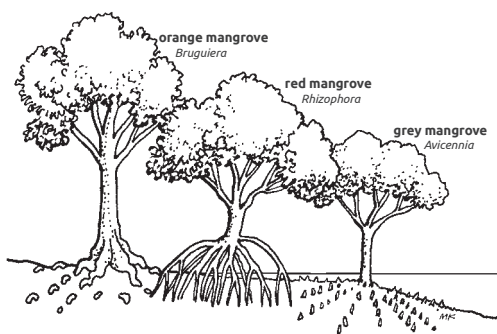


## What are mangroves?

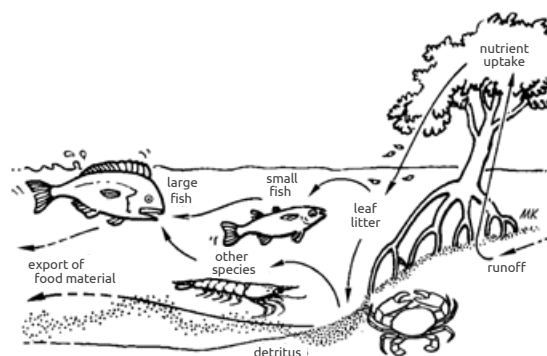
Of the many thousands of different species of trees, only about eighty can exist with their roots in salty water. These specialised but often unrelated trees that live at the edge of the sea are collectively known as mangroves.

As the trees grow in silty waterlogged soils, many have evolved exposed (or aerial) root systems that absorb oxygen as well as support the tree. In the illustration below, the orange mangrove has knee roots that stick up above the silt, the red mangrove has long prop roots that grow down from the trunk, and the grey mangrove has cable roots which send up small pegs or pneumatophores.

The number of mangrove species decreases from west to east across the Pacific — there are 33 different species of mangroves in Papua New Guinea, 25 in the Solomon Islands, 7 in Fiji, and 3 in Samoa. Mangroves do not occur further to the east in countries such as Cook Islands but they have been introduced into Hawaii and possibly Tahiti.



## Why are mangroves important?



In relation to the above figure, nutrients dissolved in water running off the land are taken up and used by mangroves. Each year one hectare of mangroves can produce over 18 tonnes of fallen leaves which rot away to form detritus — particles of material, that provide food for many animals, including worms, crabs and some fish. The holes of burrowing crabs allow oxygenated water to reach deep into the mud flats. These smaller animals provide food for many species of larger fish.

Mangroves are also important as nursery areas — places where the young of many marine species can grow in sheltered conditions with abundant food. Food material produced in mangrove areas is transferred to downstream systems and offshore by tides and by migrating fish.

The exposed roots of mangroves trap particles and sediments which gradually build up and extend shorelines. As the mangrove front slowly advances towards the sea, the newly-formed land behind the front fills up with other plants. Mangroves are effective at trapping sticky clumps of sediments mixed with nutrients (called flocs) that can smother small corals.

Mangroves also protect the land against sea level rises as well as from storms and cyclones which are predicted to become intense with global warming.







## How do mangroves reproduce and spread?

Insects and birds attracted to the flowers of some mangrove species transfer pollen from male to female reproductive parts; other trees may be pollinated by the wind. While still attached to the tree, the seeds sprout to form seedlings, or propagules, which fall into the water. These drift and those that settle in suitable shallow water become upright and sprout roots before growing into a new tree.

## Why are mangroves disappearing?

Half the world's mangroves have been lost in the last century. In Pacific Islands, mangroves are used for firewood and building materials. But most mangroves have been destroyed by reclamation and clearing land for housing development as well as by changes in water quality.

Coastal road construction, which has prevented the mixing of tidal seawater with nutrient-rich fresh water from the land, has also caused the loss of many mangroves. Rubbish dumps in mangrove areas have released oil and heavy metals into the sea; oil films have suffocated mangrove roots and heavy metals have reduced photosynthesis.



## How can we manage and protect mangroves?

To protect existing areas of mangroves, governments must limit coastal development and reduce pollution — the following actions are needed.

- Enact and enforce regulations to prevent the removal of, or damage to, existing mangroves.
- Ensure that pollution from rubbish dumps, farms and industry is minimised.
- Require an environmental impact assessment for all new development to ensure that disruption to coastal areas is minimised.
- Ensure that large pipes or tunnels are installed under coastal roads to allow the mixing of tidal seawater and freshwater runoff.
- Create buffer zones between coastal development and mangrove areas.

Coastal communities could safeguard mangroves by including them in a community-managed Marine Protected Area. Although protecting existing mangroves is the most urgent task, it may be desirable to restore an area by planting mangrove seedlings. However the following questions should be considered before starting a restoration programme.

- Why are there no mangroves in the area at present? Is the area unsuitable? Are the waves and currents too strong? If so, the planting of mangrove seedlings is likely to fail.
- If there were mangroves in the area before, why did they disappear? Were they cleared? Or else, what conditions caused them to die? Can conditions be improved?
- Why hasn't the area recovered naturally by seedlings drifting to the area? Are the currents unfavourable or have they changed? Or are conditions not right for mangroves?

Approval from local government authorities may be necessary for a community to undertake the planting of mangrove seedlings. Advice can be sought from local authorities, NGOs or regional organisations.

The protection and restoration of mangrove areas may be supported by communities allowing fee-paying tourists to view mangroves from canoes or from special boardwalks built through mangrove areas.