PACIFIC YEAR OF CLIMATE CHANGE 2009

Factsheet

Coral Reefs & Climate Change

What are Coral Reefs?

Coral reefs are created by millions of tiny polyps, which are soft bodied animals without a backbone. They form large carbonate structures by extracting calcium from surrounding seawater. This is used to create a hardened framework for protection and growth as well as the foundations for homes of hundreds of thousands, if not millions, of other species.

Covering less than one percent of the ocean floor, reefs support an estimated twenty-five percent of all marine life including over 4,000 species of fish.

Reefs provide spawning, nursery, refuge and feeding areas for large varieties of organisms. These organisms include sponges; worms; crustaceans such as shrimp, spiny lobsters, and crabs; molluscs; echinoderms such as starfish, sea urchins and sea cucumbers; sea squirts; sea turtles and sea snakes.

Why are Coral Reefs important?

Healthy reefs sustain the lives of many Pacific islanders. More than 80% of Pacific islanders live in or near coastal areas and draw from coral reefs for their livelihoods.

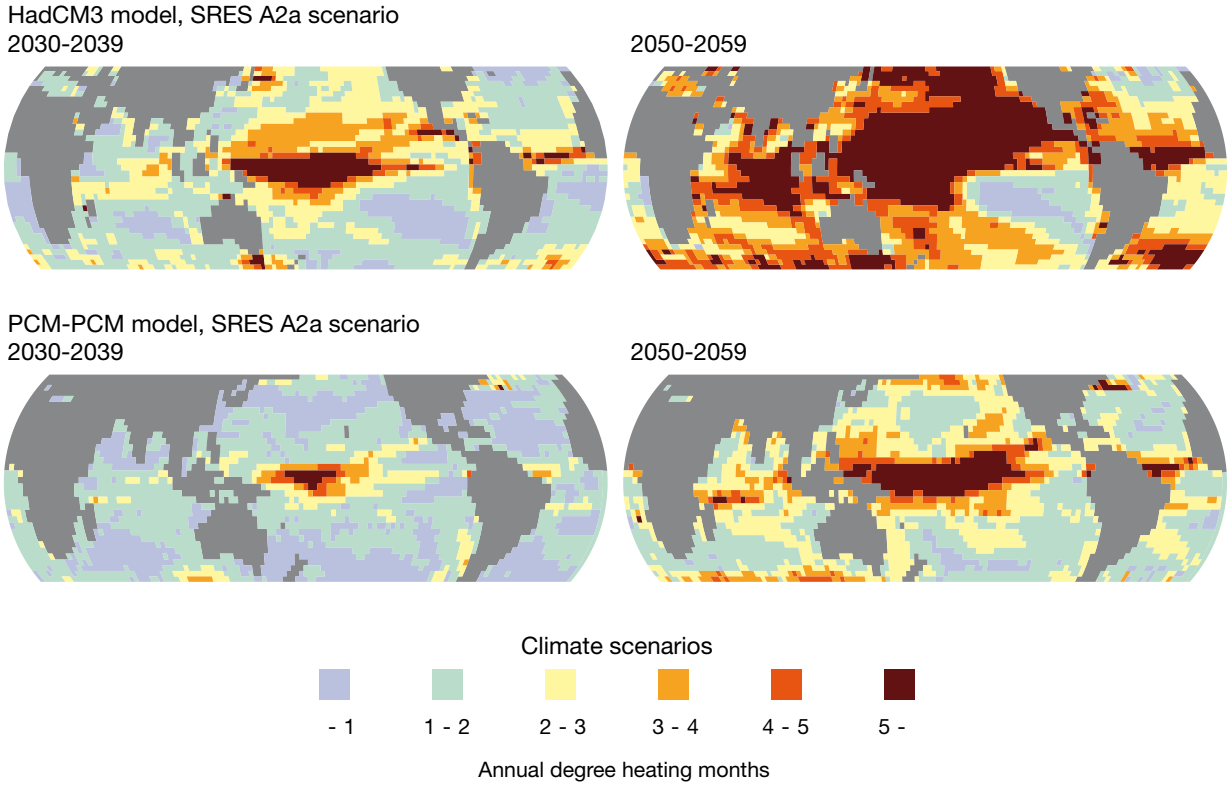
Reef structures also play vital roles as natural breakwaters, minimising wave impacts during storms and cyclones. The stronger our reefs, the greater the protection of our island homes.

How will climate change affect our coral reefs?

Major impacts are already being felt through the warming of oceans causing coral bleaching. The seawater temperature is a critical factor for coral reefs. Coral reefs usually tolerate temperatures ranging from 20 to 30°C. In the Pacific, most corals live in waters of 26-29°C. This means that even a slight rise in temperature can impact on them.

Tropical sea temperature rises and coral reefs - climate change scenarios

Graphic by Hugo Ahlenius of http://maps.grida.no/go/graphic/tropical-sea-temperature-rise s-and-coral-reefs-climate-change-scenarios



Tropical sea temperature rises and coral reefs - climate change scenarios. The impacts of coral reefs from rising sea temperatures. When coral reefs become heat-exposed they die, leaving the white dead coral, also known as bleaching. With even moderate pollution, the coral are easily overgrown with algae, or broken down by wave activity or storms, leaving only "coral rubble" on the ocean bed.

When the sea becomes warmer, the coral polyp expels its symbiotic algae (zooxanthellae). The zooxanthellae is what gives colour and provides food to the coral. Without this the coral turns white, which is known as coral bleaching. The bleached coral will continue to feed by itself but it cannot live long without the food contribution of the zooxanthellae.

If the zooxanthallae fails to grow back, this "bleached" coral eventually dies. When a coral is dead, it slowly loses this bright white colour, turns grey and tiny thread-like algae start to grow on it. If there are many fish, the fish eat this algae and help keep the reef alive. If the fish population is low, the algae take over and the reef dies permanently.

Scientists are forecasting a seawater temperature rise between 1-2°C by 2100. Corals are already experiencing many bleaching events which is likely to increase in the future. Coral reefs take between 5 and 25 years to recover from a bleaching or a storm. If bleaching becomes more frequent, coral reefs will not have time to recover and will disappear.

However, scientists have also observed that certain corals and healthy reefs can resist higher temperatures than others. Keeping reefs in healthy conditions therefore may be the best way to deal with the impacts of warming oceans.

Higher Carbon dioxide concentration

Carbon dioxide from the atmosphere naturally dissolves in water to produce carbonic acid. As more carbon dioxide is produced by human activities, more of it is dissolved in the ocean making the ocean more acidic. This process is called ocean acidification. Corals are made of lime (calcium carbonate), which dissolves in the carbonic acid. Hence, as the ocean becomes more acidic, corals stop growing normally and ultimately could stop growing altogether.

Ocean acidification is a very recent theory and many experiments are currently under way to learn more about the extent of this phenomenon and its impacts on coral reefs.

How can we maintain the health of our coral reefs?

- Take only what you need and use what you take
- Avoid building pigpens and toilets on the shoreline
- Don't stand or walk on coral
- Do not poke or prod animals and plants
- Tread carefully when walking, swimming, snorkelling and boating on and around coral reefs
- Use only a line or net to fish, not dynamite or poison. If using a net, make sure the mesh is not too small to prevent undersized fish being caught
- Observe traditional customs that have been established to help manage the reef
- Support and respect Marine Protected Areas and sanctuary areas
- Return undersized or unwanted fish to the water immediately, to minimise injury or damage
- Help promote the value of coral reefs as protection against the effects of climate change

Strong reefs, strong islands

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Coral reef photo from F.Mazeas, poster image from Ivan Lei Sam of Samoa

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