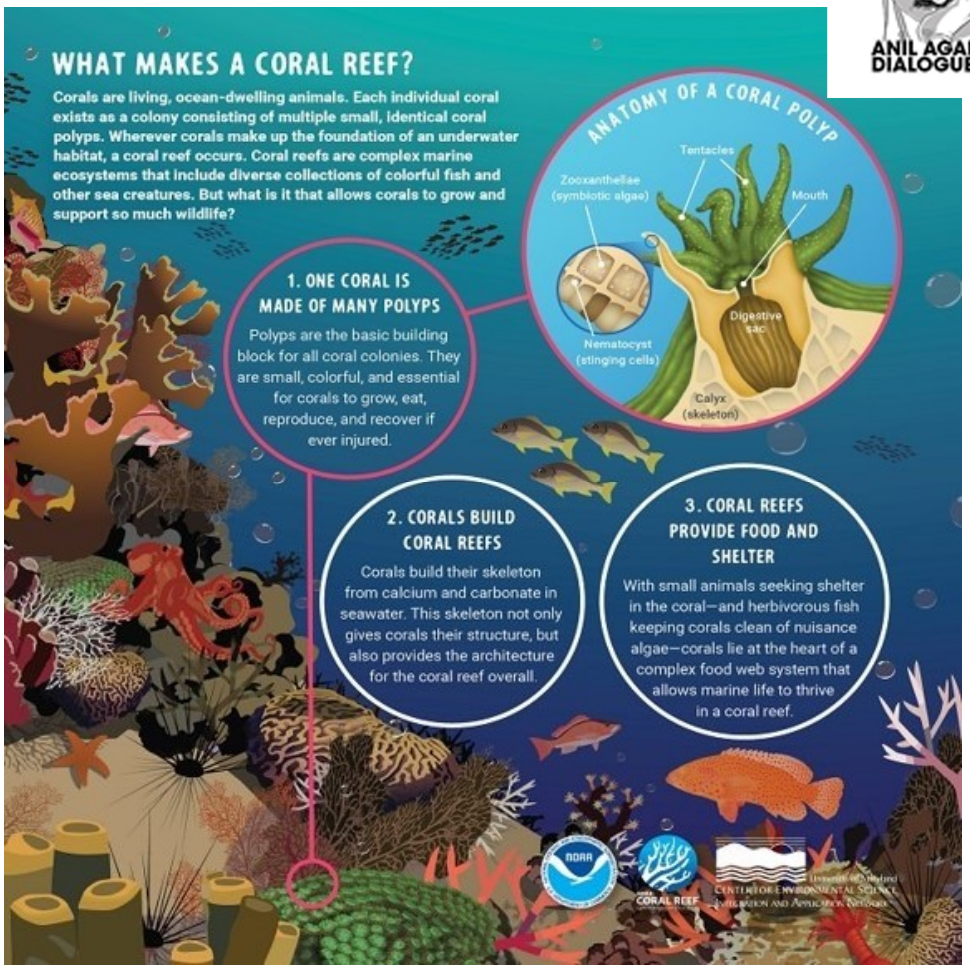

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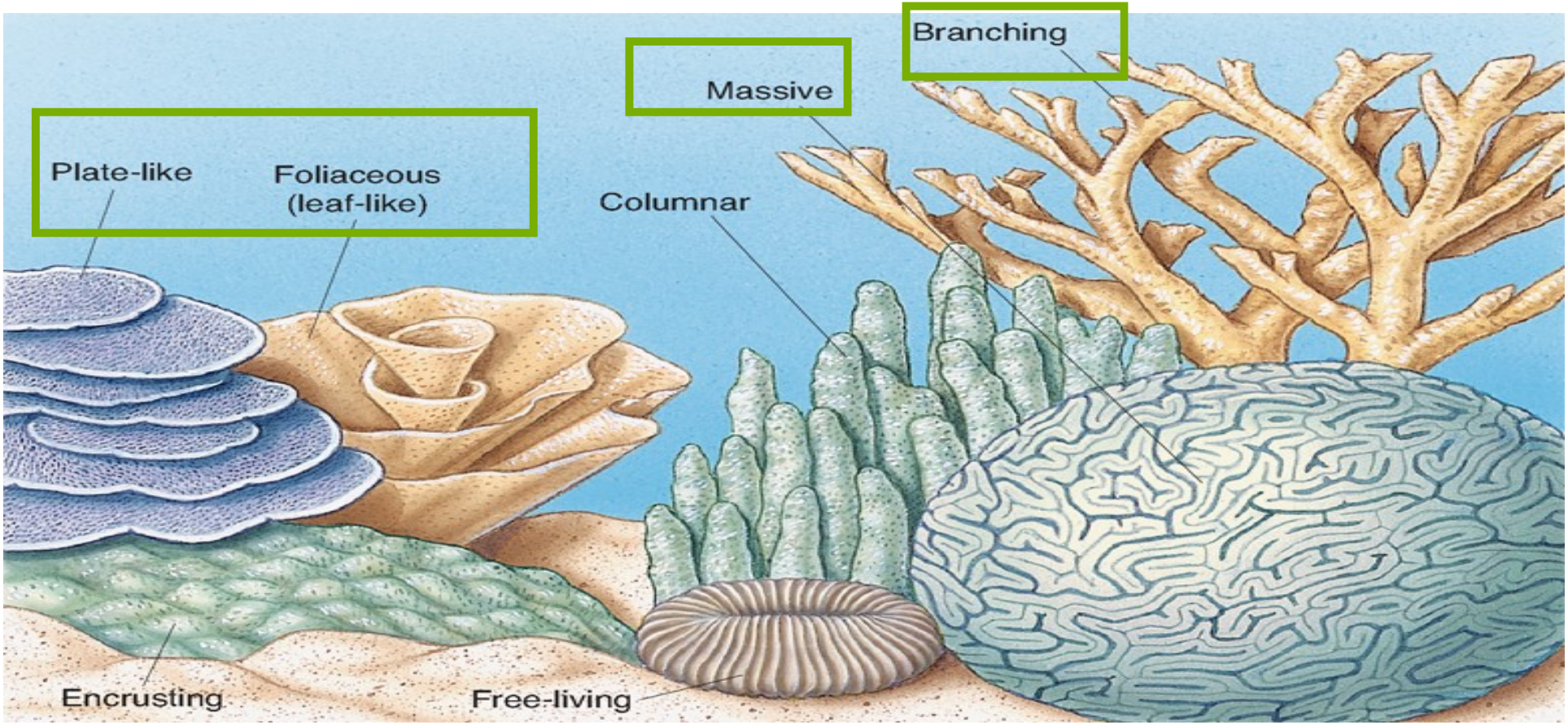
What are Coral reefs?

Coral reef:

A long and wide formation of different types of coral colonies.

Corals are one of the slow growing animals


Algae
Anemone
Gorgonids
Clams
Sponges


Branching
Massive
Plate-like
Foliaceous
(leaf-like)
Columnar
Encrusting
Free-living

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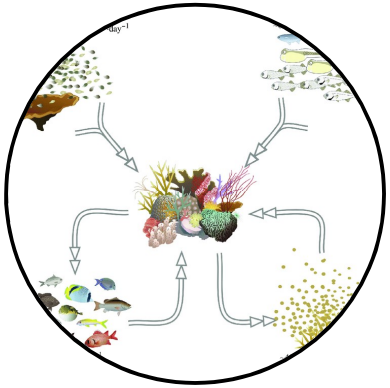
Why are we worried about the health of our reefs?

They provide lots of ecosystem services

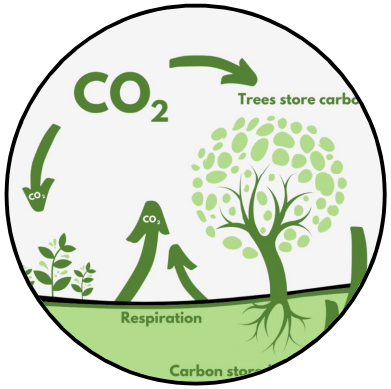


SUPPORTING

Nutrient cycling, pr imary productivity, soil formation, hab itat provision

PROVISIONING

Food, raw materials, genetic resources, bio genic minerals, ornamental resources



REGULATING

Carbon sequestration, climate regulation, water purification, storm protection

CULTURAL & SOCIAL

Use as motifs in art and literature, recreational experiences, science & education

Coral reefs occupy less than 1 per cent of our ocean and yet they are home to more than 25% of marine life.

- **Coral reefs provide over US$2.7 trillion in annual economic value.**
- **With significant GDP dependence for nations like the Maldives, Seychelles, and Mauritius through tourism, fisheries, and *coastal protection.***
- **Reef-based tourism generates roughly US$36 billion annually, while providing crucial flood protection, particularly in Indonesia, the Philippines, and Papua New Guinea**

