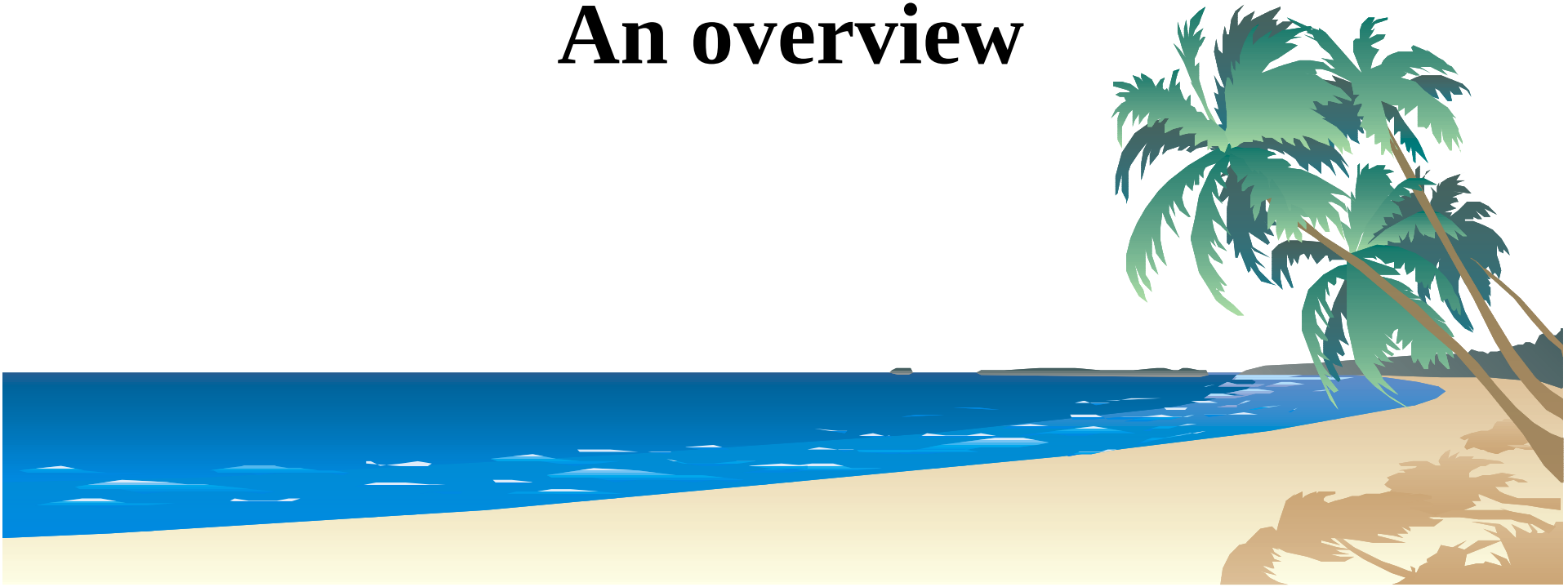
Lecture/Discussion #1:

The coastal and marine ecosystems: An overview



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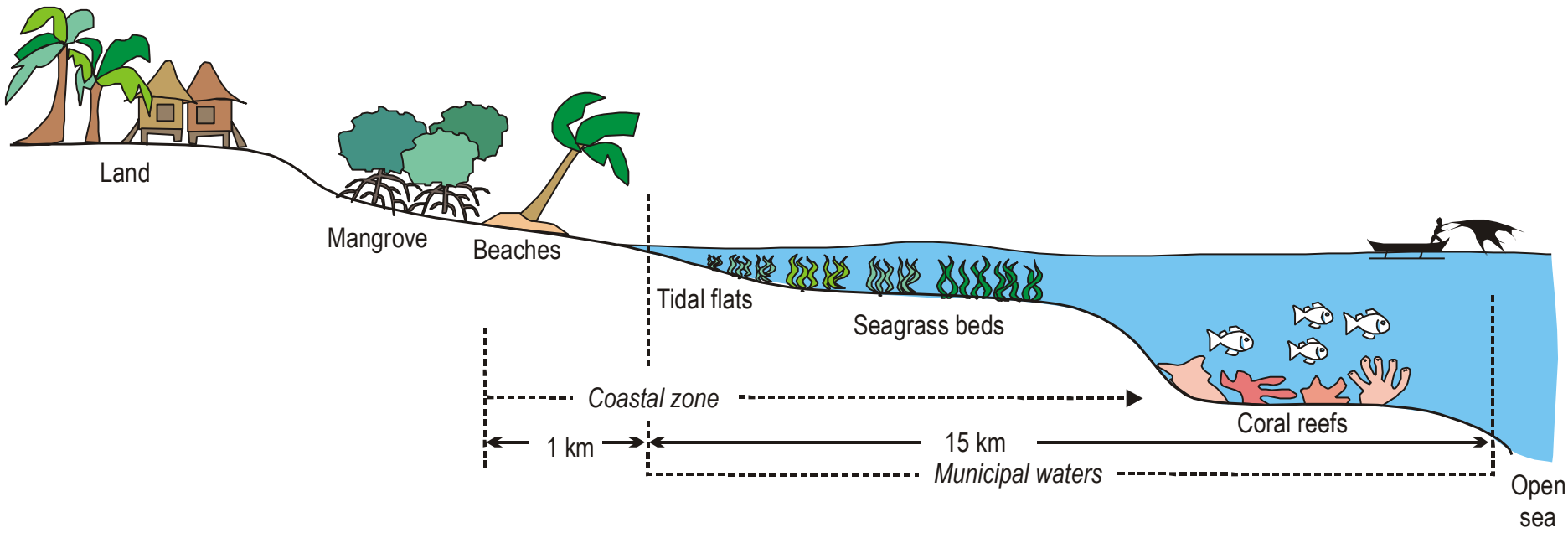
The coastal zone



Coastal Zone is the interface where the land meets the ocean. It includes the shoreline environment and the adjacent coastal waters.

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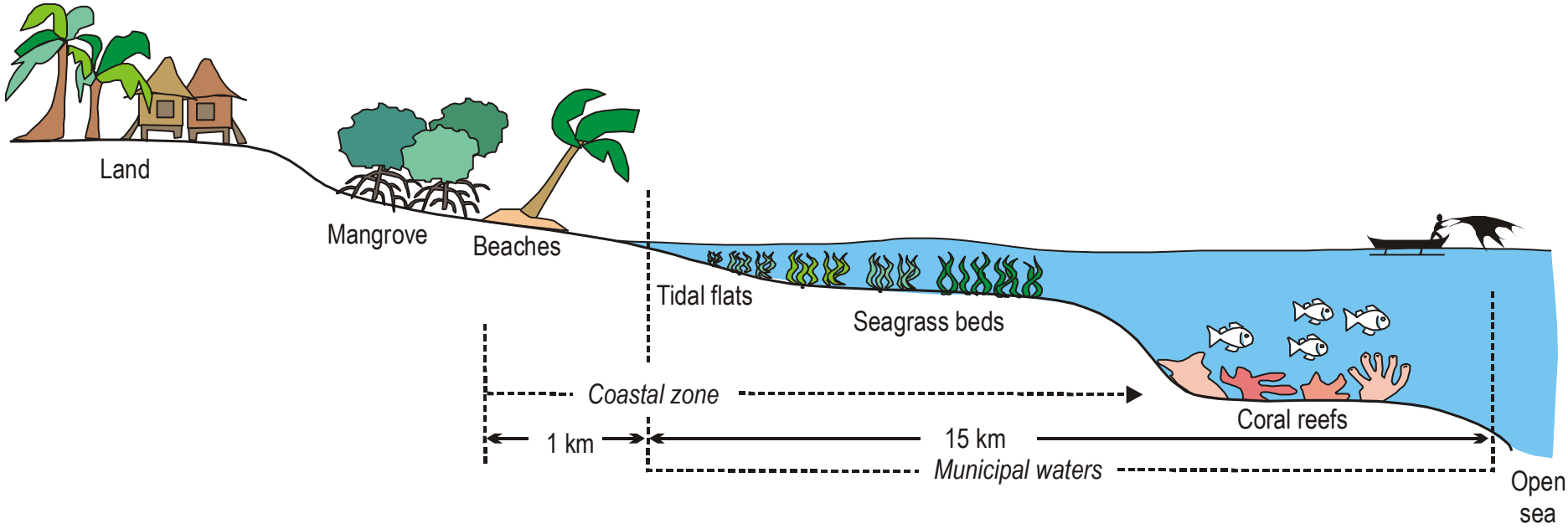
The coastal zone



