

### **1. Project name and contact information**

Current Options in Cheese Aging Caves : An Evaluation, Comparison and Feasibility Study  
FNE04-521

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### **2. Goals**

Analyze the options currently available in construction, venting, water and air filtration, and cooling methods to create a blueprint for an environmentally friendly and economically sound cave. Outreach will be through the publication of a cheese-cave manual/booklet available on our web sites as well as the Maine Cheese Guild.

### **3. Farm profile**

Smiling Hill Farm is a 500+ acre dairy farm in southern Maine. The farm is well known locally for its value added products (glass bottled milk, butter and ice cream). In 2003 cheesemaker, Jennifer Betancourt joined with the farm to co-found a cheesemaking operation, Silvery Moon Creamery. Since 2003 Silvery Moon Creamery has been crafting fresh and aged cheeses at the farm. Initially the creamery used the farm's bottling plant on their down days. We are now nearly half moved into a separate facility located in the barn above the bottling plant. We market cheese locally at the farm store and at farmers markets, as well as natural food stores and gourmet cheese shops. Additionally we distribute to restaurants through a small assortment of distributors and to shops outside the state of Maine through artisan food distributors or directly.

### **4. Participants**

Our technical advisor was Gary Anderson, at University Maine Orono. He helped steer us in the direction of other technical assistance within the University system (i.e. a potato storage engineer). Other people who provided assistance include: Stephen Belyea, Potato Market Improvement Fund, MidCoast Energy Solutions, Jerry DesRoberts, Contractor. The cheesemakers themselves were the greatest source of information and all contributing folks are indicated in the appendix of the attached booklet.

### **5. Project activities**

We visited several caves. We conducted a small survey back in 2004 and then another survey in 2009 (this time more in depth and circulated to a greater number of people). We used the survey results to create common scenarios in cheese aging set-ups and to identify new technologies or lesser known methods of climate control. We examined the ways in which other products are stored, trying to identify crops with similar requirements for



temperature, humidity and ventilation. From the survey results we put together three scenarios and then evaluated them based on a cheesemaker's perspective, environmental impact and energy useage, intial cost, cost to repair and maintain (we had drafts created of general plans for these scenarios). With all that we had learned we put together a booklet/manual to walk someone through all the elements that must be considered when designing a cheese aging system. Initially we had planned to put together detailed instructions on how to build a cave, but as we began to grasp the wide array of methods being utilized by cheesemakers it became apparent that there were too many variables. Instead we examined all the variables offering our analysis on what works and why, as well as providing case studies of three different farms/creameries and how they have met, and are continuing to meet the requirements of the particular cheese they are aging. We felt that if we had stuck with our original plan it would have been useful only to a small handful of individuals. By providing general-how to's for several types of aging facilities and analyzing all the choices that go into designing one yourself, we would be creating a more useful document.

## **6. Results**

Please see attached a pdf of our publication. Available for download at our website: [www.silverymooncheese.com](http://www.silverymooncheese.com). When we started this project we hoped to find a significant number of people with underground caves utilizing only the soil temp to regulate the temperature in the aging space. We found that most people with underground caves had quite a fluctuation in temperature throughout the year (sometimes as much as 15 degrees Fahrenheit) and that many folks with an underground cave had ended up installing conventional refrigeration. We did encounter new methods to increase humidity that we had not considered before (agricultural misters placed periodically around the periphery of the room). The CoolBot is also a new device that some cheesemakers are very happy with. It allows you to utilize a standard air conditioner to keep your aging space cool (normally an air conditioner is not able to cool a room to the desired cool temps for cheese). Another surprise we found, was how similar the storage temps are for potatoes that will be processed and cheese. Though the buildings for potatoes are much larger than what a farm our size would require it might be a good opportunity for a cooperative aging arrangement. The response to our survey was quite positive. Cheese folks agreed that there is not a lot of knowlegeout there about how to create an appropriate aging space. We hope our booklet will help with that.

## **7. Conditions**

We conducted this research to be utilized by a wide array of farms and creameries.

## **8. Economics**

The primary draw to underground or partially underground aging spaces is reduced electricity useage to maintain the temperature. The initial cost of such a facility is greater than stick built or a prefac walk-in above ground, but in the long run energy useage would be much lower. The CoolBot is a much lower cost option for temperature control than the conventional refrigeration utilized by many in the cheese industry.

Describe your economic findings, if any. This would include changes in expenses or net farm income triggered by the project such as fewer inputs, improved product or profit, fewer treatments, etc.

#### **9. Assessment**

The energy consultants we worked with (three different groups) all leaned toward conventional refrigeration. They were not convinced of the merits of the CoolBot. Perhaps a study of efficacy could be done on the CoolBot. The farm we profiled who is using it is extremely happy with the results.

#### **10. Adoption**

We still want to build an underground cave at some point in the future. With what we learned (and published in the booklet) we feel comfortable about the construction portion of it, and having learned what we have we feel that soil alone will not be enough. We will definitely plan to utilize a CoolBot or the like to allow us to maintain appropriate temperature.

#### **11. Outreach**

Please see the attached pdf of our booklet. We have posted it on our website for download and sent out a thank you and a link to the 300+ cheesemaking individual's who received the cheese aging survey. We have submitted a little write-up to ACS and the Cheese Reporter as well, directing people to the site to download.

#### **12. Report Summary**

We wanted to examine unique and environmentally friendly ways people were aging cheese. Underground and partially underground spaces have higher initial costs, but require less energy in the long run. There is new technology available to allow cheesemakers to utilize a standard air conditioner to keep the aging space cool.

Jennifer Betancourt

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**Send one paper copy** to Northeast SARE, 655 Spear Street, University of Vermont, Burlington, VT 05405-0107, **and an electronic copy by e-mail attachment to** [nesare@uvm.edu](mailto:nesare@uvm.edu). Even if you send your report via e-mail, we still need the backup paper copy by mail