



## **Flax Pond Cranberry Company**

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### **Decision Dilemma**

Jack Angley braced himself against the strong northeast winds as he walked in from his cranberry bogs late Saturday afternoon. Here it was October 29, 2005 and an early season snow storm was blanketing areas of southeastern Massachusetts with one to two inches of snow. While many looked forward to the beauty of the first snowfall, this was just one more weather element that would further complicate Jack's schedule to complete the harvesting of his cranberry crop.

Jack harvested his cranberries using a dry method as opposed to the traditional wet harvest method, and received additional compensation for his efforts. However, various extenuating circumstances, many of which were out of Jack's control, made for a higher risk for a successful harvest. Was it worth the risk, or was this the last year for dry harvesting? Jack would have to make a decision at the end of this harvest season. Wrestling with the decision, Jack thought, "Is it finally time to give up my tradition and go to a wet-harvest process?"

### **Introduction**

Only three days ago, Jack anticipated a clear and sunny weekend with temperatures in the upper 40s and low 50s. He had secured the volunteer support of about a dozen friends and relatives to help harvest up to 1/4 of his 34 acres of cranberries over the weekend. That was the best time for harvesting as most of his experienced help had other jobs during the week, and he would have to pay more for other less-skilled workers during the week.

Jack had a very tight schedule to complete the harvest. Ideally, harvesting cranberries should not start until after the berries ripen for the best deep red color, usually around early to mid October. At the same time, Ocean Spray, his sole customer, would not accept any berries after November 11 to meet their peak demand schedule just before Thanksgiving. Essentially, Jack had about a four-week window for harvesting cranberries.

Complicating his harvest process was the forecast of cold temperatures over the next few days. Significant freezing could destroy his remaining crop. Jack had an irrigation system on his farm and, like the citrus growers in Florida, could run the sprinkler system during the night to generate extra heat energy for frost protection. The crop could end up being iced over, which would help to prevent the damage from frost but also prolong the drying time. The snow could also provide some insulation. But sunny cool days might melt the snow, leaving the berries exposed to the nighttime freezing conditions.

Jack had already harvested over half of his crop, but he needed four to nine more days of good weather to complete the job. Plus, he needed to harvest the berries when they were dry to prevent mildew and spoiling in the production and packing process. Jack was one of a few remaining traditionalists in the area who harvested cranberries using a “dry” method versus flooding the bogs and harvesting them using a “wet” method.

Ocean Spray and other companies involved in the retail selling of bagged, whole fruit cranberries only used dry-harvested cranberries. They were willing to pay a premium of \$0.08 per pound over the market rate for these berries versus the wet-harvested berries. While the whole fruit cranberry market segment represented less than five percent of the total market, the demand still existed, and Ocean Spray depended on the production from a few farmers who practiced the dry-harvest method. Actually, the powerful and profitable juice market which relied on the wet harvested cranberries partially subsidized the fresh fruit market and made the premium paid for dry harvested berries more volatile.

Once inside his equipment shed that served as a small country store, Jack warmed up and dried out in front of the wood-burning stove. His concern for the remainder of the crop was evident. While it was nice to get a premium price for his product, he constantly faced additional risks. He had been fighting this battle with “Mother Nature” for almost 40 years, and he was not getting any younger. Most of his neighbors who used a wet-harvest process had long ago completed their harvest, since they could work in just about any weather conditions, and the harvesting process took at most only a couple of days.

### **Flax Pond Farm and Cranberry Production**

Flax Pond Cranberry Company was a 110-acre family farm owned and operated by Jack and Dorothy Angley.<sup>i</sup> The property purchased in 1967, when Jack was in his upper 20s, had been used for over 100 years to grow cranberries. Jack had 34 acres of producing cranberry bogs, a 10-acre pond to help in irrigation, along with 20 acres of reservoir/wet lands. There were also about 40 acres of property not suitable for cranberries that were being converted into a Christmas tree farm with 4,000 Fraser fir trees already established on 5 acres of the property.