A Philippine Coastal Zone has the following major ecosystems along its shallow coastlines

- coral reefs
- seagrass beds
- coastal wetlands including mangroves
- estuaries and lagoons

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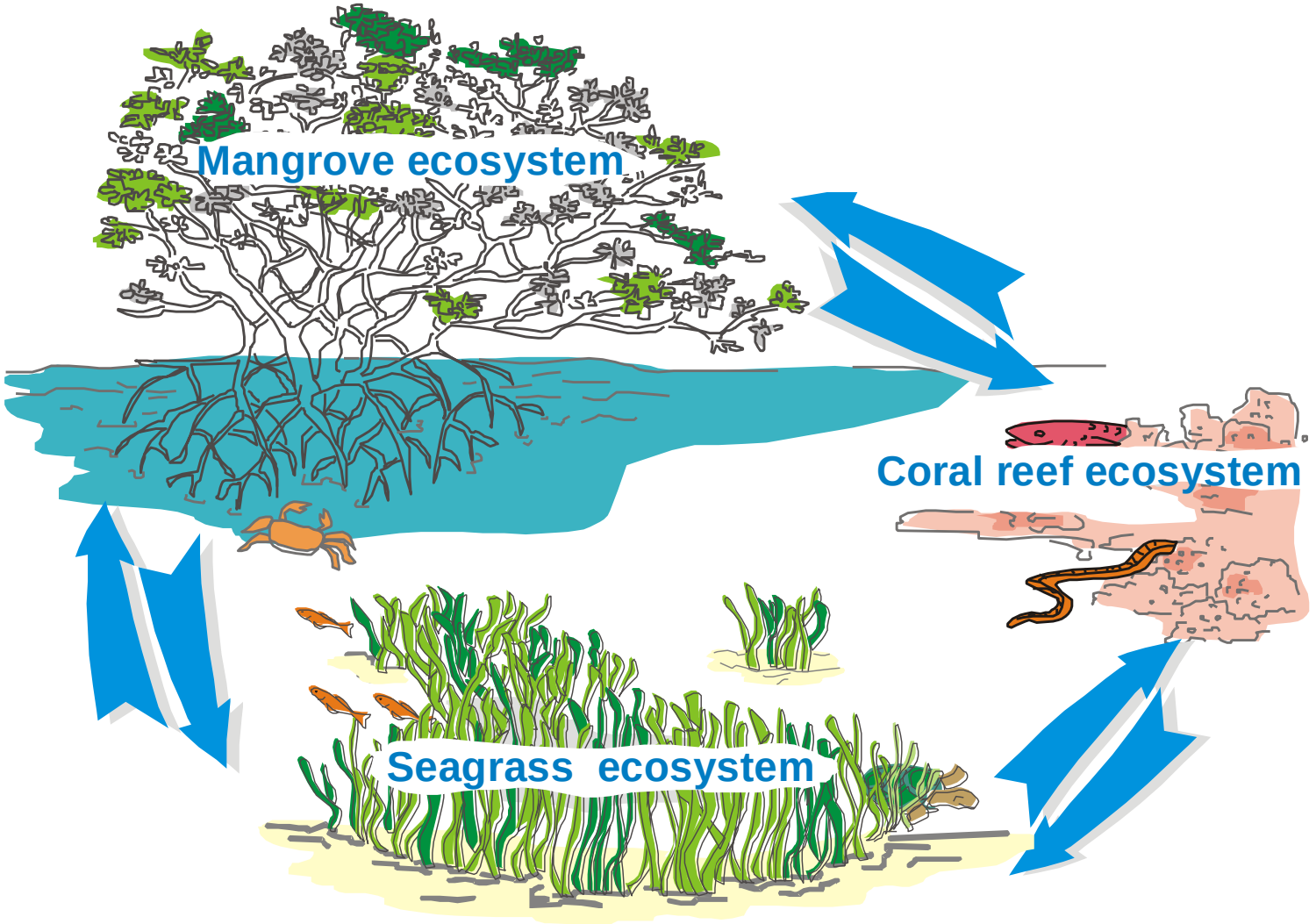
Mutual contributions of tropical coastal habitats



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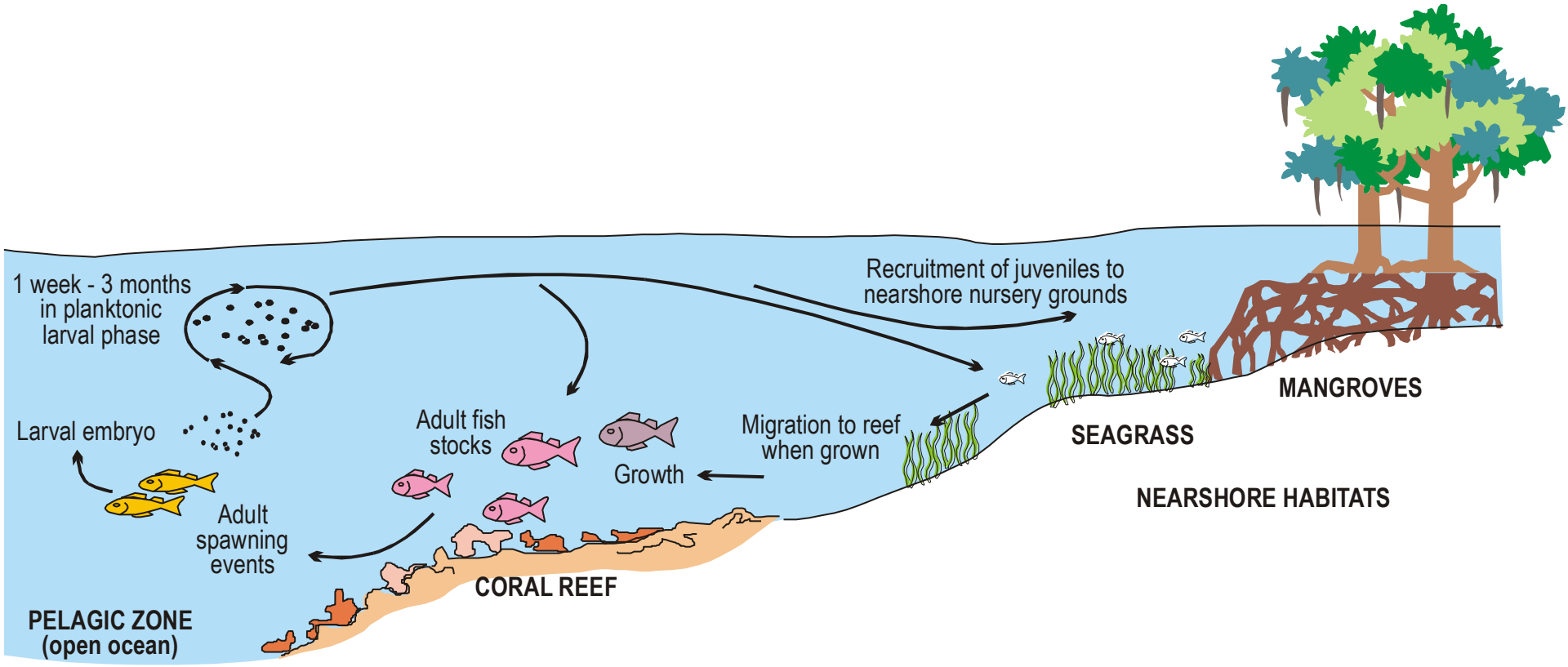
Typical life cycle of coral reef fish species and interconnectivity of habitats



