

Young Reporters for the Environment National Competition 2023/24

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Theme:	Climate Change
Sub-topic:	Seaweed Farming

Relevance of submission to UN's Sustainable Development Goals (SDGs)

SDG 13: Climate Action

Seaweed farming can potentially mitigate climate change by absorbing carbon dioxide from the atmosphere during growth. Additionally, it can be used in the development of biofuels, reducing reliance on fossil fuels.

SDG 14: Life Below Water

Seaweed farming can also help promote the sustainable use of ocean resources, conserve marine biodiversity, and reduce ocean acidification. It also contributes to the protection and restoration of marine ecosystems.

SDG 2: Zero Hunger

Seaweed can be used as both food for humans and feed for animals. This contributes to food security and provides nutrition to communities, especially in coastal areas where other crops may not thrive.

SDG 8: Decent Work and Economic Growth

Seaweed farming provides employment opportunities, particularly in coastal communities, contributing to economic growth and poverty reduction.

Dissemination

A blog (<http://tiny.cc/WhySeaweedFarming>) to raise awareness on seaweed farming was created and disseminated within the Google survey form with an invitation for survey respondents to find out more.



SEAWEED FARMING – TURNING THE TIDE ON CLIMATE CHANGE

Amidst increasing environmental concerns and challenges faced by Singapore and the world, seaweed farming has emerged as a sustainable solution that not only mitigates the impact of climate change but also addresses the issues of environmental pollution and loss of biodiversity.

Could this be the silver bullet environmentalists have been searching for?

Climate change and its threats to our oceans

Climate change is one of the most pressing challenges faced. It is driven by the burning of fossil fuels, producing greenhouse gases that trap the heat from the sun and increases global temperatures. This affects temperatures and weather patterns, which leads to adverse outcomes on food production, flooding due to rising sea levels [1], and even disruptions to marine life [2].

The oceans have absorbed 90% of the heat generated by increasing greenhouse gas emissions, causing rising sea levels, ocean acidification, coral bleaching and the loss of marine biodiversity [3], among others.

