

For 3 billion people around the world, seafood **provides** a significant source of **protein** and **nutrition**. But recent studies show that **33%** of wild **fisheries** are **overfished**, while another **60%** are fished at their **maximum capacity**.

In fact, over half the seafood we eat– from finfish and shellfish to seaweed and algae– isn't caught **in the wild**. It's grown through **aquaculture** or **aquatic** farming. Farmed seafood is one of the **fastest-growing** food industries, **expanding** in **volume** by 5.8% each year. But different **methods** of aquaculture come with different **advantages** and **issues**– some of which echo the serious problems we've seen in **industrial** agriculture.

So how can we avoid repeating the mistakes we've made **on land**, **at sea**? What aquaculture **approaches** are we currently using, and what does a **sustainable** way to **farm** the **ocean** really look like?

One of the most common aquaculture methods involves large **pens** made of **nets**, where fish are farmed **offshore** in **floating cages** roughly 1000 square meters in size. Commonly **employed** off the coast of Chile and in the fjords of Norway, these fish, like many **industrially farmed** animals, **occupy** stressful, **overcrowded** pens. They produce **massive** amounts of **waste**, **polluting** the surrounding areas and potentially spreading **diseases** to wild species. Worse still, since the **antibiotics** employed to fight disease aren't fully **absorbed** by the fish, they get **excreted** back into the environment. Net pens are also **susceptible** to escapes, **unleashing** huge numbers of fish which **compete** for resources and **weaken** the local gene pool with genes **adapted** for **captivity**. Escaped fish can even **disrupt** local **ecosystems** as **invasive** species.

Other techniques, such as **man-made** coastal **ponds** commonly used for **shrimp** farming in Southeast Asia, create additional environmental problems. Just like net pens, these ponds are prone to **spreading** pollution and disease. Their construction also frequently **destroys** important ecosystems like **mangroves** and **marshes**, which **protect** coastal areas **from** storms, provide **habitats**, and **absorb** tonnes of greenhouse gases.

One way to solve these problems is to farm fish on land in completely **contained** systems. **Tanks** and **raceways** can **recirculate** and **filter** water to prevent pollution. But even fully contained facilities

still **contend** with another major **hurdle**: fishmeal. About 10% of the seafood **caught** globally is used to **feed** animals, including **carnivorous** farmed fish. Researchers are working on fish feed made of **insects** and **plant-based** proteins, but for now, many **inland** fish farms are connected to overfishing.

All these **obstacles** can make sustainable aquaculture feel a long way off, but **innovative** farmers are finding new ways to **responsibly** farm the seas. The most **promising** solution of all may be to look lower on the food **chain**. Instead of **cramming** large, carnivorous fish **into** pens, we can work with natural ocean systems to produce huge amounts of **shellfish** and **seaweeds**. These **low-maintenance** flora and fauna don't need to be fed at all. In fact, they naturally **improve** water **quality**, **filtering** it as they feed off of **sunlight** and **nutrients** in the seawater. By **absorbing** carbon through photosynthesis, these farms help **battle** climate change and reduce local ocean **acidification** while creating **habitats** for other species to **thrive**. Shifting to **restorative** ocean farming could provide good **jobs** for coastal **communities**, and support healthy **plant** and **shellfish**-based diets that have an incredibly **low carbon footprint**.

In just 5 months, 4,000 **square** meters of the ocean can produce 25 tonnes of seaweed and 250,000 shellfish. With the right **distribution network**, a series of small farms, collectively **the size of** Washington State could feed the planet. Farms like these are already popping up around the globe, and a new generation of farmers is stepping up to **pursue** a more sustainable **future**. Done properly, **regenerative** ocean farming could **play a vital role in** helping our oceans, our climate, and ourselves.