

Ocean Agriculture

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The earth's population is expected to reach 10 billion by 2050, accounting for an additional 3 billion mouths to feed compared to the population in 2010. There is a big shortfall between the amount of food produced being currently produced and that which will be required to feed the populace by 2050. To aggravate matters, there is an urgent need to cut greenhouse gas (GHG) emissions from agricultural production (crop and animal husbandry) and mitigate deforestation practices aimed at increasing arable land. However, to feed 10 billion humans by 2050, the world resources institute (WRI) estimates that the current food production will have to be increased by 56%, global arable land area by 593 million-hectares, and GHG emissions reduced by 11-gigatons to prevent global temperatures from rising 2°C which would result in devastating climate change.

In recent decades, agriculture has been transformed through the consolidation of small diverse farms to form large industrial farmland through "vertical integration" with an aim to maximize profits. Today, agricultural systems used to produce crops and animals are resource intensive practices that involve heavy use of fertilizers, pesticides, and freshwater. Some of these practices have been detrimental to the environment as they have caused soil degradation, pollution, loss of biodiversity through deforestation, contamination of freshwater aquifers with fertilizers and pesticides, and emission of GHGs. With current agricultural systems being not sustainable the burden is on us to find alternative and eco-friendly ways to produce food without further harming the planet.

The oceans cover approximately 70.8% of the earth's surface and are home to 94% of wildlife and produce 70% of the total oxygen in the atmosphere. In contrast, the landmass on earth is less than 30%, with the World Bank estimating that only 10.8% of land is arable as of 2018. With that in mind, regenerative ocean farming offers a solution to the looming food crisis of the future. Ocean farming involves growing crops and seafood in a large body of water in a fixed location. Currently, kelp and seaweed are the main crops being used in this system, whereas scallops, mussels, oysters, and clams are the main types of shellfish grown. However, ocean farms are expected to start producing genetically modified cereal grain varieties that can grow in salty water. Ocean farmed crops like kelp and seaweed have important applications in food, animal feed, fertilizers, and biofuels and thus reduce dependence on terrestrial crops. Shellfish are an extremely sustainable and excellent source of protein since they require no land inputs and mature within months. Ocean farming could be used to reduce the amount of land required for agricultural use, lower GHG emissions, and restore sea ecosystems, while reducing our dependence on fertilizers and pesticides to grow food. Therefore, as global population rises and arable land per capita declines, farming in the salty waters of the oceans is a sustainable way to feed the future.