In a good year, the bogs produced between 100 to 125 barrels of cranberries per acre. About 75% of the time Jack harvested around 100 barrels per acre, 5% of time the

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<sup>i</sup> <http://www.flaxpondfarms.com/history.html>

harvest was about 125 barrels per acre, and 5% of the time the harvest was only near 75 barrels per acre. Jack recalled two exceptional years, one in which he harvested 175 barrels per acre and one in which he harvested a record 250 barrels per acre. A standard U.S. barrel of cranberries weighed 100 pounds.

All the whole fruit cranberries were sold through a coop arrangement to Ocean Spray, which was the only buyer for either dry or wet harvested berries in the area. The fact that the Ocean Spray factory was so close, which minimized distribution costs, also made Ocean Spray the most economical and reliable source for product sales.

Jack remembered back in the late 90s when times were good, the price per barrel was \$75. These high prices brought an abundance of supply and caused the market to crash in 1998 with the price dropping to \$10 per barrel. Such wide fluctuations in the price were generally infrequent but had happened more than once. The latest market price per barrel was about \$36 for wet and \$44 for dry berries. However, even the premium for dry berries could change and Jack recently lost over \$50,000 resulting from a \$2 per barrel price drop.

Flax Pond Farm, one of many cranberry farms located in Carver, Massachusetts, was in an area that had been famous for over 125 years as a cranberry-producing center. The Ocean Spray corporate headquarters, which evolved because of the demand for cranberries, was located only about 20 miles to the west in Lakeview-Middleboro, Massachusetts. What made this southeast area of Massachusetts particularly conducive to growing cranberries was a combination of wetlands, sandy soil, and temperature.

Water was most essential for growing cranberries and most of the Flax Pond property was part of a wetland system some five feet above an adjacent river, which served as a water-collecting area for the Weweantic River Basin. There was no actual source of running water through the property, so the pond and reservoir system needed to be used to support the growth of the cranberries. The pond and reservoir were maintained at reasonable levels by recycling rainfall and surface run-off collected in the bogs, which prevented them from drying up in the summer heat. There was sufficient water available for sprinkler irrigation for frost protection in the spring and fall as well as summer watering. In the winter the bogs were flooded and iced over for protection from killing winds and low temperatures.<sup>1</sup>

Soil consistency was also critical for optimal cranberry production. The soil had a sandy composition to support the cranberry plants, some of which were over 100 years old. In the winter, when the bogs were frozen and covered with ice, Jack used a sanding machine to apply about 1 inch of sand onto the ice. The sand slowly sank through the ice, settled on the plants, and promoted new vine growth. It also functioned as an organic pesticide by smothering dormant insect pests.<sup>2</sup>

Equipment for the sanding operation consisted of two sanding rigs at \$13,000 each, plus a used loader at \$20,000 and a used dump truck at \$15,000. The sand, if not available on site, cost \$100 per truck load and Jack needed 250 loads to complete the job last year.

## **Flax Pond Farm and Other Endeavors**

To protect against potential cash flow problems from a season of either low production or unanticipated losses due to weather, insects, diseases, or price cutting, Jack had a country store with retail items centered on a cranberry theme. The store was advertised on the web and locally through tourist bureaus and the chamber of commerce. Ocean Spray also referred tourist inquires to the Flax Pond web site.

Dot, ran the country store and along with Jack gave tours and told stories about the cranberry harvest process. They always had enough time to answer every tourist's question and share information about their business. Dot, like Jack, thoroughly enjoyed her work. After almost 40 years, they still looked forward to getting up every day and working hard to make the business a success. Dot had recently published a recipe book and was looking to do another book in the near future.

Additionally, Jack had recently started a Christmas tree farm on the acreage which was not suitable for cranberry production. He planned on planting trees on a few acres each year as the growth time for Christmas trees was from three to six years. Once this process was fully operational he could sell about 20% of the trees each year.

