Market Survey and Sustainable Management Plan for Tri Cycle Farms Hydroponic Greenhouse

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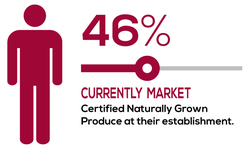
DESIGNING A SMALL-SCALE HYDROPONIC FARM

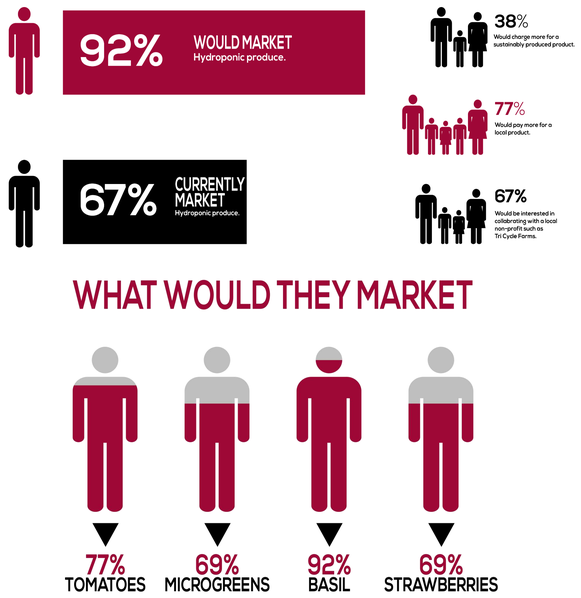
Tri Cycle Farms is a nonprofit community urban farm in Fayetteville, Arkansas. With the help of students and volunteers, Tri Cycle is working to fight food insecurity and teach the public about urban farming. In 2018, Tri Cycle is has a plan to construct a small hydroponic greenhouse producing Certified Naturally Grown herbs, strawberries, and tomatoes for market and providing a hands-on classroom for teaching hydroponic methods of production. In order to make this impending project sustainable and profitable, a market survey of local businesses was preformed to establish which crops were in demand. Using this information, a sustainable management plan was created with suggestions of how to process, ship, and recover waste in a sustainable manner.

MARKET SURVEY

Working with S. Gould and L. Gray from the Department of Biological Engineering, a market survey of 13 local businesses was conducted. The survey was given orally, and included questions about opinions of hydroponic crops, what the demand is for produce, and questions about seasonal availability of produce.

DATA





RESULTS

Many of the survey questions were either yes/know/don't know questions, and a few were short answer. Answers that were left blank were questions the surveyed either didn't answer or felt they couldn't answer. Some questions yielded better results than others. Questions about pricing did not yield informative results, since many people either didn't know or felt that price depended on a variety of factors including season, quality, offer price, or company requirements. Questions about seasonality yielded moderate results. The crops that businesses desired and needed the most included basil and other herbs, tomatoes, and strawberries. A majority of deliveries are daily and almost all are delivered via refrigerated trucks. While less than half of businesses consider hydroponic crops a market premium, 92% would consider selling them at their establishment. Many were ambivalent about the Certified Naturally Grown label and only considered an Certified Organic Label as marketable.

SUSTAINABLE MANAGEMENT PLAN

This plan outlines sustainable strategies to create a successful hydroponic operation. It focuses on four external aspects of the system. The internal aspect, production, is included in the theses of S. Gould and L. Gray.

Processing: Proper processing is vital to produce attractive, marketable, and safe food. Ensuring worker and equipment cleanliness will reduce losses, creating more revenue and less waste. Reusable or biodegradable packaging can decrease packing waste and increase the sustainability of the product. Proper storage reduces losses and increase quality of the final product.

Distribution: A major source of environmental concern is fossil fuel emissions. Moving goods between vendor and purchaser with lowest possible impact on the environment involves the whole distribution process of storing, processing, packaging, loading, and delivery. Delivering twice a week, using fuel-efficient vehicles, and selling locally reduces mileage and environmental impacts.

Retail: Buying locally has become a movement. Locally grown food has social, environmental, and economic benefits. It creates economic opportunities, reduces environmental impact, and contributes to a cohesive community. By supplying to local businesses, Tri Cycle can contribute to these multiple aspects of sustainability.

Waste: It is essential for small businesses to take advantage of any opportunity to increase economic sustainability. A practice many farmers utilize is selling value-added products in addition to raw produce. A value-added product is the production of a commodity using other products- in this case imperfect fruit and vegetables. Tri Cycle can utilize value-added products to reduce food waste and increase economic stability.

APPLICATIONS FOR SUSTAINABILITY

This project for Tri Cycle Farms highlights the economic, social and environmental considerations necessary to evolve a sustainable management plan.

The survey helped to assess the community demand for certain produce so that the greenhouse could be economically sustainable. It also clarified whether certain labels generate any additional interest. This helped determine what produce would be economically sustainable once the produce is sent to market. The waste reduction and value-added product marketing can generate revenue while the hydroponic system is in its early stages of development. This is an important aspect when considering reduction of food waste and can also serve as a source of revenue.

The management plan outlines many ways of increasing environmental sustainability. By using reusable and biodegradable packaging, Tri Cycle can reduce waste and environmental impacts associated with processing. Marketing to local businesses reduces food miles and has a beneficial economic and social impact on local food distribution.

This project has the potential to create a long-term relationship between the hydroponic greenhouse at Tri Cycle and University of Arkansas students. This project will reduce the environmental impacts of the greenhouse and make it economically sustainable. Running the operation as sustainably as possible will have the added benefit of educating farm visitors about the importance of sustainability. The results of this project can serve as a guideline for sustainable production in other small-scale hydroponic settings.

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