

Carbon dioxide mitigation potential of seaweed aquaculture beds (SABs)

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Abstract Seaweed aquaculture beds (SABs) that support the production of seaweed and their diverse products, cover extensive coastal areas, especially in the Asian-Pacific region, and provide many ecosystem services such as nutrient removal and CO₂ assimilation. The use of SABs in potential carbon dioxide (CO₂) mitigation efforts has been proposed with commercial seaweed production in China, India, Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Thailand, and Vietnam, and is at a nascent stage in Australia and New Zealand. We attempted to consider the total annual potential

of SABs to drawdown and fix anthropogenic CO₂. In the last decade, seaweed production has increased tremendously in the Asian-Pacific region. In 2014, the total annual production of Asian-Pacific SABs surpassed 2.61×10^6 t dw. Total carbon accumulated annually was more than 0.78×10^6 t y⁻¹, equivalent to over 2.87×10^6 t CO₂ y⁻¹. By increasing the area available for SABs, biomass production, carbon accumulation, and CO₂ drawdown can be enhanced. The conversion of biomass to biofuel can reduce the use of fossil fuels and provide additional mitigation of CO₂ emissions. Contributions

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