## **Environmental Solution: The Future of Farming**

Marissa Blanco-Johnson- Liam Conner- Hazel Krane- Kylie Rostad-Tallulah Shepherd- Wildon Uyeda

In our environmental solution, we are tackling three environmental problems: aquaculture, traditional farming on land and the Farm Bill of 2008. Aquaculture is also one of the most detrimental forms of farming; it can result in genetic contamination when non-native farmed species escape, nitrate pollution from fish waste and overfeeding, and mangrove habitat. In addition, traditional farming on land also produces high levels of nitrate due to the overuse of fertilizers, which can also leach into aquatic ecosystems causing eutrophication, harmful algal blooms and hypoxic zones. Our solution to these marine problems is large-scale implementation of aquaculture to supplement traditional farms. We would like to amend the 2008 Farm Bill to provide subsidies to encourage farmers to make this transition.

Aquaponics is a combination of hydroponics, growing plants in nutrient rich water, and aquaculture, fish farming. By connecting these two systems, the waste products from one system are removed by the other. Fish grown in tanks are fed and then release their wastes, ammonia and carbon dioxide, in to the water around them. Ammonia is converted into nitrates by nitrifying bacteria. This water is pumped to grow beds containing plants, which consume the nitrates as fertilizer and use the carbon dioxide during photosynthesis. In return, the water supplies the fish waste-free and oxygen rich water.

The United States of America is one of the highest-ranking countries in agricultural subsidies. Agricultural subsidies are direct payments or economic incentives, such as tax breaks, that are given specifically to farmers. Currently the government spends about \$20 billion every year in <u>direct</u> funding to farmers to keep food prices low and to enable US farmers to compete with produce raised in other countries. We would like to amend the Farm Bill to include

subsidies allocated to farmers who incorporate aquaponics into their existing traditional farm. The funds given would be in direct correlation to how much the farmers utilize aquaponics in their food output. This way, farmers would still have an incentive to use aquaponics on a large scale, but this allows them to make a gradual shift over time gradually.

Along with the subsidies offered in the Farm Bill, there will be the added effect of increased food output by farms, and increased revenue for farmers in the sale of fish for food. After the subsidies start the motivation to switch to aquaponics, the real motivation will be that traditional farms will not be able to keep up financially with other farms. Eventually, due to competition from farmers using aquaponics systems, farmers who do not utilize the systems will be forced to switch to the newer methods.

The FDA will have to be involved in the monitoring of these farms. Despite the increased health of both fish and plants, the nature of a closed system means that unmonitored diseases can spread through fish tanks quite easily. Farm supply companies would need to start selling larger amounts of the supplies to build aquaponic units, but any company that was able to meet the demand would be able to capitalize on the increased demand.

In order to amend the bill, we would first need to write a proposal summarizing our plan. We would then contact a representative of Congress' office to request a meeting to discuss our proposal. With a congress person's support, we could would ask him or her to present the proposal to Congress. With enough supporters for the amendment it could be added and take affect the following year of it being voted in.