***What does it mean to say a coral reef (or a system of many coral reefs) is "resilient"?***

A scientific definition of resilience: *"the capacity of a system to absorb disturbance and reorganize while undergoing change so as to maintain essentially the same functions, structure, identity and feedbacks" (Folke et al 2004; cited in Tett et al 2013).*

***What "resilience" means for a coral reef.***

"Resilience" signifies that a reef may withstand damage or, given sufficient time, recover well enough from a disturbance to sustain substantial ecological function.

"Resilience" does not imply a direct or immediate return of a reef to its original condition. Reefs are likely to be changed by each significant disturbance; even fast-growing corals take years even decades to recover, while slow growing coral may need centuries.

There are also limits to resilience: many reefs are failing to recover as they once did.

***High and low resilience.***

A resilient (healthy) coral reef, for example, can regenerate after a disturbance (given enough time before the next one) to a point where it can continue to support a high variety of species – not only corals but also reef-building algae and micro-organisms, fish, sharks, molluscs, worms, seabirds to name a few.

A reef with low resilience is unlikely to regenerate quickly enough after a disturbance, such as mass coral bleaching, before the next disruption, and may instead continue to degenerate. Degraded reefs can remain in a poor condition for periods of decades even centuries.

***Building resilience.***

Building resilience of a coral reef means removing the pressures on the reef that prevent or slow recovery, particularly those caused by human activity, without further delay.

On a regional and local scale, building resilience means improving water quality running off the land; ensuring the necessary protection of marine protected areas so that fish and other important species remain as abundant as possible; and the culling pest species such as the crown of thorns starfish.

These local interventions will be most effective when the growing risk to reefs of global (ocean) warming is greatly reduced.

***Facing up to the cause.***

Global warming is already a pervasive and persistent driver of heat stress on coral reefs with consequential bleaching and coral death.

It is critical that the emission of $CO_2$ and other greenhouse gases is reduced as soon as possible, and on a global scale.

Without a substantial reduction in global emissions to an extent that there is a chance to keep the average temperature increase to the low end of the Paris agreement (1.5ºC), reef ecosystems on the planet are dangerously likely to fail or collapse.

*References:*
*Tett, P et al 21 authors (2013) Framework for understanding marine ecosystem health. Marine Ecology Progress Series 494: 1-27.*

*Folke, C et al 7 authors (2004) Regime shifts, resilience, and biodiversity in ecosystem management. Annual Review of Ecology, Evolution, and Systematics 35: 567-581.*