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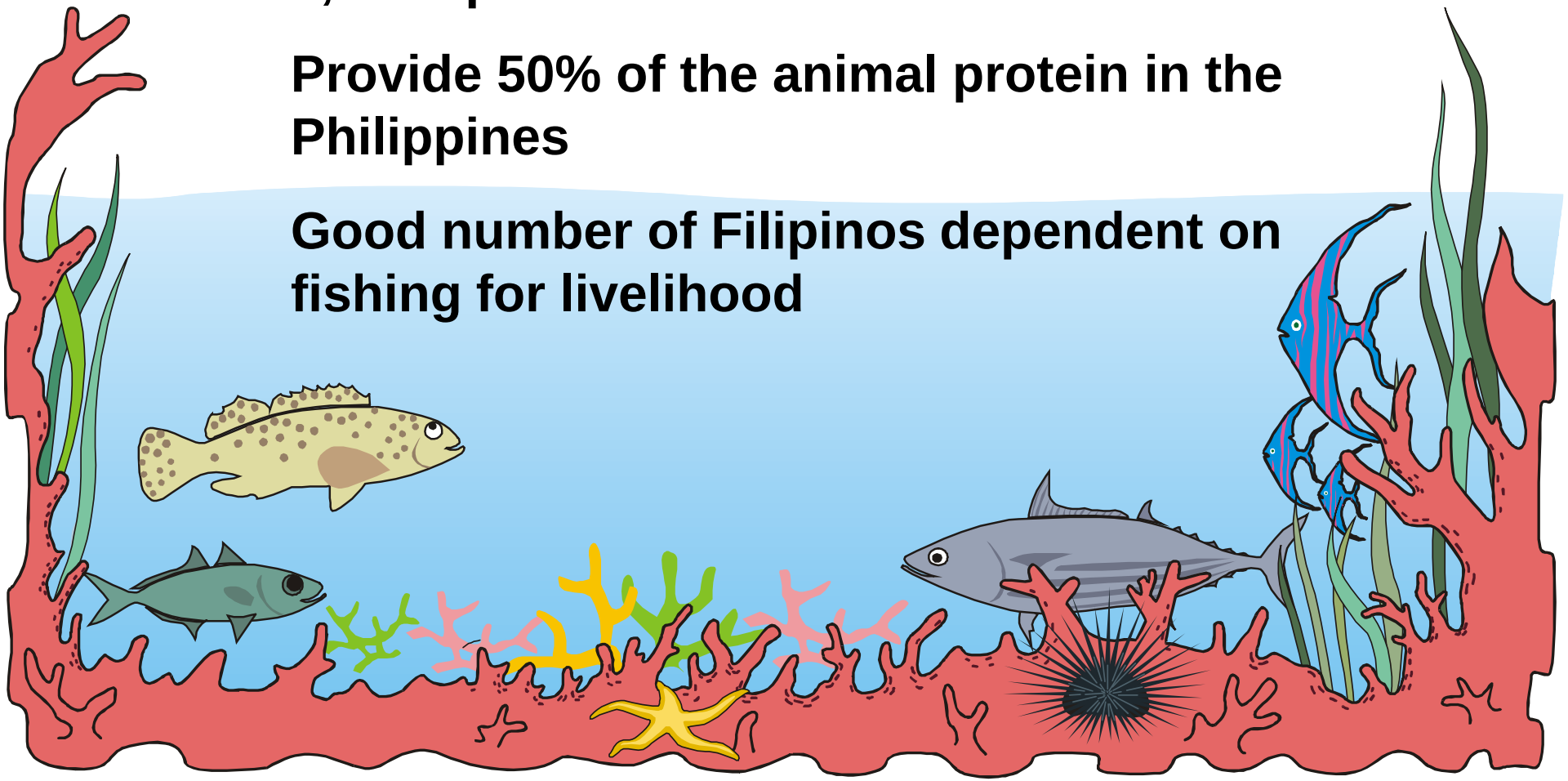
Rich marine biodiversity with 400 species of corals; 900 species of seaweeds; and 1,400 species of fish and crustaceans

Provide 50% of the animal protein in the Philippines

Good number of Filipinos dependent on fishing for livelihood



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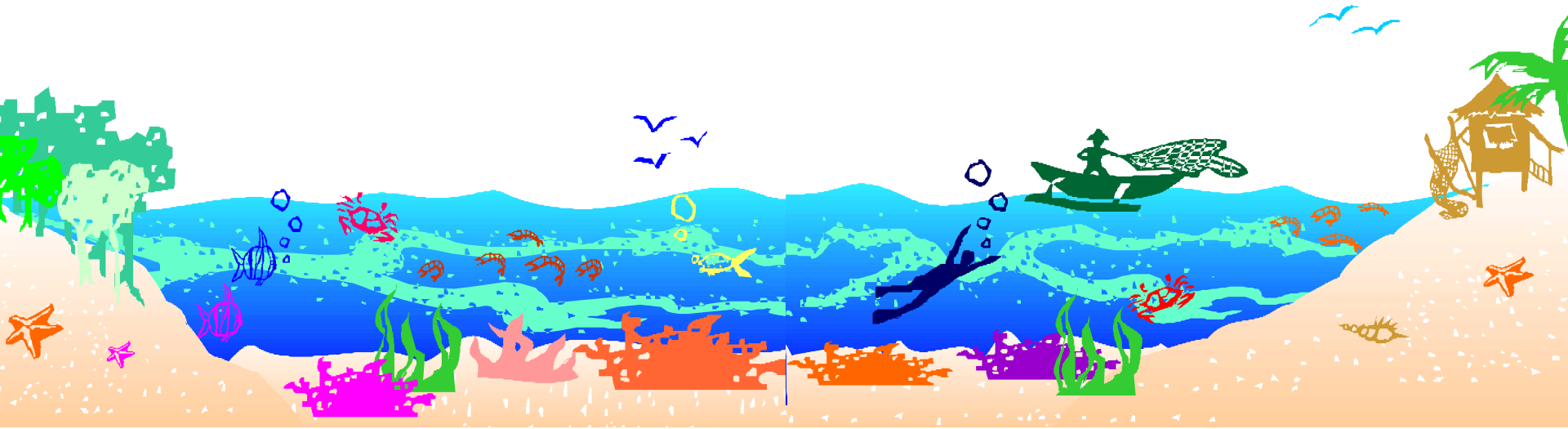
Habitats of the Philippine coastal zone



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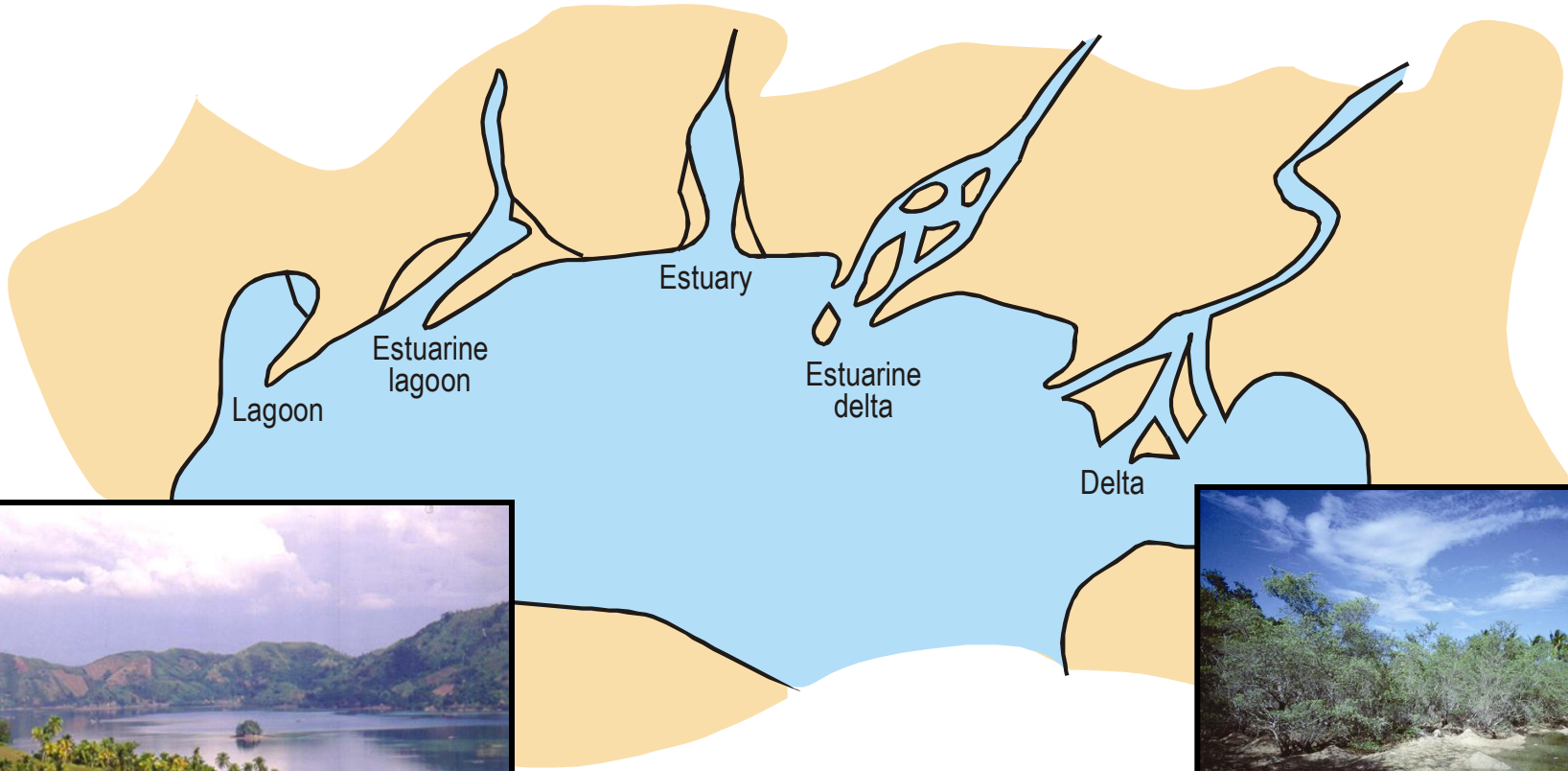
Examples of inlet types from lagoons to deltas



Estuary in Malalag Bay, Davao del Sur

Estuaries, lagoons and bays

Coastal wetland in Masbate

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Coastal wetlands, including mangroves

Wetlands play as home and nursery feeding grounds to a great variety of plants and animals.

