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Cultivating The Future: A Design to Improve Technological, Financial, and Organizational

Aspects of Farming in New England

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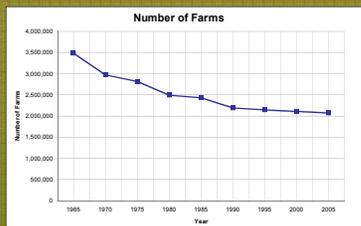
Abstract

Farming has been on a decline in New England since the Industrial Revolution, and the only way it will reclaim its former status is to make it into a prominent and prosperous field that will attract the younger generation. To address urgent problems of farming in New England, we collected background information on the problems faced by farmers from local farmers themselves. We interviewed three farmers and gained insight into the issues of technology, financing, and management that form the core of farmers' problems today. In the area of technology, we proposed redesigns of current farming structures to make them more efficient. The proposed improvements were the use of high tunnels, the inclusion of computers and robots, and a redesign for a more efficient barn. In the financial realm, we proposed to reduce farmer's costs by reducing the use of supplies, including feed, seeds or supplies, and by increasing the necessary government involvement. Finally, we identified three areas in which the organization and management of the farm could use improvement, such as crop rotation and diversity, irrigation, and launching a CSA. Our ideas will help to reinvigorate farming in the New England region, and also to increase the availability of locally grown, organic produce.



Background

Over the years since the Industrial Revolution, we have seen a decline in farming land. This reduction in the abundance of farms has caused people to rely on conventional food products that require an unnecessary amount of energy and processing to get to their shelves. This is the problem that we seek to fix and hence, promote the need for more farms, close to virtually every resident, in the New England region.



Project Goals/Objectives

- Improve upon three aspects: Technological, Financial, and Organizational
- Increase the availability of locally grown organic produce
- Reinvigorate farming as a profession

Methods/Process

Our two step method began with personal interviews with farmers. We interviewed the following farmers:

- John Bemis – Hutchin's Farm, Concord, MA
- Mark Duffy – Great Brook Farm State Park, Carlisle, MA
- John Lee – Allendale Farm, Chestnut Hill, MA



After these interviews we decided to break the research into three different aspects:

- Technological
- Financial
- Organizational

Technological Improvements



Fig. 1

- Computers:**
- Keeping track of
 - Customers
 - Finances
 - ...with better accuracy
 - Communication

- High tunnels (Fig. 3):**
- Extend growing seasons
 - Protect crops from harsh weather conditions
 - Keep out most pests
 - Easier to grow food organically.



Fig. 3

Animal Waste Management (Fig. 4):

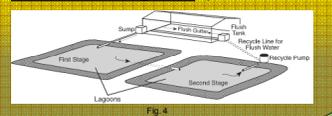


Fig. 4

Robotics



Fig. 2

Fig1. Milking Robot

Fig2. Barn Cleaning Robot

Financial Improvements

Farming today is unstable financially. The farmers and their families often have trouble making enough money for their needs and wants. In order to get more money for their family about 50% of farmers have a job off the farm. Around 50% of the income farmers make are made from off the farm. This makes farming a part time job, ultimately making it less efficient. We believe that in order for the farming to be to its maximum efficiency they will need to make more profit, in order for their motivation to work. A couple possible solutions to this involve the intervention of the Government. The Government can:

- Give large bonuses to farms for helping the community.
- Lower taxes for the farming community as well.



Organizational Improvement

Three specific ideas for the organizational aspect of farming, that would need to be improved or looked upon by any farmer are...

Crop Rotation/Diversity – Crop rotation is the process of growing different crops in the same area from season to season. Crop diversity is growing many different types of crops. Crop rotation helps to eliminate pests and add nutrients to the soil, naturally without the need for pesticides.

More Efficient Irrigation – Two types of systems should be added to any farm. The first is called a "gravitational irrigation" system.



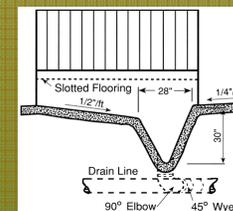
Gravitational irrigation is relatively simple process where the crops are planted on an incline, so the water channels down. The other system is "drip irrigation", where a buried hose lets out small amounts of water. Both combine to form an extremely low energy system.

C.S.A. - Stands for Community Supported Agriculture. To create a CSA consumers sponsor a farmer, or become shareholders. Then in return the farmer gives them fresh produce. This is a win-win situation, one that John Bemis said is the basis of his income.



Conclusions/Recommendations

- High tunnel
- Incorporation of Computers/Robotics
- Animal Waste Management
- Financial infrastructure to minimize costs
- Crop rotation/diversity
- Efficient Irrigation
- CSA



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References

- USDA/Cornell University/Ohio State University
- American Farmland Trust/Interviews with Farmers
- Lely Industries NV