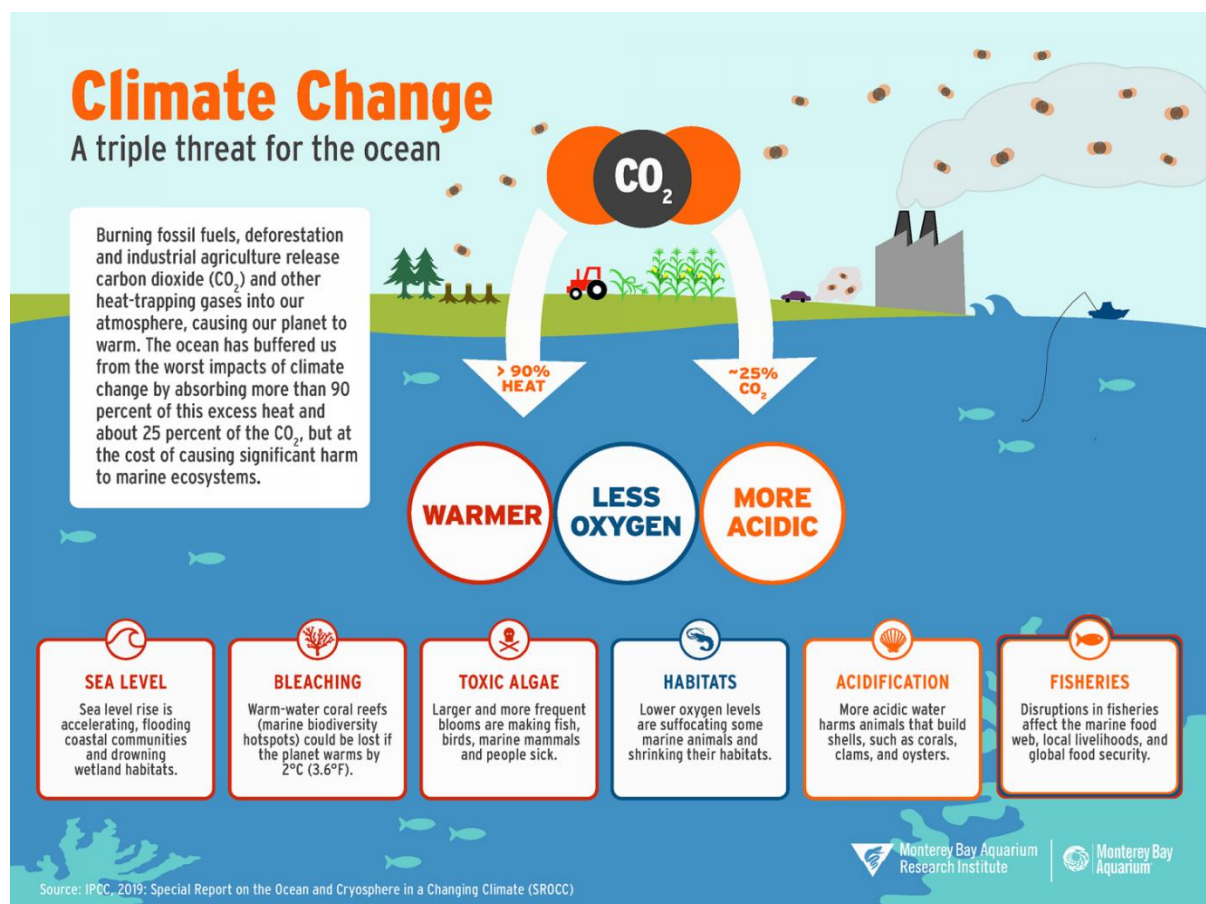


Figure 1. Impact of greenhouse gases on our oceans.
(Source: Monterey Bay Aquarium Research Institute [4])

Threat (1): Rise in sea levels

According to the World Meteorological Organization, the annual rate of increase in sea levels has more than doubled over the past 3 decades. Furthermore, the rise in sea levels has been associated with the increased occurrences of coastal hazards such as flooding and landslides, and will impact 2.68 billion people who live in coastal areas, including the coastal city state of Singapore [3].

Threat (2): Ocean acidification

Our oceans absorb a third of the carbon dioxide in the atmosphere. With more carbon dioxide absorbed by our oceans, the acidity of the oceans increased by 25% compared to the pre-industrial revolution period. Ocean acidification results in less calcium carbonate in sea water which is needed by sea creatures to build and maintain their shells and skeletons [5].

Threat (3): Coral bleaching and loss in marine biodiversity

Warm temperatures of the sea water cause coral reefs to expel microscopic algae, also known as coral bleaching. Prolonged exposure to warm waters and coral bleaching will cause the coral reefs to die eventually, leading to deterioration of entire reef ecosystems. This in turn poses a threat to the existence of marine species that depend on these coral reefs for survival [7].

Seaweed farming as a ‘silver bullet’ to fight climate change?

According to the Intergovernmental Panel on Climate Change, to avoid severe impact of climate change in the future, countries would have to halve greenhouse gas emissions by 2030 [1]. As carbon dioxide accounts for two thirds of greenhouse gases [1], seaweed farming helps to fight climate change by capturing and storing carbon dioxide from the atmosphere through photosynthesis. This also results in the reduction of ocean acidification [8].

By cultivating seaweeds in Singapore's coastal waters, we can contribute to global efforts to combat climate change while enhancing the resilience of our marine ecosystems.



Figure 2. Seaweed is an invaluable resource in our fight against climate change.

(Source: Fortune [12])

Weeding out environmental pollution in Singapore

Environmental pollution poses significant challenges to Singapore's coastal waters and ecosystems worldwide. Agricultural activities, urbanisation, and industrialisation contribute to nutrient pollution, leading to harmful algal blooms and degradation of marine habitats. Seaweed farming offers a natural solution to mitigate nutrient pollution and restore ecological balance in marine environments.

To work towards Singapore's aquaculture goals, a delegation of government officials and academics recently visited Australia [9] to learn best practices as part of its move towards achieving food security [10]. They learnt how nutrient pollution caused by uneaten fish feed and waste, which affects water quality and the yield of fish produced, can be mitigated by the farming of seaweeds near fish farms.