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Mangroves are woody, seed bearing plants adapted for life in brackish water. Serve as feeding and nursery grounds and refuges to many fish species, migratory birds and other marine organisms.

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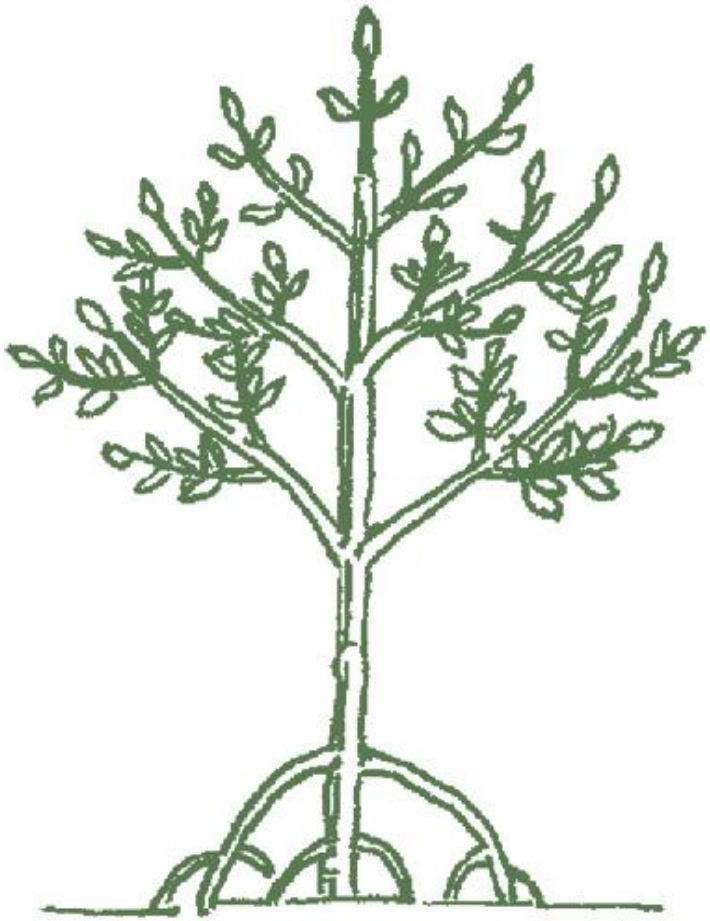
Examples of two major mangrove genera



Rhizophora

Avicennia

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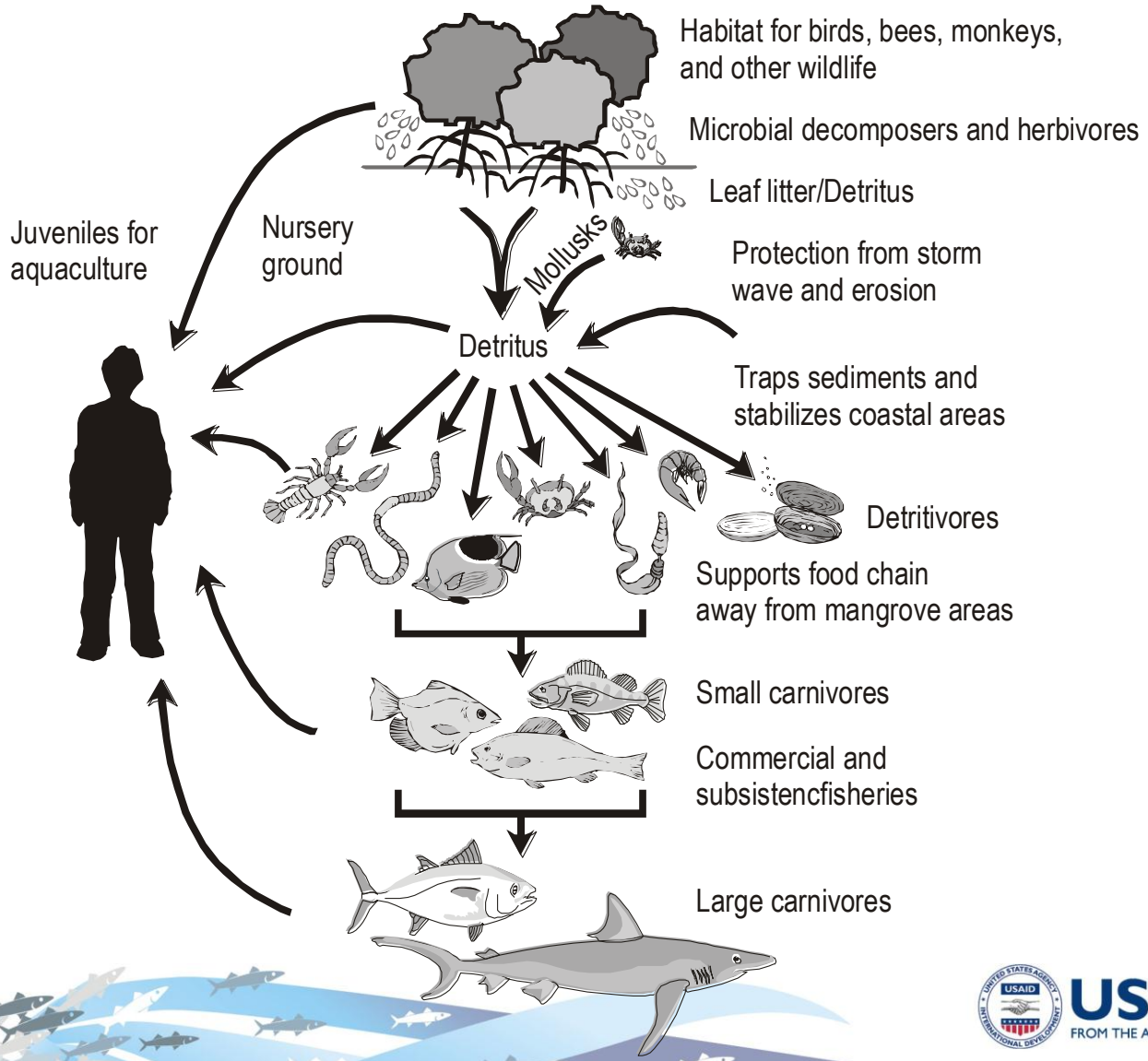
Mangroves and their ecological and economic benefits



Benefits to humans:

- Clean water
- Fish, shells, mollusks, etc.
- Medicines
- Tannins
- Wood (fuel and construction)
- Honey
- Alcohol
- Shore protection
- Research data
- Education
- Recreation/tourism
- Biodiversity

