

Fantastic Fish Farms

Ag in 10 Minutes a Day!

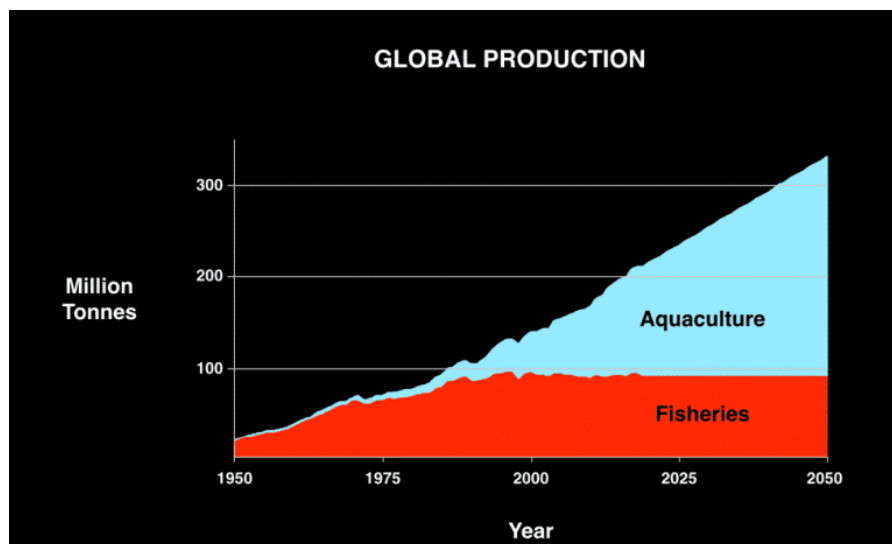
Fish on a farm? Usually when we think about a farm, the things that come to mind are crops, cows, chickens, or pigs. But there is also a growing industry in fish farming! Next time you are at a grocery store, look at the seafood counter. You will see both farm-raised and wild-caught seafood.

What is Aquaculture?

Aquaculture is another name for farming fish and other aquatic species under controlled conditions. Aquaculture has been around for about 4,000 years! In ancient times, people would keep fish in a small pond until they were ready to eat them. Wealthy Romans had pools inside their homes where they kept their seafood. Today, aquaculture provides more than half of the fish we eat. As the world population continues to grow, humans must find ways to produce enough food. Aquaculture is one way that enough food can be **sustainably** produced without causing too much decline in the wild fish population.



Using the graph below, you can see that while aquaculture has become more popular, fisheries, which catch wild fish, seem to have stopped increasing how much seafood they produce for the world. This graph also predicts how much of our seafood and aquatic plant life will come from aquaculture in the future, if trends continue.



Graph from Scott Lindell, The Woods Hole Oceanographic Institution

Aquaculture is not just for fish that we eat. There are lots of ways that it is used. Have you ever seen an aquarium with beautiful fish, or maybe a koi pond? An **aquaculturist** can breed for more desirable traits such as size, color, or disease resistance. In addition to fish, aquaculture is responsible for producing seaweed and algae, as well as aquatic flowers and other plants. In Maryland, we often think of aquaculture when we eat oysters which have been raised in the Chesapeake Bay. Places like the Phillips Wharf Environmental Center on Tilghman Island on the Eastern Shore train people in aquaculture to start their own oyster farm.

There are different types of systems used for various species. **Open net** pens, ponds, raceways, **recirculating** systems, and **suspended** systems each have different characteristics that make them work better for one species or another. For example, an open net pen would be more likely used for coastal area fish to keep them in the same water that is already there. Recirculating systems can be used indoors or outdoors and can be far away from a natural water source. Suspended systems are mostly used for shellfish such as mussels, oysters, and clams. These systems are often used along with other systems because shellfish are filter feeders and help keep the water clean. Here is a picture of an open net pen and a raceway system.



Image from [The Future of Aquaculture, Two Sides of the Story \(blueocean.net\)](http://The Future of Aquaculture, Two Sides of the Story (blueocean.net))



Image from [Raceway \(aquaculture\) - Wikipedia](http://Raceway (aquaculture) - Wikipedia)

Where is Aquaculture Practiced?