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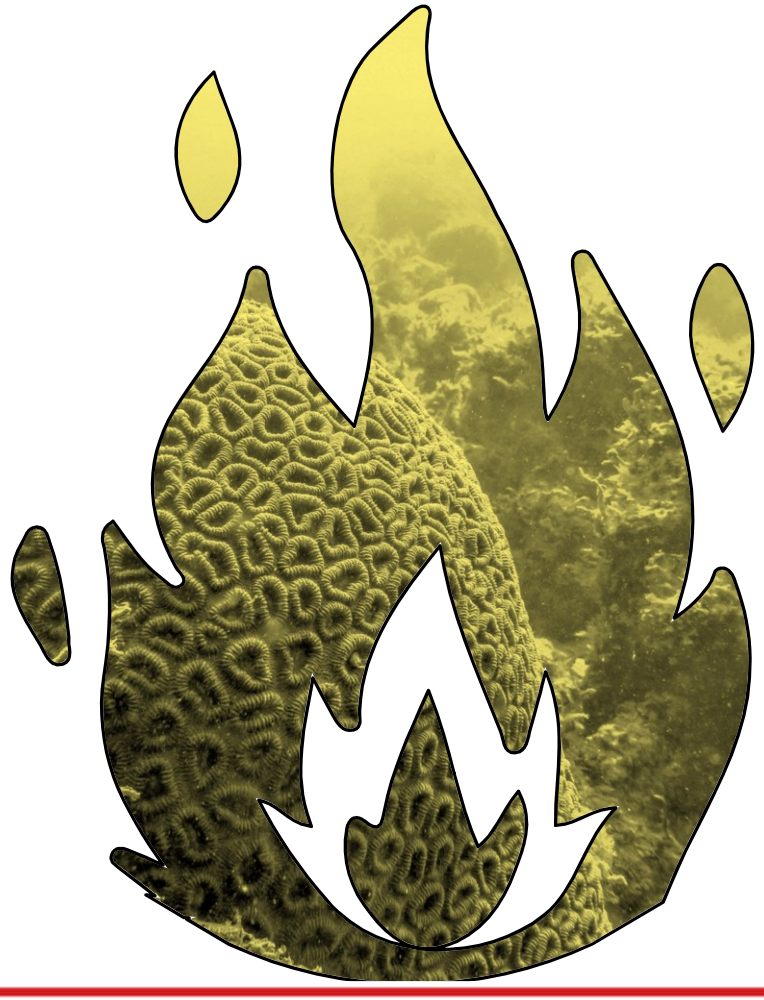
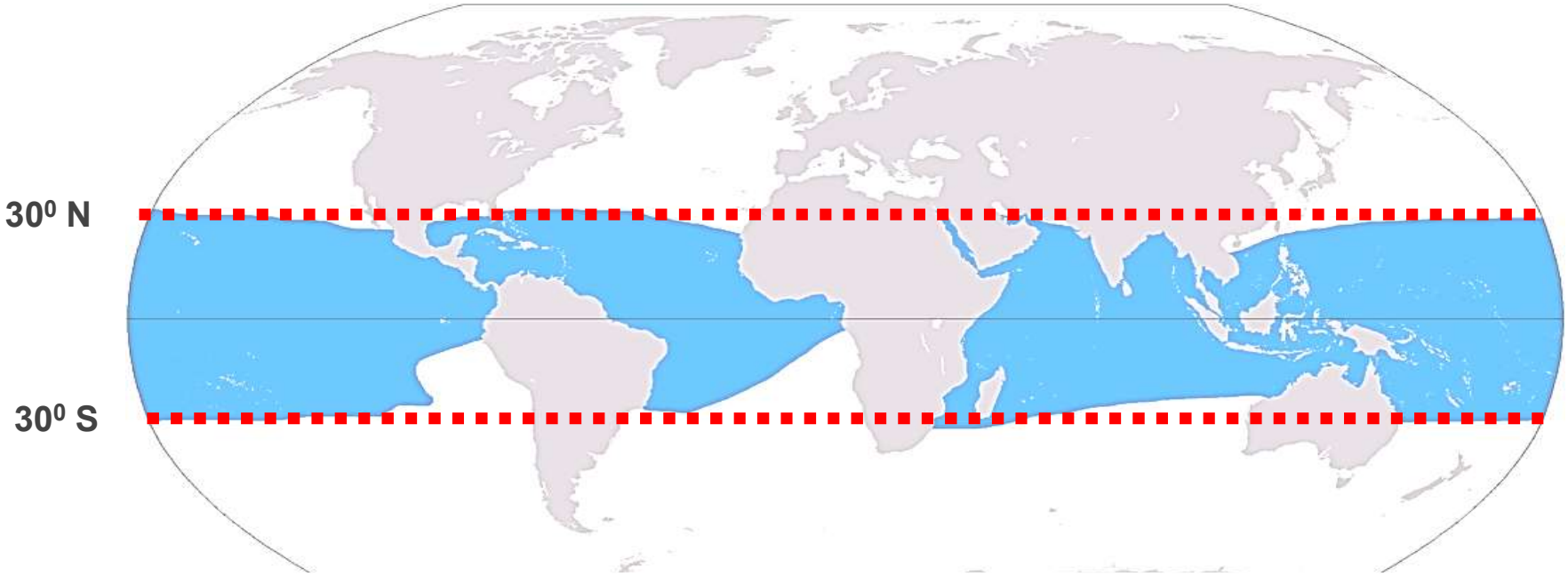
How are corals responding to the changing climate regimes?



Where are coral reefs found?

- Optimum temperature required **26-27^{0}C**
- Shallow water reefs found from **30^0 N to 30^0 S Lat**



What is Zooxanthellae?