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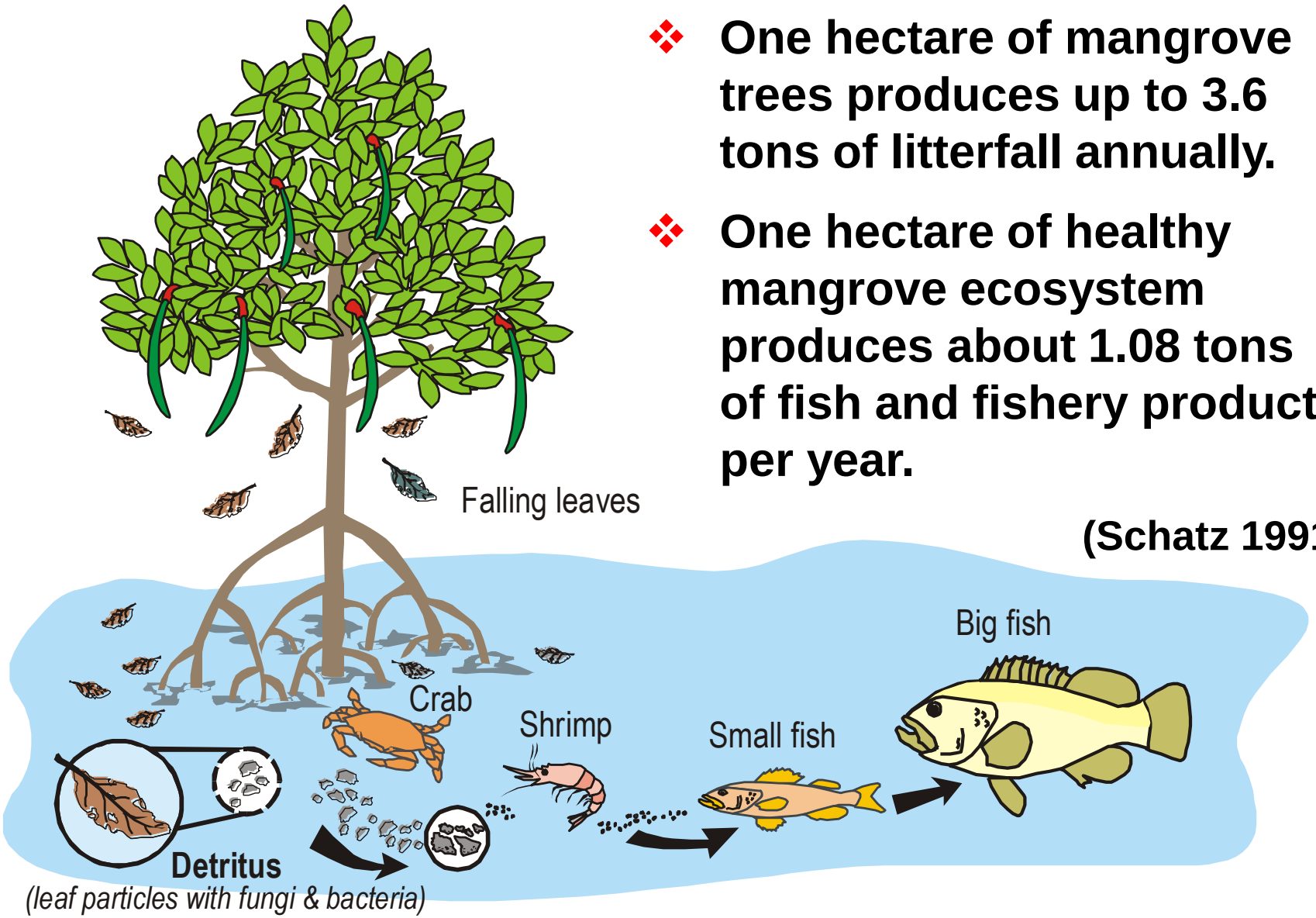

- **One hectare of mangrove trees produces up to 3.6 tons of litterfall annually.**
- **One hectare of healthy mangrove ecosystem produces about 1.08 tons of fish and fishery products per year.**

(Schatz 1991)

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Beaches are dynamic landforms which features are constantly being shaped through forces of wind and water.

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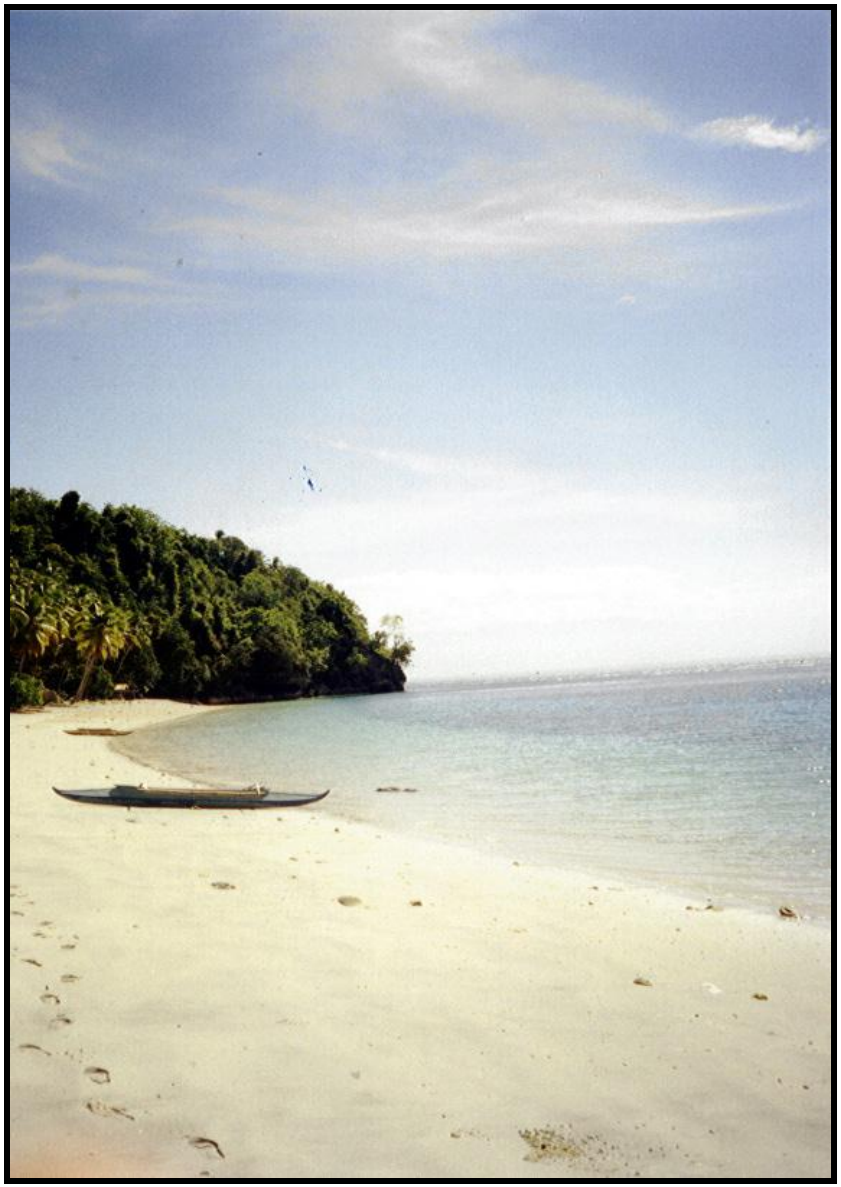

Undisturbed beaches also serve as nesting places for turtles. They also are the focal point of coastal tourism since many tourist activities depend on clean beaches.

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Seagrass beds are seed-producing marine plants that occur in shallow, nearshore waters, and are often found between coral reefs and mangrove areas, colonizing the soft, shallow and sandy-muddy bottom.

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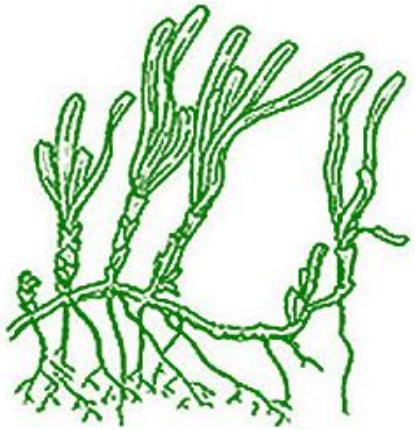
Seagrass

- Seagrass beds harbor a rich assemblage of marine organisms that all contribute to the important role of seagrasses in the marine ecosystem
- Seagrass beds support at least:
  - 172 species of fish
  - 46 species of invertebrate
  - 51 species of seaweeds
  - 45 species of algal epiphytes
  - 1 species of sea turtle
  - 1 species of Dugong

