

Strategic Approaches to CO₂ Sequestration Using Harvestable Algae Kelp Forest

Korean Society of Phycology

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Thierry CHOPIN

Integrated Multi-Trophic Aquaculture (IMTA), implemented on the eastern coast of Canada, gains much attentions and popularity as a marine polyculture system, using organic matter and inorganic nutrients discharged from the salmon farm as nutrients for mussels and kelp, because it minimizes pollution by marine farms and increases revenue from the marine farming. The value of algae farming as an ecosystem service should be duly recognized, and new programs such as nutrient trading credits should be developed as an institutional tool to generate revenues. Multi-trophic aquaculture might be introduced at the inland flatfish farm on Jeju Island to prevent pollution of the coast and to reuse nutrients.

KIM Jang-kyun

I would like to introduce a new environment-friendly farming method, called “nutrient bioex-

traction,” which effectively removes the nutrients from inland areas by cultivating algae and shellfish at Long Island Sound which suffered from eutrophication. This technology, designed to remove nutrient salts by cultivating or farming organisms, is suggested as a solution for removing the nutrient salts flowing from inland areas, which is regarded as the cause of the bloom of green lava off the eastern coast of Jeju Island.

CHUNG Ik-kyo

As the Paris Agreement was adopted at the 21st Conference of the Parties of the UNFCCC in December 2015, it is expected to increase the ability to adapt to the adverse impacts of climate change, foster climate resilience and lower greenhouse gas emissions, and make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. Accordingly, algae, the marine oxygen producer and CO₂ reducer,



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are suggested as a means to cope with climate change. From 2005, Korea has been discussing measures to reduce CO₂ by using algae, jointly with 12 Asian countries, and expects that algae around Jeju Island under the greater influence of climate change would be an effective means to reduce CO₂. I propose expanded farming of algae as a measure to cope with marine eutrophication and acidification.

[Discussion]

- A continued public campaign, with a storyline, to raise the awareness of IMTA is necessary to cope with the negative reactions of the public toward the use of nutrient salts, regarded as pollutants, for multi-trophic aquaculture. At the same time, the government should make efforts to develop higher value-added products from marine farms, such as livestock feeds and beer, which might appeal to the public sentiment.
- Integrated multi-trophic aquaculture might be suggested as a solution to the bloom of sea lettuces in the coasts of Jeju Island, but more varied approaches should be developed through basic research to solve the marine environmental prob-

lem.

- Jeju Province is encouraged to employ IMTA in cultivating the seaweeds with higher economic value such as seaweed papulosa and callophyllis japonica, the major algae resources of the island. At the same time, the province should develop and establish more robust algae-farming facilities that can endure adverse conditions on the coast of the island.

Policy Implications

- There should be continued research and efforts to apply IMTA to more algae species, and the central and local governments need to pay more attentions to and invest more in IMTA.
- As a carbon trading system was introduced to reduce CO₂, a nutrient trading credit system should be considered for the reduction of nutrient salts in the sea and on land.
- The regulations on installation and operation of marine farm facilities should be eased for expanded implementation of IMTA.
- There should be continued attention to and research on the ways to utilize algae in coping with and adapting to climate change.
- The government should designate marine sanctuaries to utilize the diversity of algae in the coast of Jeju Island as valuable natural resources.