- Most reef-building corals contain photosynthetic cells called zooxanthellae that live in their tissues. The corals and zooxanthellae have a mutualistic relationship.
- **Zooxanthellae nourish the host coral as well as help it deposit its skeleton.**
- Many corals can survive and grow without eating, as long as the zooxanthellae have enough light.

Reef-building corals are limited to warm water and can grow and reproduce only if the average water temperature is above about 20C°.

The upper temperature limit varies, but is usually around 30° to 35°C.

The first outward sign of ***heat stress***, or stress of other kinds, is bleaching, in which the ***coral expels its zooxanthellae***.

It is called bleaching because the golden-brown or greenish zooxanthellae give corals most of their color; without zooxanthellae the coral's tissue is almost transparent and the coral looks white because of its underlying limestone skeleton.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DIALOGUE 2026
Obviously, the one on the left needs help!!

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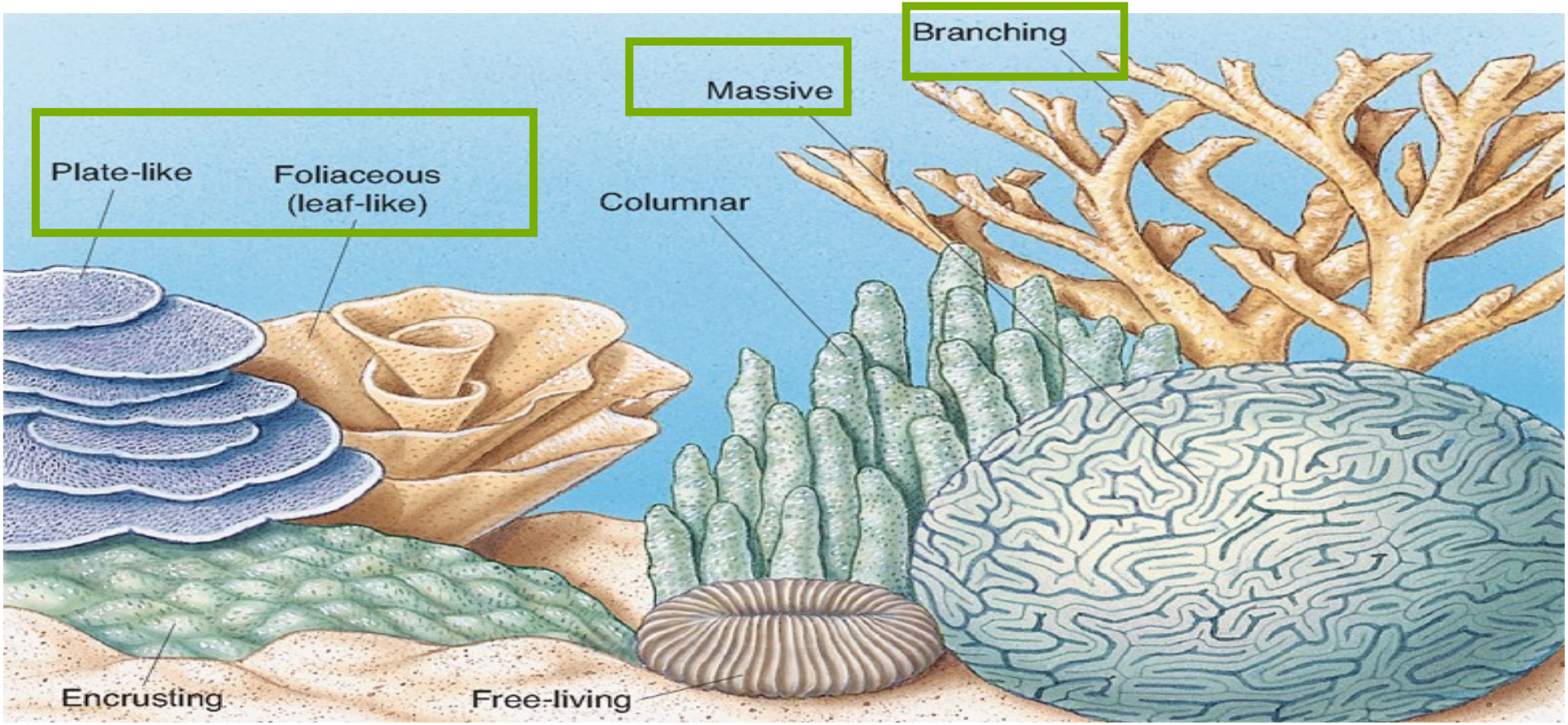
Temperature increases and competition from the algae have killed much of this coral reef.

Is this reversible?