Aquaculture is practiced all over the world. China is the largest producer of farm raised seafood in the world, with Japan, India, Norway, and Vietnam making the top five. The United States is not yet a top producer, but the industry is growing, with aquatic species now being raised in all 50 states. Oyster hatcheries are even growing in Maryland. Oyster farmers, mostly in counties along the Chesapeake Bay, are raising oysters in the rivers, streams, and the Bay itself to provide local seafood to consumers and restaurants. However, since there are so many different systems, it is not necessary to live in a coastal area to produce fresh seafood for the local community rather than **importing** it from another part of the world.

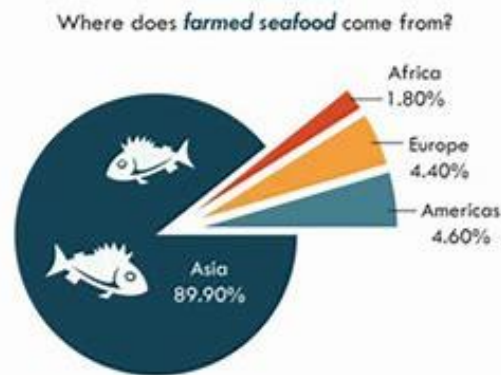


Image from [The Blue Revolution - Florida Sea Grant \(flseagrant.org\)](http://The Blue Revolution - Florida Sea Grant (flseagrant.org))

How Does Aquaculture Affect the Environment?

All types of farming have an impact on the environment and farmers. These can be positive or negative. Some of the negative impacts of aquaculture are too many **nutrients**, escaped fish, and disease. Too many nutrients, such as fish waste and uneaten food, can upset the natural balance of the local **ecosystem**. This can cause too much algae to grow which uses up the oxygen in the water. Aquaculture farmers must monitor nutrient levels very carefully and make important adjustments. When fish escape, they may be in an area where they aren't normally found. They may begin to prey on local species, and not have any predators themselves. This could have disastrous results when such **invasive species** move in. Disease is another concern. With many fish living in a smaller space than normal, illness can spread quickly, and can also affect the local population in open systems. The use of antibiotics or other water additives can harm local species as well.

Positive impacts of aquaculture include restoration of species, water quality, low **feed ratio**, and consistent quality. In areas where wild fishing has greatly decreased the number of fish in our waterways, farmed fish can be raised and released to help grow the population.

Many fish farms include filter feeders such as oysters, which can clean up to 50 gallons of water per oyster, per day! Farmed fish have a relatively low feed ratio compared to other sources of protein. For every pound of food that a fish eats, it gains about a pound of protein or "meat". Compare that to beef, which can take 6.8 pounds of food to gain a pound of meat. Another important benefit of eating farmed seafood is consistent quality. We have no control over what wild fish eat in our oceans and rivers – things that are harmful like mercury. Farm raised fish eat a controlled diet, so they have a much lower risk of toxins. They are also able to be harvested at a time when they are at the most marketable size and quality. Overall, aquaculture is one solution to maintain enough food for our world's growing population.

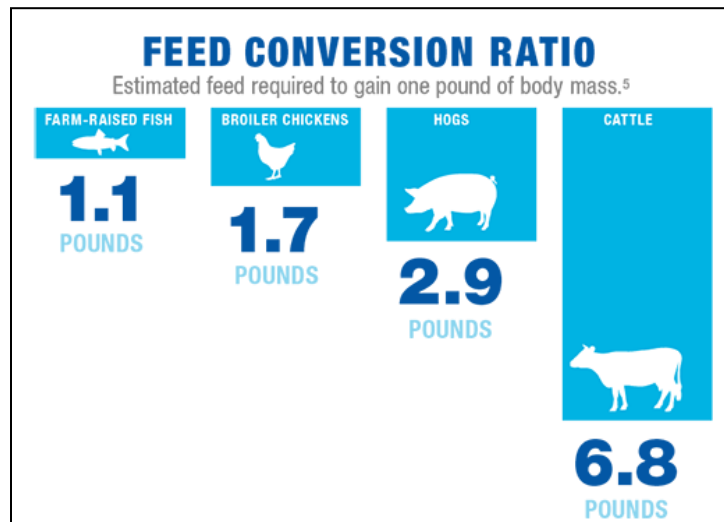


Image from [Global Aquaculture Alliance](http://GlobalAquacultureAlliance.org)

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Directions: Read each question and fill in the best answer.

