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## Seagrasses can offset climate change



Seagrasses (above) are found in coastal waters all over the world, apart from at the poles. PHOTO: SITI MARYAM YAAKUB

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### Plants can store 35 times more carbon than rainforests; S-E Asian varieties more resilient



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The verdant meadows of the sea are up to 35 times better than rainforests at storing carbon and are nurseries for all manner of marine creatures. Yet, about 40 per cent of the world's seagrass may have been lost due to human activity.

Found in coastal waters all over the world, apart from at the poles, seagrasses play a part in mitigating climate change by burying carbon under the seabed for up to thousands of years.

Such carbon, stored in coastal ecosystems like seagrass meadows, is often referred to as blue carbon.

And this potent ability to mitigate climate change is helping to drive conservation efforts for seagrass, said Dr Siti Yaakub, a marine ecologist at the environmental consultant company DHI Water & Environment.

Ms Samantha Lai, a PhD student at the National University of Singapore (NUS) who is studying the resilience and restoration of seagrass in Singapore, said: "At the global level, seagrass conservation efforts consist of monitoring seagrass meadows by student scientists or researchers... restoring areas of degrading meadows by planting seagrass seeds or shoots... and by protecting areas from impact or destruction."

While much of the world's seagrass has been lost, there is a silver lining. Recent research done by local scientists, including Dr Siti, and Australian collaborators found seagrasses in parts of South-east Asia - including Malaysia, Thailand, Indonesia and Singapore - to be resilient to natural and man-made stressors.

## Environmental and economic benefits

### SEAGRASS ECOSYSTEMS

Despite their name, seagrasses are flowering plants that can be found all over the world in shallow coastlines, except for the poles.

They form extensive beds or meadows, which can consist of only one species of seagrass or multiple species in mixed beds. There are about 60 known seagrass species, with the highest number found in the tropics.

Seagrass meadows can reduce the amount of bacteria that can cause disease in humans and marine life such as corals. A 2003 study found that chemicals from seagrass tissue can kill or stop the growth of bacterial pathogens that affect humans, fish and invertebrates.

Seagrasses also provide shelter and food for a wide range of animals, including fish, crabs, sea turtles, dugongs, birds and tiny invertebrates.

### BLUE CARBON STORAGE

Seagrasses can bury organic carbon, often referred to as blue carbon, into the seabed.

Although seagrass meadows occupy less than 0.2 per cent of the area of the world's oceans, scientists estimate that these meadows bury roughly 10 per cent of organic carbon in the oceans each year.

While tropical rainforests can store carbon for decades, seagrass ecosystems are capable of storing carbon for millennia, and at a rate 35 times faster than rainforests can.

## **SUPPORT OF GLOBAL FISHERIES**

Seagrass meadows support fisheries and so are important for seafood supply.

In the Indo-Pacific, 746 species of fish are known to depend on seagrass meadows. The species of fish associated with seagrass contribute to both industrial and small-scale fisheries.

Dr Siti said: "We found that the meadows in this region are very genetically diverse. This means they are resilient to stressors like climate change, disease and all kinds of anthropogenic stressors (such as land reclamation, which destroys the habitat for seagrasses)."

Their genetic diversity is also good news for the marine life that depends on it, noted Ms Lai.

Were seagrasses to disappear, coastal sediments could erode and this erosion would not only negatively affect environments upland such as mangroves, but also environments further down, such as corals, she pointed out.

If the plants lack such diversity, then people run the risk of a "massive die-out", Dr Siti added.

One question that marine ecologists cannot answer for sure is how much seagrass there is overall, especially in South-east Asia. "There are pockets (of research done) in South-east Asia, where there's a lot of information, but for the vast region, it's a big data gap, a big black hole of no information," Dr Siti said.

To help plug this, more than 200 seagrass researchers, students and managers from non-profit organisations have gathered in Singapore for the World Seagrass Conference and the 13th International Seagrass Biology Workshop (ISBW) to share their research and engage the public. The meetings, which began on Monday and will end on Sunday, are organised by the DHI Group, the National Parks Board and NUS.

In line with the theme of translating science into action, there will be a two-hour public talk today at UTown at NUS at 7pm, featuring seagrass researchers from Australia, Malaysia and Sweden.

Members of the public can register for the talk for free at the ISBW website ([www.isbw13.org](http://www.isbw13.org)).

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