

What's for Dinner: Choosing the Sustainable Option for Atlantic Salmon Farming



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Abstract

Choosing sustainable food options is becoming a popular and necessary action for many people. Fish, particularly salmon, is an area that requires special attention when deciding what is sustainable and healthy. Over-fishing the ocean is becoming a rapidly increasing problem. With 90% of the world's main large consumable fish supply exhausted, an alternative is necessary. In my thesis, I compare three main types of Atlantic salmon farming. They are traditional water-based, traditional land-based and genetically modified land-based farming. Traditional water-based farming allows the salmon to grow in pens placed in bodies of water. Both traditional and genetically modified land based farming allow the salmon to grow out in large monitored tanks of water on land.

	Traditionally Farmed Water-based	Traditionally farmed Land-based	Genetically Modified Land-Based
Environmental Impacts	<ul style="list-style-type: none"> Large potential for escape and breeding with wild salmon, potential to cause abnormal behavior and genetic characteristics Organic waste which leads to eutrophication Easy transfer of disease to other salmon, farmed and wild. 	<ul style="list-style-type: none"> Reduced possibility of escape Reduced risk of disease Waste is treated and in some locations, used as fertilizer 	<ul style="list-style-type: none"> Reduced potential for escape. If escape occurs breeding is likely, causing a disruption to biotic communities, loss of diversity and spread of disease to wild fish Reduced risk of disease High food mileage
Economic Impacts	<ul style="list-style-type: none"> Inexpensive for farmer because minimal management is required High food requirements Additional chemicals and antibiotics required to fight disease 	<ul style="list-style-type: none"> Better food efficiency (less food is wasted) Higher management costs 	<ul style="list-style-type: none"> Rapid growth allows for market Potential lower feed requirement Reduced survivability may require more fish input
Human Health Effects	<ul style="list-style-type: none"> Polychlorinated biphenyls (PCBs) are pollutants that, if consumed in large quantities can be detrimental to one's health. They can be found in farmed salmon and are a concern for human consumption. The cause of PCBs is due to the small fish that make up the fish meal used to feed the salmon. 		
	<ul style="list-style-type: none"> High levels of omega-3 fatty acids compared to other breeds of fish which can reduce heart disease 		<ul style="list-style-type: none"> Potentially higher level of Omega-3 Fatty Acids Uncertainty of long term human effects such as allergens

Figure 4: A water-based farm in Norway.



Figure 5: An outdoor land-based salmon farming system in Chile.



Figure 6: An indoor land-based salmon farm which looks similar to the process of Genetically Modified aquaculture.



Figure 1: An immature female Atlantic Salmon.



Figure 2: A mature breeding male Atlantic salmon.

Methods

In order to conduct this assessment of sustainability, I did a literary review of peer-reviewed journal articles. I also conducted interviews with the fish managers at Byerly's and Wal-Mart. As a method to determine the sustainability of Atlantic salmon farming, I compared the three types of farming based on environmental impacts, health impacts and the economic viability of each type. Based on my research I concluded that water-based farming is not sustainable, due primarily to the negative environmental impacts it creates.



Figure 3: The Marine Stewardship Council is an international organization that certifies sustainable aquaculture practices and their label is used on sustainably sourced seafood.

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Conclusion

Sustainability is critically important when it comes to our life today. Our resources are being used quickly and before we realize it, they will be gone and impossible to bring back. I recommend that while genetically modified salmon farming and land-based, traditional farming rank close sustainability wise, I would suggest that the land-based, traditionally farmed salmon is more sustainable because of its minimal impacts on the environment and the potential for long term productivity. When shopping for Atlantic salmon, look for packages that are labeled that they are sustainably farmed and responsibly sourced. It is important that when genetically modified salmon comes onto the market, to also look for similar labels. Ultimately, it is the consumer who decides whether they want their fish to be sustainable.