Key Herbivorous Fish Families

- **Parrotfish (Scaridae):**
- **Surgeonfish (Acanthuridae):**
- **Rabbitfish (Siganidae):**
- **Damselfish (Pomacentridae):**
- **Angelfish (Pomacanthidae)**
- **Butterflyfish (Chaetodontidae):**

Yes. Herbivory is the answer

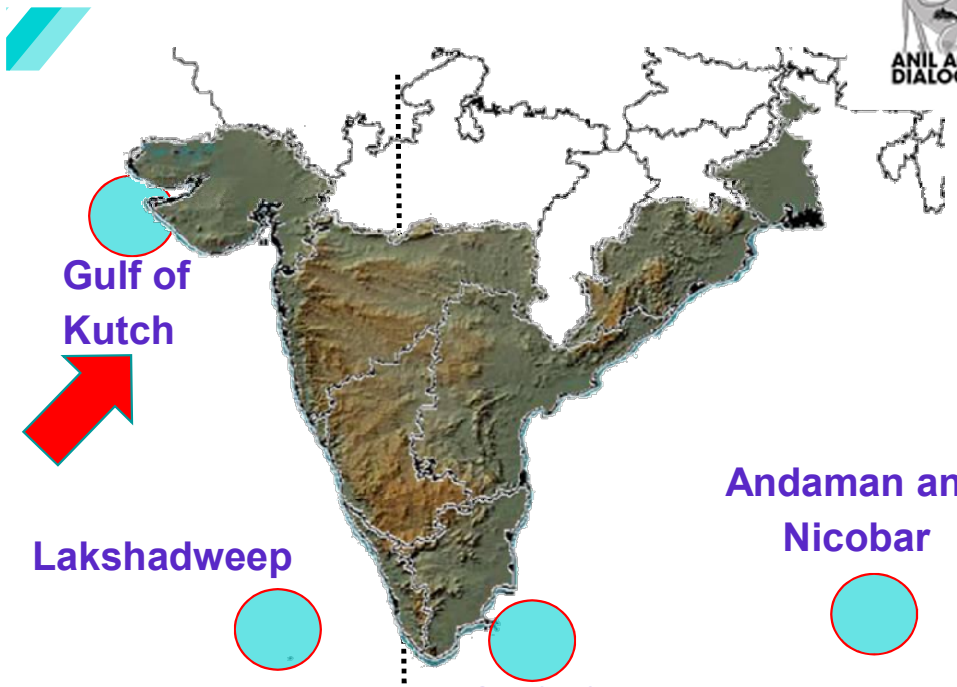

Branching
Massive
Plate-like
Foliaceous
(leaf-like)
Columnar
Encrusting
Free-living

Structure and forms also plays a major role

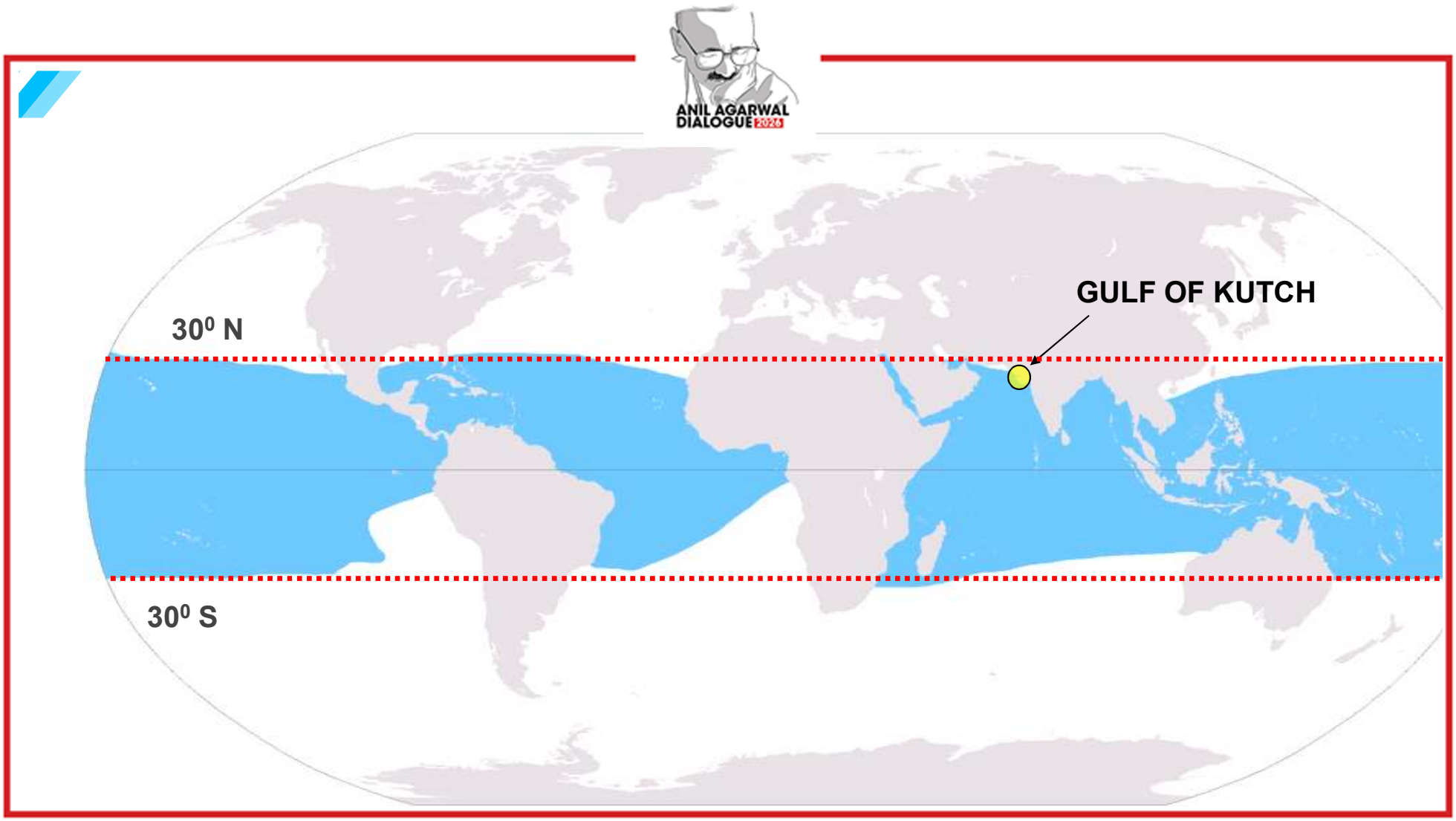
Structure and forms also plays a major role

