

Integrated Multi-trophic Aquaculture in Canada

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Executive Summary

Integrated multi-trophic aquaculture (IMTA) aims to improve the productivity of aquaculture practices by using the nutrient rich wastes from finfish culture to culture marine plants and invertebrates and thereby economic and environmental sustainability. **Given that IMTA has been successful on small scales, resources should be allocated to speed the process of expanding IMTA to a commercial scale.**

The image to the left depicts the movement of nutrients in a typical IMTA system.

Why is integrated multi-trophic aquaculture important?

Aquaculture is currently the fastest expanding form of animal food-production worldwide. The expansion of the aquaculture sector signifies the potential for economic growth for Canada, especially in coastal areas. Integrated multi-trophic aquaculture aims to contribute to the productivity of the growing aquaculture sector, while remaining economically practical and environmentally sustainable. **The main concept and the key to success in IMTA is the recycling of wastes by taking notes on how these processes occur in nature.** Typical aquaculture systems operate on a monoculture system approach, with only the culture of one profitable finfish species. IMTA integrates the culture of profitable benthic invertebrates and marine plants in a system that is similar to a food web; **the wastes from the culture of the finfish are then recycled and used towards the growth of the invertebrates and marine plants.** Filter feeders and deposit feeders such as mussels are able to filter organic nutrients from the wastes of the finfish, while the marine plants absorb inorganic nutrients. **The result of this is an increase in environmental sustainability, while providing strong economic benefit through the additional culture of profitable marine invertebrates and plants.**



Profitable species such as mussels and sea urchins are able to be cultured alongside finfish with relatively little costs once production has started.

How is IMTA currently being supported?

The Department of Fisheries and Oceans (DFO) is currently investigating how IMTA can be implemented by aquaculture farmers. Their aim is to understand the impacts that aquaculture systems have on the environment, how IMTA can improve fish health and industry best-practices as it relates to the expansion of IMTA. Significant contributions by NSERC have also allowed numerous scientists from universities all over Canada to contribute relevant data towards having a thorough understanding of the implications of IMTA.



Organizations such as CIMTAN are contributing relevant data towards the growth of IMTA.



Obtaining licenses for the sale of invertebrates from the CFIA can be a gruelling and lengthy process.

How is IMTA currently being constrained?

Practicing IMTA is currently most applicable to small-scale aquaculture operators as it may be difficult for commercial operators to implement large-scale IMTA farms. **As IMTA has expanded, aquaculture regulations had to be changed.** This means that if an aquaculture farmer is interested in IMTA, he or she **must apply for licenses** that will allow them to also culture invertebrates and marine plants at their site. This can often be **a gruelling and lengthy process, as site operators must be able to demonstrate a strong integrated multi-trophic aquaculture management plan.** The development of these IMTA management plans can also be **very costly**, especially to the small-scale operator. These costs may inhibit the likelihood of IMTA to be taken up by small-scale aquaculture operators who are currently the operators that IMTA is most relevant to.

Conclusion

IMTA provides strong economic benefits and is environmentally sustainable, but is currently inaccessible to small scale aquaculture operators because the start-up is so costly.

Implications & Recommendations

Given that IMTA has been proven to be successful at sites in New Brunswick and British Columbia for but the start-up fees are so costly for small scale-operators, **the recommendation is make IMTA more accessible to these operators.** This can be achieved **by providing grants** to small-scale operators to **subsidize the costs** associated with the synthesis of a thorough integrated multi-trophic aquaculture management. If more aquaculture sites are producing IMTA seafood for the market, **this will generate more interest and support from the public and thereby benefit the growth of IMTA in the long-run.**

References

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