

Key Findings

- Sea ranching may allow invertebrate stocks to increase, however, it must be implemented in conjunction with other methods to effectively support species conservation
- Implementation at a small scale fishery level is possible but changes in management and defined ownership of areas are needed for maximum functionality
- More research is needed due to the status of data deficiency in many areas

INTRODUCTION

Sea ranching has been officially implemented since the 1970s as a form of stock enhancement that allows for economic gain. Stock enhancement involves raising juvenile fish and releasing them to assist a population to overcome the challenge of having too few numbers to increase the overall amount of fish. Sea ranching implies that the fish released will later be harvested as adults. Many fisheries in Asia have expanded their scope to sea ranching invertebrates like sea cucumbers, abalone, and shrimp to broaden and increase their fishing catch.

“ Marine ranching has played an important role in promoting sustainable development of fishery and construction of ocean economic zone in China ”

- Jiao Li et al., 2014



Lower catch-per-effort has accelerated the need for an alternative to capture fisheries, especially with increasing demand for seafood in Asia²



Countries that use the most mariculture include China, Indonesia, Chile and Norway³



Invertebrate fisheries may require 20 years of investment to become economically profitable⁴



Invertebrate sea ranching differs from finfish because they ideally do not leave the release area unlike spawning fish.

Sea ranching of invertebrates involves open ocean pens and controlled areas that can be monitored and enforced to protect the stock from predators. Due to the environmental conditions of the ranching, the potential stock enhancement would be limited to the carrying capacity of the site itself, however, habitat enhancement adjustments can increase the production by up to 16-fold⁵.

For Sea Ranching

Stock programs can increase fishers income and provide stable financial support⁶. Self-governance programs can increase community involvement and improve stock understanding⁷. Sea ranching can reduce money spent on fish feed, water circulation and routine management upkeep costs. Most invertebrate species are fairly limited in physical range which makes them easy to recapture. Sea ranching could support the recovery of endangered species and provide environmental benefits to the surrounding ecosystem such as increasing seagrass productivity and recycling nutrients.

Against Sea Ranching

Invertebrate pens can be vulnerable to predation and there is not enough research on the juvenile life cycle of many of the species to adequately understand the requirements of an invertebrate stock. The true costs are often underestimated due to subsidies and hidden costs like the release of juveniles⁹. Some research has indicated that ranched species could have genetic and behavioural differences and that reproducing with wild populations could have questionable impacts¹⁰. Intervening with wild populations could also lead to overpopulating areas and result in complete ecosystem shifts that are unpredictable.



Purcell and Agudo, 2013

No Guarantee of Success

An example of failed invertebrate fishing is the scallop ranching in the Bay of Brest. For 12 years, the stocks were enhanced with 90% funding from public subsidies with no overall gain for fishers⁸. Once they switched to fishing licenses, however, the rights based approach allowed for better management and the stock was maintained and successfully enhanced.

Policy Recommendations

Stocks do not count for IUCN population counts unless they have successfully produced viable offspring. Therefore, it may be perceived that there are more fish than there are. Sea ranching should not be used as a singular conservation management strategy. In order to allow for successful population recovery, the original source of population decline must be eliminated.

Invertebrate sea ranching could have social, economic and ecological benefits if proper management is implemented, however, it is unlikely that it would be an influential tool for future conservation initiatives.

Successful management plans have required clear ownership rights, engaged fisher involvement, shared resource enhancement and utilisation from both fishers and government¹¹.

Limited data is a major hindrance to conservation actions, but it should not be the reason to not take action¹².

Most programs have shown little evidence of ecological benefits for conservation of species, however, there can be social and economic benefits such as implemented self governance programs and reduced costs on resources and energy spent to upkeep stocks.

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