Growth Resilience

What is the solution?



Coral reefs in India?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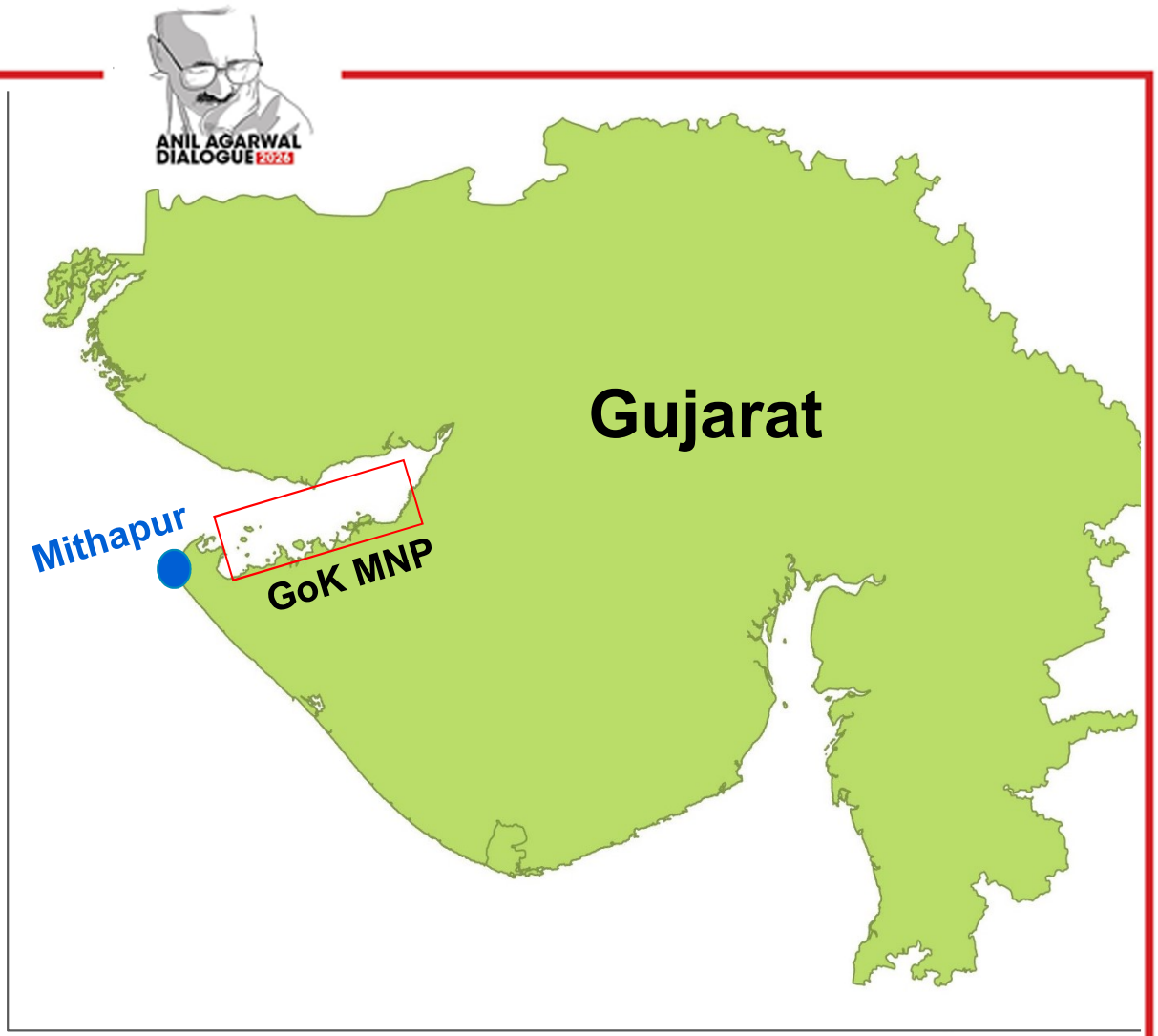
GULF OF KUTCH
30⁰ N
30⁰ S

Restoring Reefs: Bringing back the Corals of Mithapur

Why Mithapur?

