

Thesis Project Portfolio

Hydroponic Crop Cultivation for Food Security in Small Island Developing States

(Technical Report)

The Sociopolitical Influence on the Rise of Solar Technology in California

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

The threat of climate change is requiring that we adapt and find new ways to utilize the power of technology. Small island developing states in the Caribbean have been hit particularly hard by the consequences of global warming. As a result of increased severe weather and natural disasters, the agricultural sustainability of the islands has been threatened. Our capstone set out to address a way in which these communities can utilize existing technology in a way to transform their agricultural farming into something more sustainable. Coinciding with this project, my individual sociotechnical research addressed the challenge of combating climate change through the transition to renewable energy in the United States. This research centered around a case study of California's successful deployment of solar energy technology, and how sociopolitical movements helped root the state at the forefront of green energy. Through a deep dive into the specific factors, it highlights the opportunities presented for this technology as a result of societal support and political backing.

These two documents address an issue of ever-growing importance: climate change. The importance of the subjects of discussion are seen around us as year over year global warming leads to visible effects on the environment around us. It is only through the study and further development of renewable energy technology that we will be able to combat and overcome this existential threat. Both documents work to show through example that adaptation by society and technology will be required for a reversal of climate change.

Our capstone group picked up the project where the preceding year left off. They had set the groundwork for the project and established ties to workers in the Caribbean who shared their needs for a new farming method. Their research into the reasoning and identification of needs for an alternative farming hydroponics system is where we picked up on the project. From there we

incorporated the key characteristics identified into a robust design that could withstand the commonly faced natural disasters and serve as an emergency resource when needed. For my independent research, a variety of research had previously been done on specific instances of public support for renewable energy, as well as political and legislative documents addressing the incentive programs for the deployment of the technology. With this, I developed a synthesis of the sociopolitical factors' development and influence over time with the rise of solar energy technology in California.

The capstone groups in the following years will have the opportunity to work with our design and implement it within a small community in the Bahamas. Upon its success, the design can then be shared and spread through small island developing states to provide and agricultural aid for those who need it. For the sociotechnical research, there is a need for a higher-level quantitative study into the effects of governmental incentives on renewable energy deployment in order to correctly advise future legislation. Together, this future research and development will work to establish a greener and sustainable planet for generations to come.