Moreover, seaweeds have an impressive ability to absorb excess nutrients, including nitrogen and phosphorus. By locating seaweed farms in nutrient-rich waters, nutrient concentrations can be reduced and water quality improved. The improvement in water quality will not only positively impact the fish farms but also local marine life, seagrass and corals.

Not all that 'glistens' is gold

While glistening ribbons of seaweed may bring benefits, if not properly managed, they may exacerbate the loss of biodiversity by altering habitats and disrupting ecological processes. However, with careful planning and sustainable practices, seaweed farming can contribute to biodiversity conservation and habitat restoration.

The strengths, opportunities, and weaknesses of seaweed farming are summarized in Figure 3.

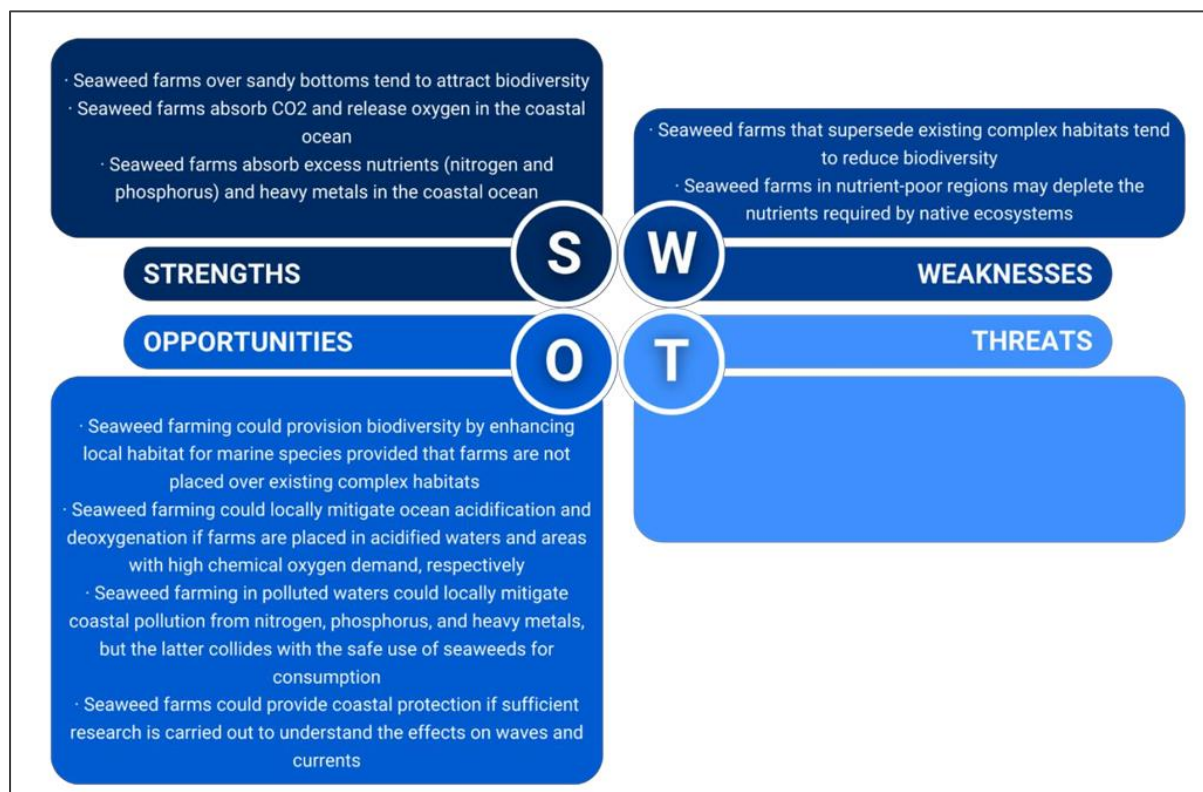


Figure 3. A SWOT analysis of seaweed farming.

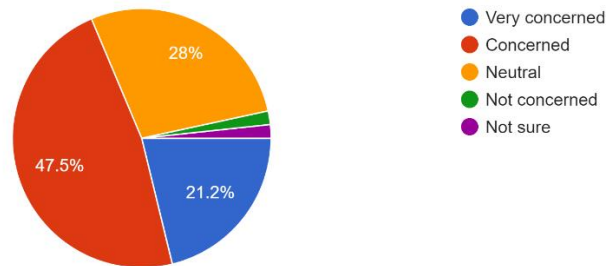
(Source: UN environment programme 2023 report [11])

Survey findings

A survey¹ was conducted to understand Singaporeans' awareness and attitudes towards seaweed farming. The following are key survey findings from 118 respondents.