- **Lies outside the Gulf of Kutch Marine National Park**
- **Threats like reef destructive fishing/non fishing practices**
- **No Branching corals**



Stony Coral

Branching Coral

2008-the start

12% live coral cover

Community interactions

Slow down degradation and assist recovery


NO TAKE ZONE
NO FISHING

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Artificial Reef as fish aggregators

Fish catch near Artificial Reef

Fish catch from degraded Reef

Community involvement

4 fishing villages

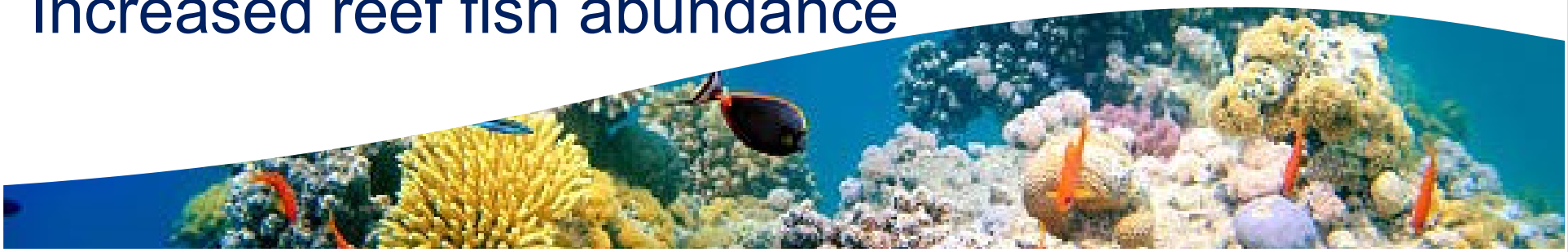
Now we have….

- **An artificial reef surface area of ~1 acre**
- **No-Take Zone of ~37 Acre**
- **The reef supports 350 families**

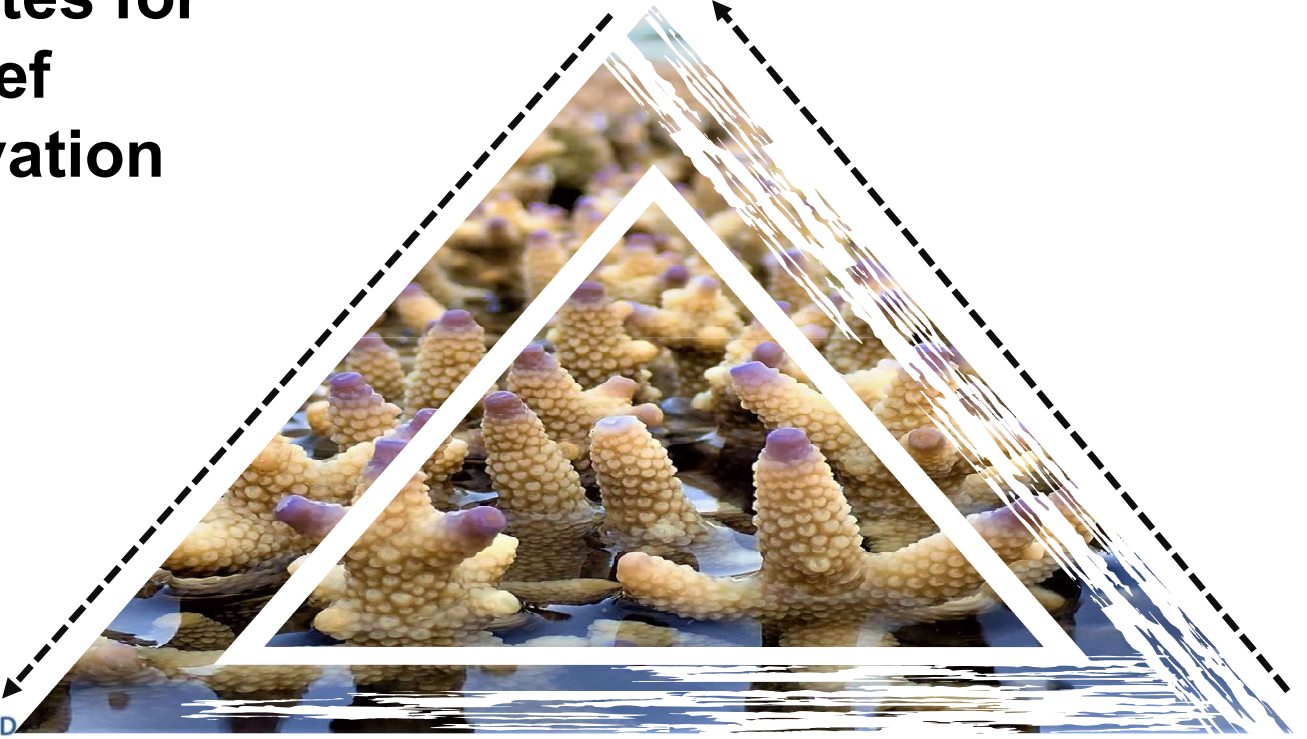
Resulting to….

