INTRODUCTION TO THE FARMSTEAD CHEESE RISK REDUCTION AND MONITORING PROGRAM….REPORT ON 2007 and 2008

This program created a pilot project for testing samples of milk, cheese, and the creamery environment. The pilot project started in June, 2007 and ended in 2009. A SARE grant enabled the program to pay for the costs of shipping samples and testing for the first six months of the first year. During the first two months of the pilot project I made visits to twenty-four farms that make cheese, in New York and New England. I helped the farmers to create a practical sampling and testing program for their milk, cheese, and creamery environment. I taught them to take samples and interpret results. I left each farmstead cheesemaker with resource materials, including "Food Safety Plans for the Artisanal Cheesemaker....Step by Step" and several guidelines from the Dairy Practices Council concerning milk quality and HACCP planning. We structured the project so that all of the samples were tested at AgriMark's Central Laboratory in West Springfield, MA and the results were sent via email to me first. I reviewed these results and sent them on to the farmers with comments. This kind of teamwork involving the producers and a field agent made it possible to find sources of contamination and prevent any incidents that posed a consumer health risk.

The hardest part of this work was to figure out where to set the critical limit for coliform bacteria in the finished cheese because these limits vary from state to state in the US and in other countries (European systems for the safe production of raw milk cheese, a report presented to the Vermont Cheese Council by Peter H. Dixon, November 28, 2000). This level is referred to as a "critical limit" because it indicates that a breakdown in sanitation has occurred and a corrective action must be taken to keep unwanted bacteria out of the cheese. When the coliform limit is exceeded the farmstead cheesemaker must look around for a source, find it, clean it up, and retest the batch of cheese made directly after the deviant batch. It was easier to set critical levels for the pathogenic bacteria that we tested for, such as: *Staph. aureus, Listeria monocytogenes, Salmonella,* and *E. coli* 0157.H7, because there are generally-agreed-upon levels that are used in the UK, EU, Canada and the USA.

We also took environmental swab samples to test for *Listeria species.* It was apparent that these results were more useful to correct deviations than the finished product results. In most cases, there was a faster turn around time to solve the problem before more cheese was made and in some cases we were able to pinpoint the source of environmental accurately.

Many of the farmstead cheesemakers had prior training in HACCP planning. The testing was used to monitor the HACCP program of each farm and verify that their program was working properly. In 2008 the farmers were paying for their own shipping and testing and I was still being paid by the grant to be the field agent. In addition to gathering data and giving advice, I was writing short reports that I have shared with the pilot project group. There were still eighteen participants in final year, which indicates that this program was important to the well being of farmstead cheese businesses. The peace of mind that came from knowing that one was running a clean operation counts for part of the success.

Another part was the ability to reduce the possibilities for serious contaminations of the cheese, hence the use of the phrase "risk reduction and monitoring" for the program. Lastly, there was probably an indirect effect of increasing the overall quality of the cheeses due to the farmstead cheesemakers technical training and increased knowledge of food safety.

This important information may help to make things more secure at your farm and creamery. For raw milk being used for raw milk cheese it is important to watch levels of coliform, *E. coli, Staph. aureus*, thermoduric (heat-tolerant) bacteria, psychrotrophic bacteria, and SCC. These levels are also important for pasteurized milk going into cheese. Although the coliform and *E. coli* will be eliminated without any deleterious effects to cheesemaking, the thermoduric and psychrotrophic bacteria will release enzymes as they are destroyed. Some of these are strong proteases and lipases and may be responsible for off-flavors and shelf-life reduction in cheese. *Staph. aureus* must be present at more than 100,000/ml to produce enough toxin to cause illness. The results from 2007 and 2008 gave a profile of the milk being used to make farmstead cheese within the pilot project group of twenty- four farms. Unless there were actually pathogens in the milk there was no significant association between the levels of certain bacteria or somatic cells in milk and a risk to public health in the cheese.

Although the best way to protect the consumer would have been to test a sample from every batch of cheese, this is impractical because the average farmstead cheesemaker cannot afford to spend $75 per batch for shipping and testing. Therefore, a random sampling approach, which identified the riskiest cheeses (low acid, high moisture, fast ripening) and set a timetable for periodic sampling, was used. The cheeses were tested within a week of sale so that the results could be used to prevent batches of cheese from being distributed. We tested cheeses using this method and, although *Listeria species* were found in several samples, further testing revealed that *Listeria monocytogenes (*the pathogen) was not present in the samples. There was only one incidence of a pathogen (*E. coli* 0157.H7) in 95 samples of raw milk cheese and no cases of pathogens in 45 samples of pasteurized milk cheese. *E. coli* (non pathogenic) counts in the cheese containing the pathogen were 1,000 per gram. This indicates that the pathogen level was too low to cause illness but the cheese was withheld from the market because once it would have left the farm it would no longer have been under the control of the producer and temperature abuse could have increased the health risk.

Lynda Brushett, a cooperative development specialist, also worked on the project. After the two years of technical assistance, sampling and testing were completed she directed a survey of the cheesemakers that participated in the project. She also collaborated with the Vermont Cheese Council to assess the perspective of cheese buyers on risk reduction practices (*management)* by cheese producers. Her goal was to find out if a "Cheese Quality Assurance Program" that focused on training cheesemakers to develop HACCP-based monitoring programs could be used in a marketing plan to promote Vermont cheeses.