

Field of Streams:  
Designing a Floating Field to Grow Hydroponic Crops.

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The global population has grown from 1 billion in 1800 to 7.9 billion in 2020 so each year we need more food to support these people. Additionally, with more people there's less space for farms. With the populations growing at such an exponential rate and the farmable land decreasing there are increased food crises to occur all over the world. Two-thirds of the Earth is covered in water, leaving only one-third land. What if we were able to utilize the other two-thirds? With my floating farms we could potentially use the Earth's water systems for farms. With 5.34 million square miles of farmland if the ocean could be used we could have 139.5 million additional farm areas. My research objective is to create floating fields which are greenhouse-like structures floating on the water utilizing hydroponics and vertical gardens to grow seeds. These farms will be 100% self-sustaining. A small scale system was built using a 13 quart tub, with floatation tubes, vertical gardens with rockwool substrate and a self watering system. Floating field met all of its design criteria. It germinated both radish and tomato seeds. Thirty-five percent of the radish seeds germinated and 50% of the tomato seeds germinated. Average height for radish seedlings was 2.89 cm and for tomato it was 4.675 cm. The average mass of the radish plants is 0.07 g while the tomato average mass was 0.1835 g.

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1. As a part of this research project, the student directly handled, manipulated, or interacted with (check all that apply):
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