Types of seagrasses commonly found in the Philippines

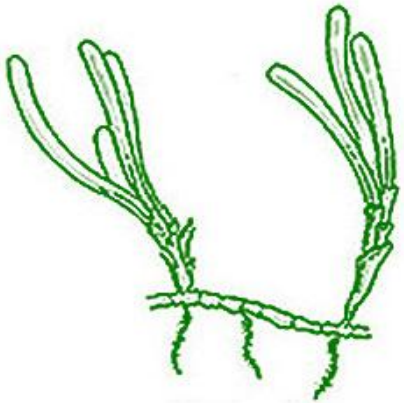


Cymodocea

Halodule

Syringodium

Halophila



Thalassia

Enhalus

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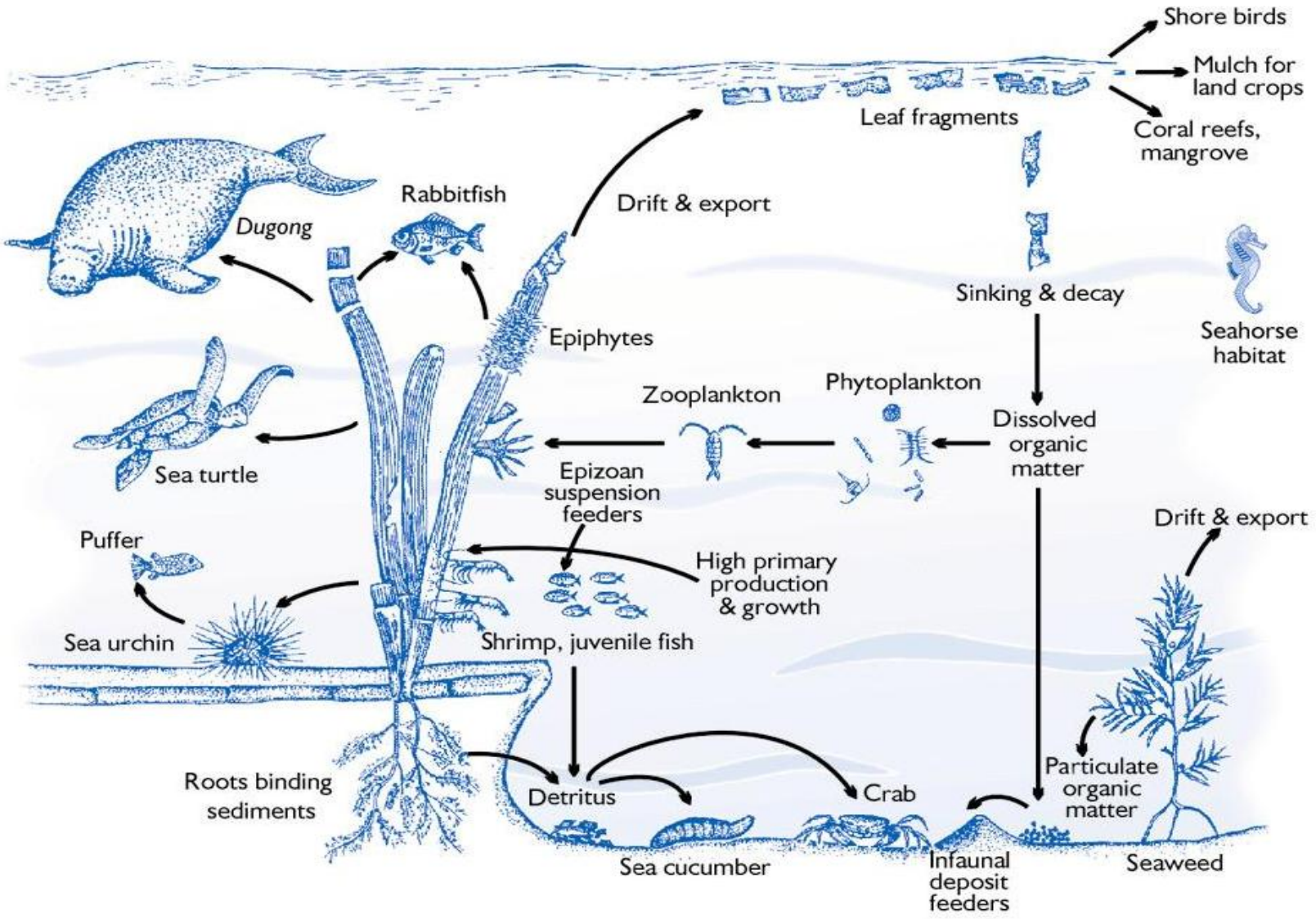
Food chain in Philippine seagrass ecosystems



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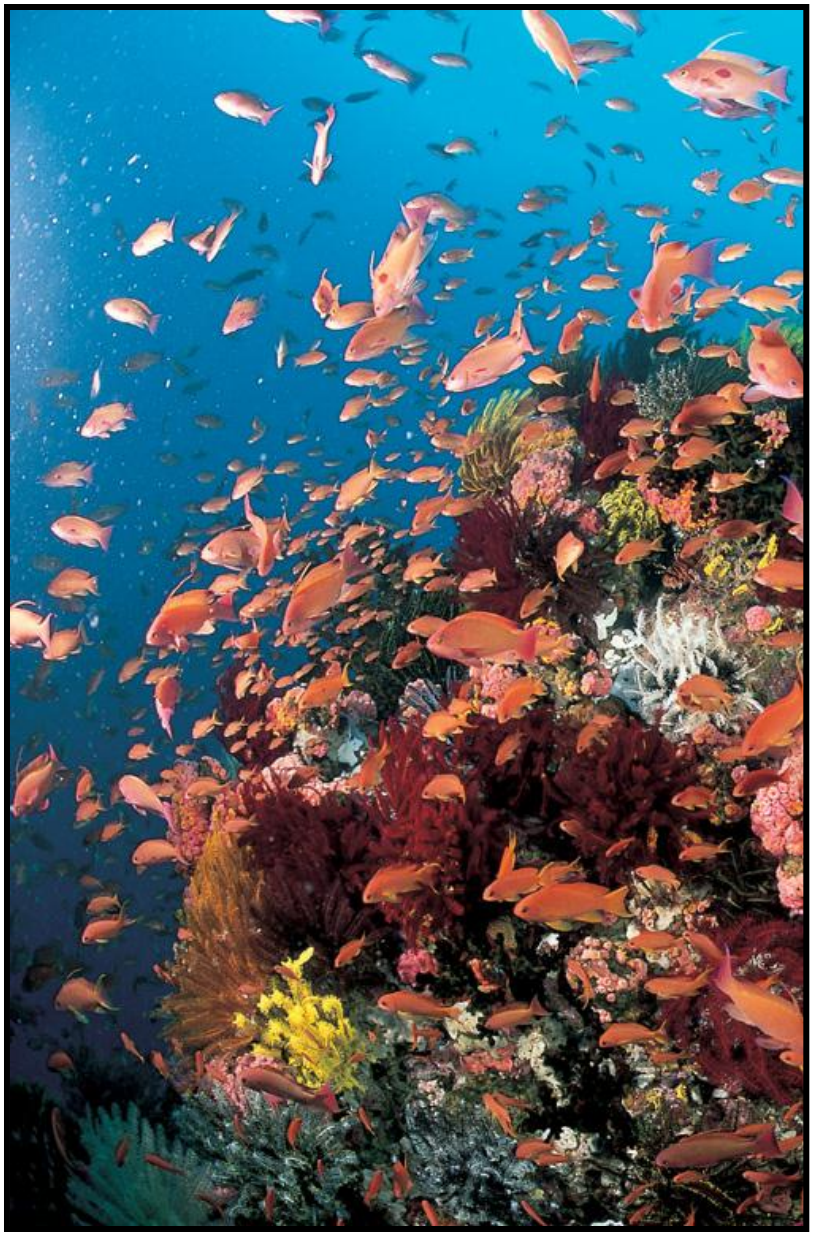

Corals are actually tiny animals called polyps that live in colonies underwater, either in patches or extensive reefs.

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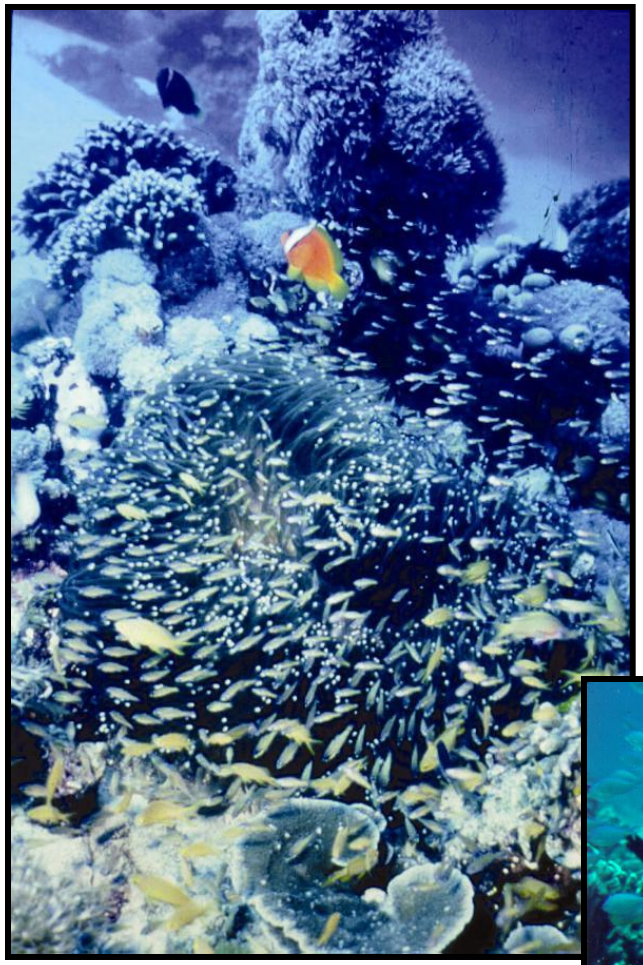

Each colony is composed of thousands of tiny polyps. Polyps secrete salivary calcium carbonate material that hardens to form the rigid structural mass of the reefs.

