

## Protect and regulate China's oyster resources

Oysters are widely appreciated for their taste and nutritional value. Natural oyster reefs play important roles in coastal ecosystems, including water purification, habitat provision and shoreline stabilisation (1). However, oyster stocks are declining and their aquaculture is increasing around the world, especially in China (2).

China has at least 30 oyster species (3). All provide valuable ecosystem services. Their filter feeding habit reduces suspended particles and nutrients. One hectare of oyster reef can clean water equivalent to nearly 15 Olympic swimming pools daily (4). Oysters' excrement can stimulate denitrification by removing nitrogenous organic matter helping mitigate eutrophication (5). Natural oyster reefs provide habitat for many species, enhancing biodiversity and increasing fisheries. Oyster reefs can reduce impacts of waves caused by hurricanes and typhoons, stabilizing shorelines.

Despite their ecological importance, 85% of oyster reefs globally have been degraded since the 19<sup>th</sup> century by over-harvesting, coastal development, water pollution and disease (1). China's oyster reefs, especially those in Tianjin and Jiangsu (6, 7) have been seriously damaged during recent decades.

Extensive degradation of natural oyster reefs has been accompanied by rapid development of oyster aquaculture driven by high profitability. China's oyster farming accounts for over 80% of global production and covers more than 1400 km<sup>2</sup> (8). However, less than 10% of oyster farmers have aquaculture licenses or permits (9). Poor water quality management within large aquaculture developments contaminates oysters with heavy metals, organohalogenes, and viruses. Very high cadmium (0.5 mg/kg), lead ( $8.10 \times 10^{-2}$  mg/kg), inorganic arsenic ( $8.40 \times 10^{-2}$  mg/kg) and polychlorinated biphenyl (PCB) ( $1.36 \times 10^{-3}$  mg/kg) concentrations now occur in South China oysters (10). Notably, inorganic arsenic and PCB pose carcinogenic risks.

The COVID-19 pandemic highlights the importance of ecological conservation and natural oyster reefs need stronger protection. Effective regulation for sustainable development of aquaculture must include exclusion of polluted waters and depuration procedures.

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