Increased coral cover from 12% to 19%

Increased reef fish abundance



Communities and Corporates for Coral reef Conservation

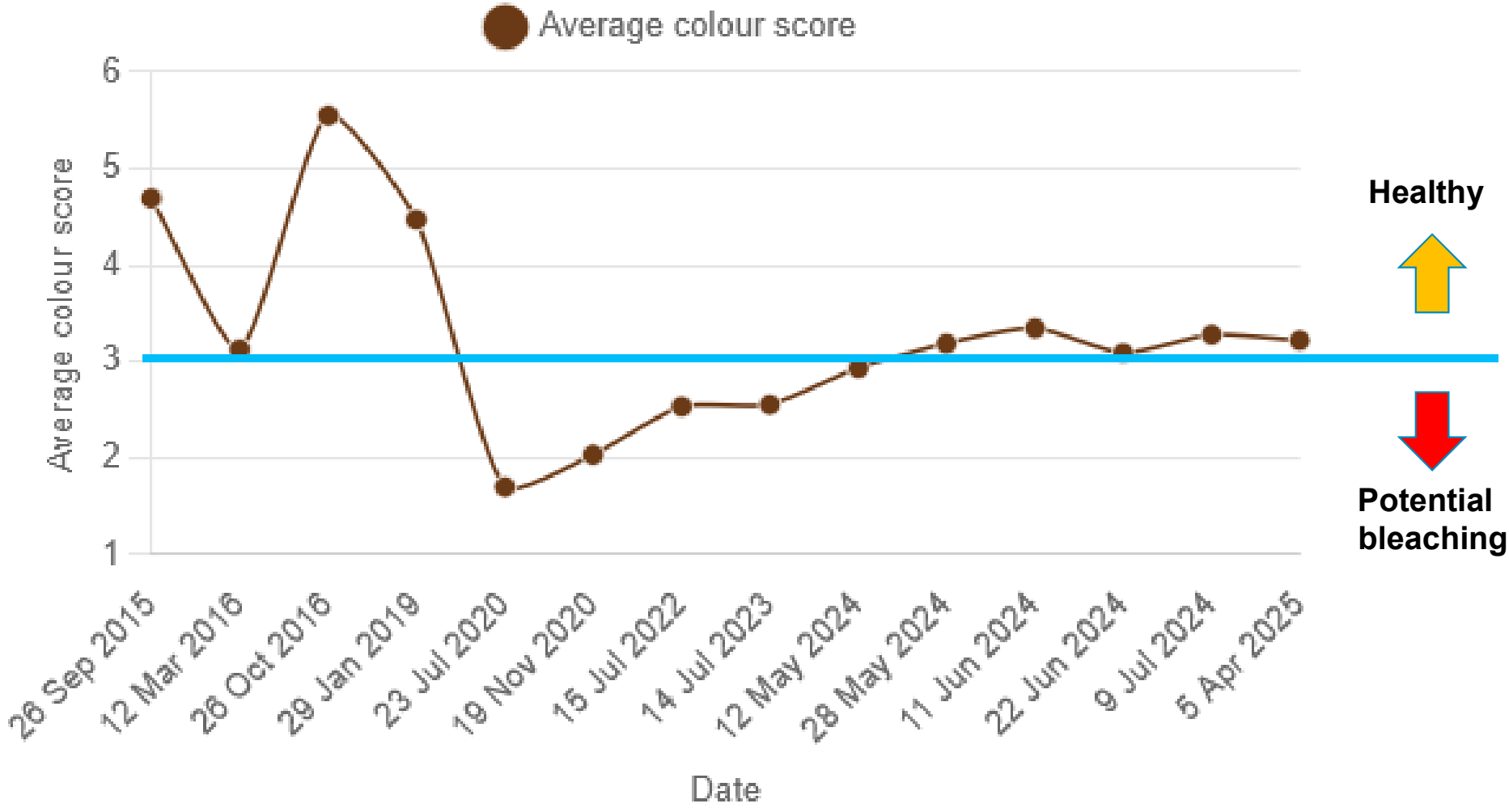


TATA CHEMICALS LIMITED

Wildlife Trust of India

With the support of Gujarat Forest Department

Bleaching data of Mithpaur Coral Reef



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Thank You

sajan@wti.org.in