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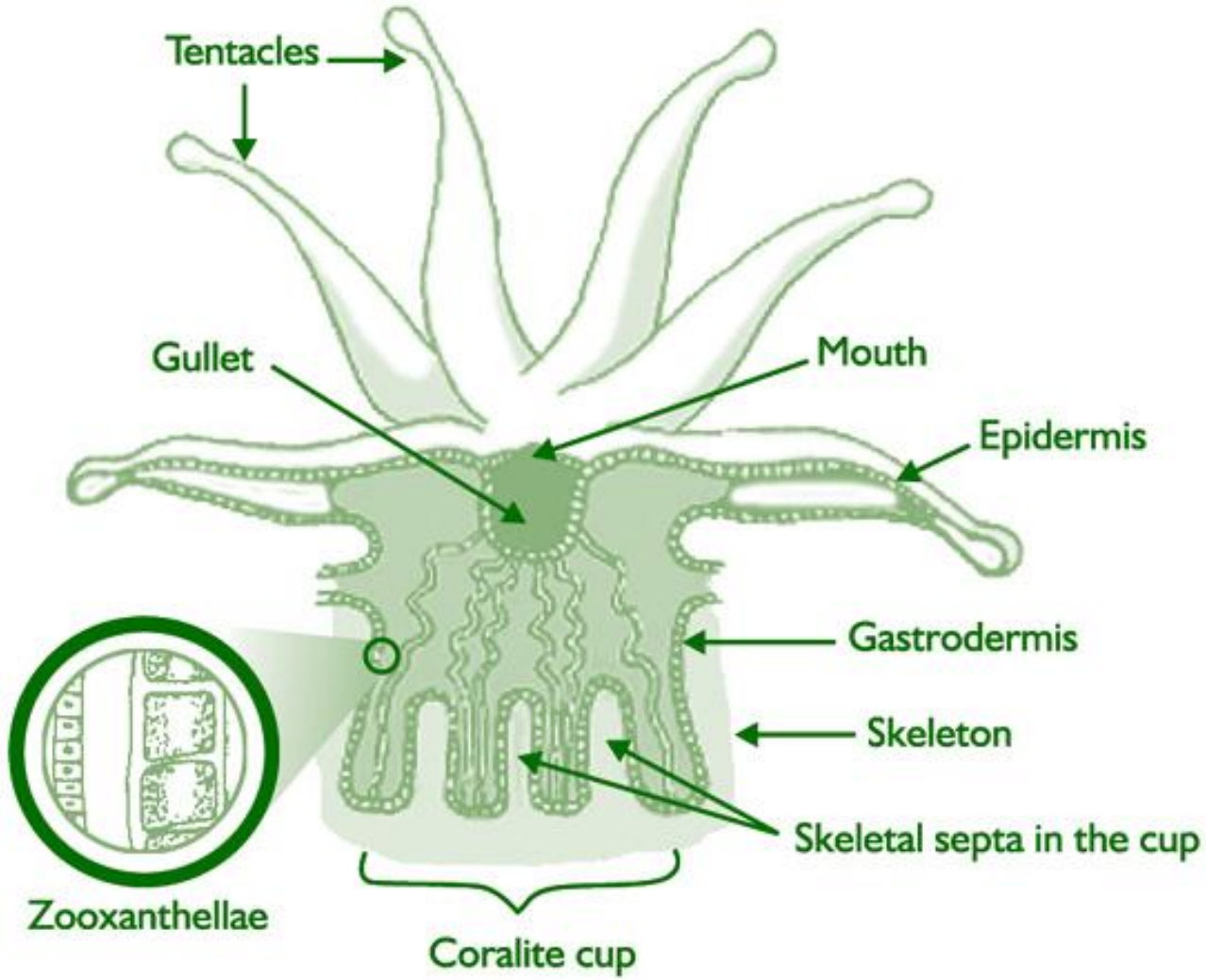
Parts of a coral polyp