1. Which does aquaculture NOT provide?

- A. Seaweed
- B. Clams
- C. Chickens
- D. Fish

2. Where is the most seafood farmed?

- A. United States
- B. India
- C. Norway
- D. China

3a. Why are suspended shellfish systems important to include in aquaculture?

- A. They look nice
- B. They clean the water
- C. They like to eat fish
- D. They make good pets

3b. Which sentence in the last paragraph supports your answer to 3a?

- A. "Positive impacts of aquaculture..."
- B. "Compare that to beef..."
- C. "Many fish farms include..."
- D. "Farm raised fish eat a controlled..."

Name _____

Date _____

5. What can you conclude from the “Global Production” graph?

- A. Aquaculture will continue to increase.
- B. Wild fish populations will increase.
- C. We will not need more seafood in 2050 than today.

6. Which type of protein has the highest feed ratio according to the graphic?

- A. Salmon
- B. Pork
- C. Chicken
- D. Beef

Extended Response: Use details from your own experience and information from the article in your response.

Write a letter to your Mayor explaining why it would be a good idea to include aquaculture in your community. Make sure to be persuasive and include the many benefits that it would bring.

Aquaculture Facts

- There are at least 580 different species of aquatic plants and animals currently being farmed around the world.
- The most commonly farmed fish include carp, salmon, tilapia, and catfish.
- Aquaculture has increased steadily since 1970 at a rate of over 8% yearly.
- More than 70% of the world's wild fish population has been depleted.
- In 2017, 36 million pounds of oysters were harvested, totaling \$186 million.

TRY THIS AT HOME! TASTY TILAPIA TACO RECIPE

(ASK AN ADULT FIRST)

Ingredients: 1-pound farm-raised Tilapia filets (or other white fish), 1Tbsp. vegetable oil, salt, and pepper, 4 tortillas or taco shells, toppings.

1. Wrap tortillas in foil and place in a 350-degree oven while you prepare the fish.
2. Heat oil over medium heat in a skillet.
3. Season the fish with salt and pepper, and cook about 3 minutes on each side, or until fish flakes easily with a fork.
4. Cut the fish into 4 portions and place into a warm tortilla or taco shell.
5. Top with your favorite toppings and enjoy!

Topping ideas: Avocado, lime juice, cilantro, salsa, cheese, lettuce or slaw, tomato, sour cream, or anything else you like!



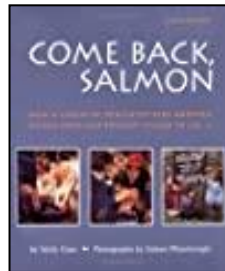
Check Out These Books:



TALES OCEAN ANIMALS AND THEIR ECOSYSTEMS

BY ERICA COLON

A reference book all about different ecosystems in the oceans, and how they have changed over time, the importance of biodiversity among ocean species.

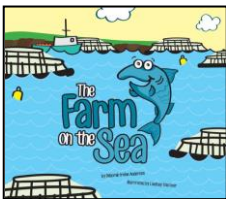


COME BACK, SALMON

BY MOLLY CONE

population.

A group of fifth grade students work together to clean up their local creek and restore the salmon



THE FARM ON THE SEA

BY DEBORAH IRVINE ANDERSON

Come read this story about a farm at sea! This is the story of a rare blue salmon named Sunny who guides children through the stages of salmon farming



WHY THE OYSTER HAS A PEARL

BY JOHNETTE DOWNING

A trickster tale about Oyster, who once was the generous keeper of all the gems in the world. Find out what happens when a greedy snake decides to shift the balance of the wealth in the sea.