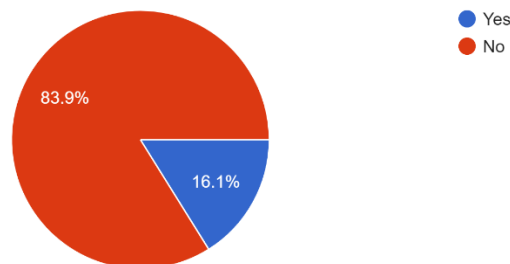
- About **7 in 10 (68.7%)** were **concerned about the threat of climate change** to the local marine ecosystems.

How concerned are you about the threats of climate change to marine ecosystems in Singapore?
118 responses



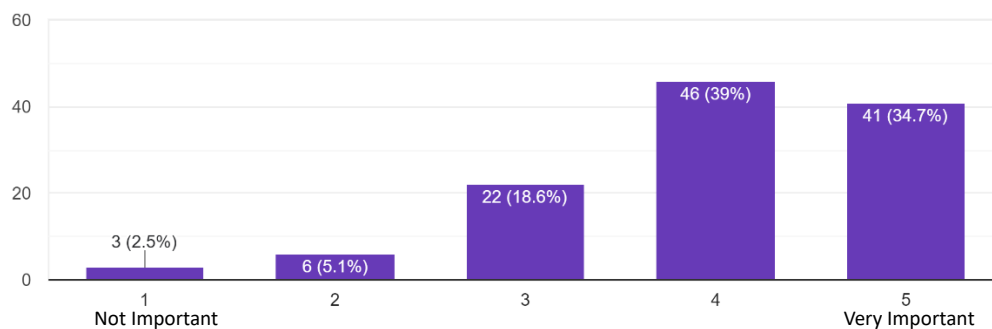
- However, **8 in 10 (83.9%)** have **not heard** of seaweed farming.

Have you heard of seaweed farming as a solution to mitigate climate change effects on oceans?
118 responses



- After learning about the seaweed farming and its benefits, **7 in 10 (73.7%)** think it is **important** for Singapore to support seaweed farming efforts.

How important do you think it is for Singapore to support seaweed farming initiatives?
118 responses

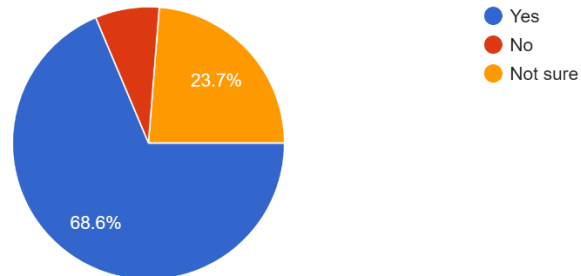


¹ The online survey form can be found at <https://forms.gle/tPYBqtPURdggMwXo6>

- About **7 in 10** (68.6%) said they would support efforts to promote seaweed farming.

Would you support efforts that promote seaweed farming to help reduce the threats of climate change?

118 responses



The survey revealed that while awareness of seaweed farming was low initially, there was a good amount of support for seaweed farming initiatives after learning about its potential benefits. This highlights the importance of education and awareness-raising in fostering support for seaweed farming as a climate change solution.

What part can we play?

- 1. Increase public awareness:** Raise awareness among the public about the environmental benefits of seaweed farming and the importance of sustainable seafood consumption.
- 2. Encourage community participation:** Encourage others to actively participate in seaweed farming and other marine conservation initiatives.
- 3. Support seaweed farming:** Purchase products from seaweed farmers to support efforts to continue sustaining seaweed farming.

Turning the tide

Seaweed farming is an exciting solution to fight climate change. It offers a natural and sustainable solution to reduce greenhouse gas emissions and mitigate the effect of climate change on our oceans. As increasingly more countries harness the potential of seaweed farming, we too can ride the wave and turn the tide against climate change, and build a more sustainable future for generations to come.

References

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