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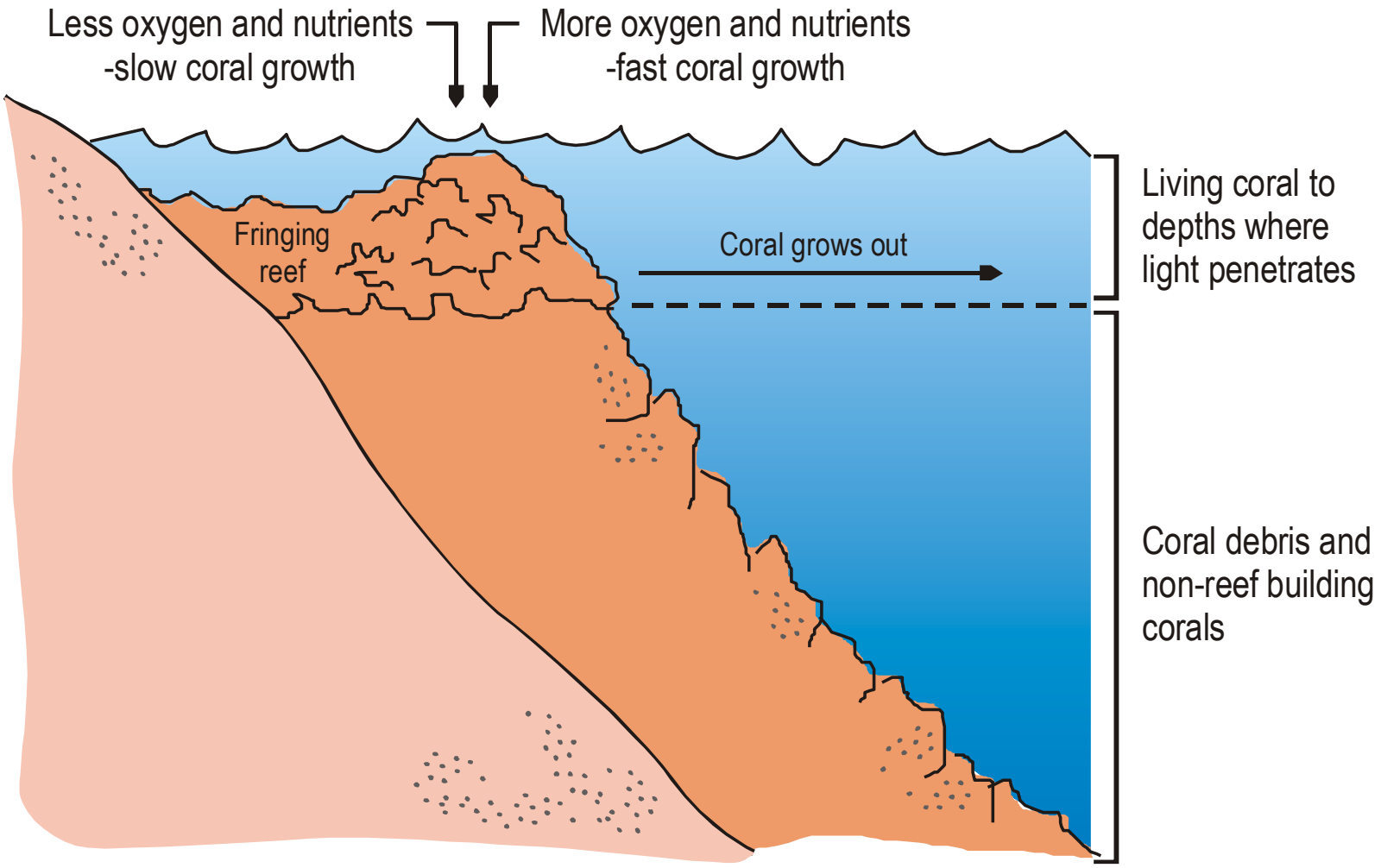
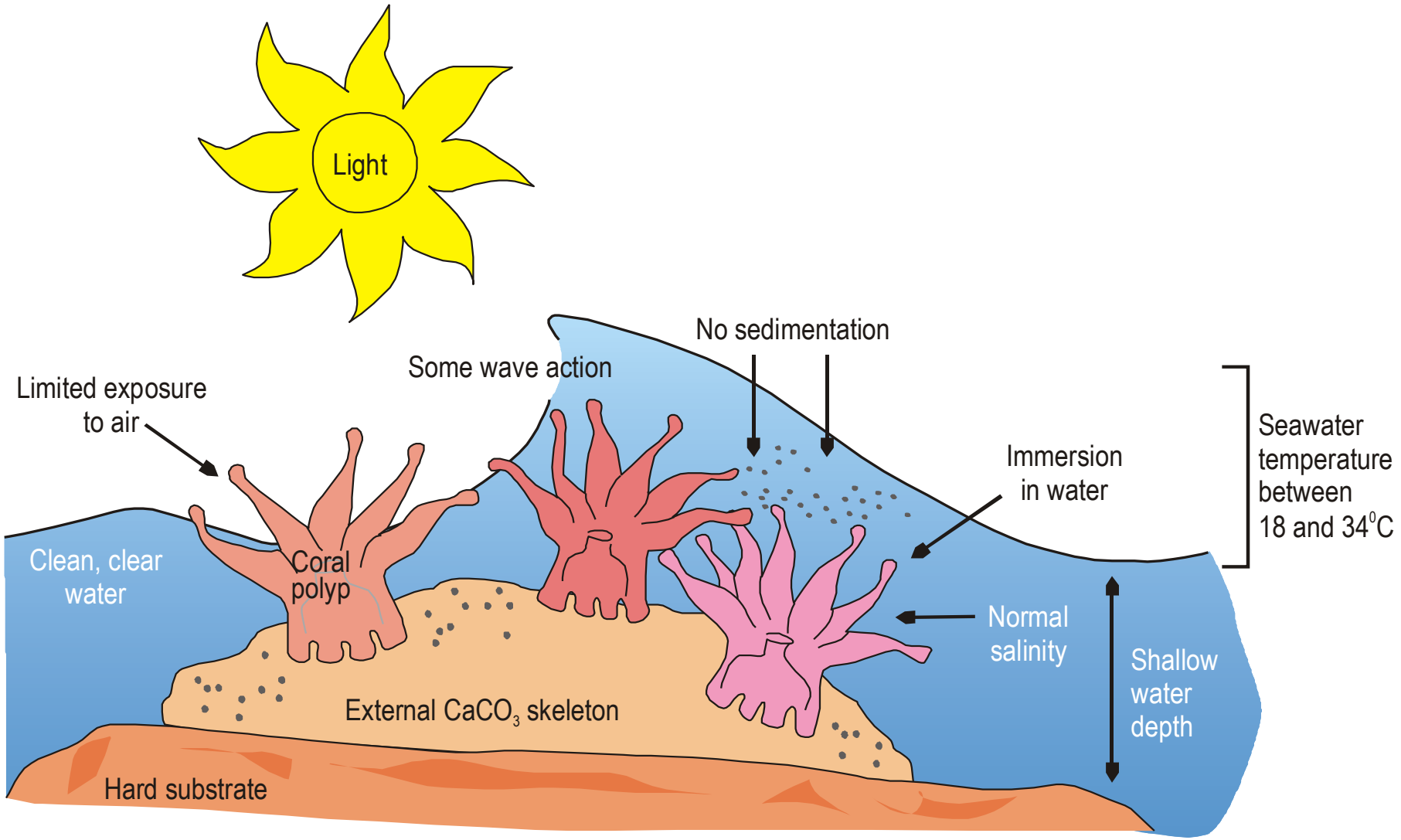
Formation of a typical fringing coral reef



The coral colony grows as one polyp buds off another polyp. The polyps build a united skeleton which gives the colony the strength to withstand waves and storms.

Requirements for healthy coral reef growth



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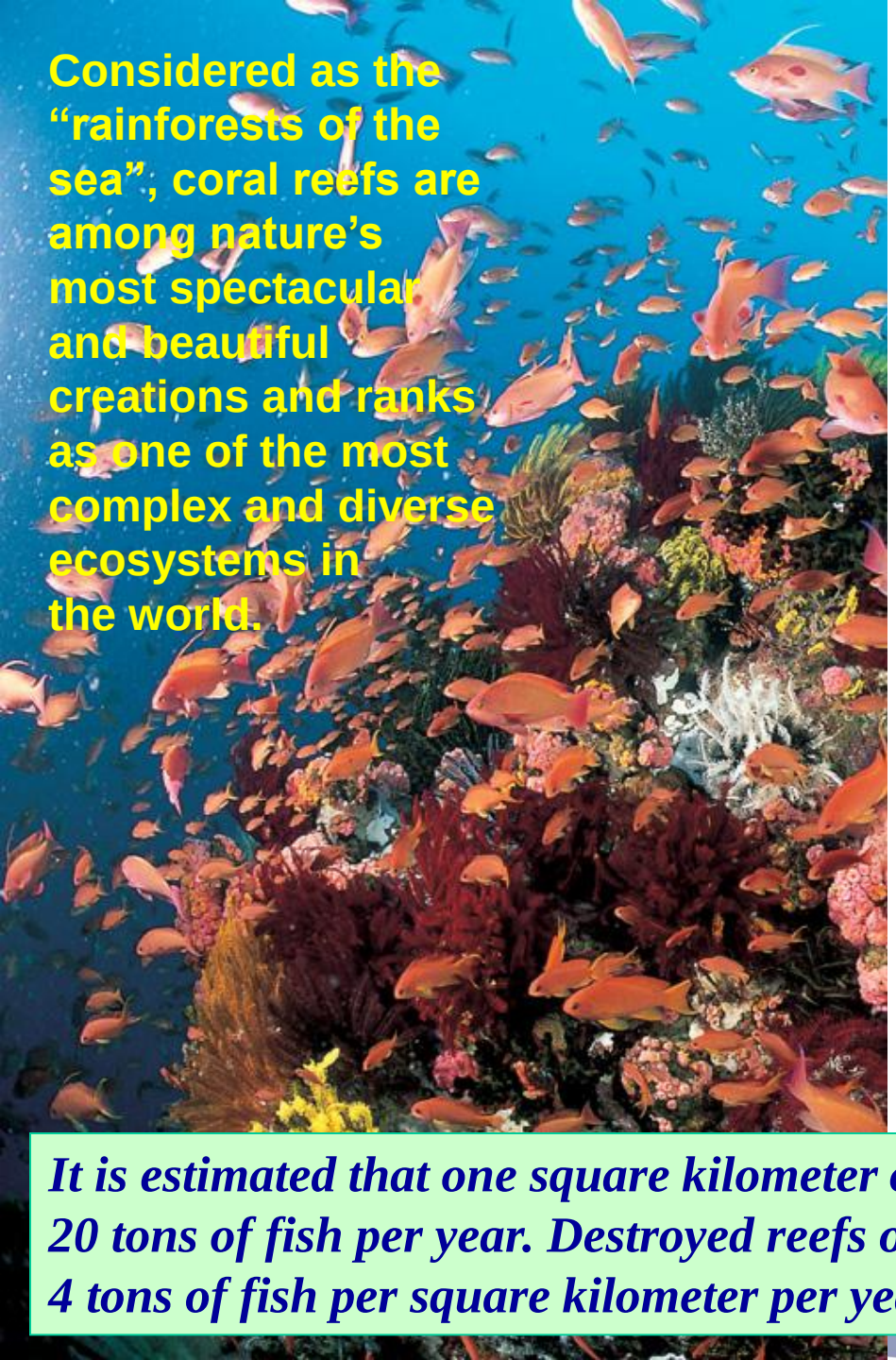

Philippine coral reefs host:

- more than 2,000 species of fish
- 5,000 species of clams, snails and other mollusks
- 488 species of corals
- 981 species of bottom-living algae
- thousands of other marine organisms

It is estimated that one square kilometer of healthy coral reefs can produce up to 20 tons of fish per year. Destroyed reefs on the other hand only produce less than 4 tons of fish per square kilometer per year.