The country store and tree farm served mostly as a diversionary outlet from farming, plus the store got Dot more actively involved in the business and gave her the chance to interact with people which she loved doing. Each endeavor brought in about five percent of the annual earnings. The cranberry harvest accounted for the remaining ninety percent of their livelihood, so in spite of his recent efforts to diversify, Jack was still essentially solely dependent on the successful dry harvest of his cranberries.

As long as Jack and Dot were physically able, they planned on continuing with Flax Pond and the related businesses. They had given no thought to any succession plans and were not even sure if any of their immediate family had any interest in taking over the farm in the future. All of the family members were willing to help in the shop and with the production and harvest when needed, but most had gone on to other full-time professions and Jack questioned whether any of his family would find this farming an economically profitable venture given the amount of work and expertise required.

## **The Cranberry Industry**

The history of the cranberry dates back hundreds of years. Long before the Pilgrims arrived in 1620, Native Americans mixed deer meat and mashed cranberries to make *pemmican*—a survival cake that kept for long periods of time. Medicine men valued the cranberry as an ingredient in poultices to draw poison from arrow wounds. The rich red juice of the cranberry served as a natural dye for rugs, blankets, and clothing. The Delaware Indians in New Jersey revered the cranberry as a symbol of peace.<sup>3</sup>

Legend had it that Pilgrims served cranberries at the first Thanksgiving in Plymouth, along with wild turkey and succotash. During World War II, American troops required about one million pounds of dehydrated cranberries a year.<sup>4</sup>

Cranberries have been known by many different names. Eastern Indians called them "sassamanesh," while the Cape Cod Pequots and the South Jersey Leni-Lenape tribes named them "ibimi," or bitter berry. The Algonquins of Wisconsin called the fruit "atoqua." But it wasn't until German and Dutch settlers came up with the term "crane berry," because the cranberry blossom resembles the head and bill of a crane, that we arrived at what we know today as the cranberry.<sup>5</sup>

The cranberry business had seen a recent expansion with the introduction of a variety of new products. Ocean Spray, now 75 years old, had become very aggressive in product development, marketing, and distribution. Some of the latest production sensations have been the white cranberry products, mixed cranberry drinks, and craisians. With the increased interest in health foods, and the good nutritional value of cranberries, demand for various products continued to increase. Ocean Spray was North America's leading producer of canned and bottled juices and juice drinks and had been the best-selling brand name in the canned and bottled juice category since 1981.<sup>6</sup>

While Massachusetts was probably the most famous state for growing cranberries, Wisconsin actually grew more cranberries. New Jersey, Washington, and Oregon, along with parts of Canada, also had a significant cranberry harvest. All these regions had the required cold temperatures needed to kill off plant-destroying insects. Most importantly, the cold temperatures were necessary for bud development over the winter (about 2,000 to 2,500 hours below 45 degrees Fahrenheit) to help insure viable buds in the spring.

Cranberry production processes in some of these other states were able to take advantage of lessons learned from Massachusetts as the farms tended to be more uniform and the procedures more systematic. In Wisconsin, just about all berries were wet harvested. Most bogs tended to be the same shape and size, which made it easier for equipment to efficiently collect the berries.

In contrast, farms like Flax Pond that had existed for over 100 years used the same harvest by hand methods until just about 40 years ago. Also, there was no standardization in the shape of the bogs which were determined primarily by the contour of the land, and could have hindered the growth and harvesting process. When harvesting in the 1960s, workers used handheld scoops that resembled large combs, pulled berries from the vines, and collected them in 1/3-barrel boxes that were hauled by wheelbarrows to a central collection point. When Jack first owned Flax Pond he needed a labor force of at least 30 people to accomplish what about 12 people do today.<sup>7</sup>

Insects were a serious concern in cranberry growth. The cranberry plant, actually somewhat like a small bush or dense vine-covered growth, remained in the ground year round. Insects had plenty of time to adapt to the plant and the surrounding environmental conditions. Jack had perfected his approach to managing plant destruction from insects

and disease, but once lost about 25% of his crop to a bad insect infestation. Much of the spring and summer was spent measuring and recording insect populations to insure proper timing for pesticides. At times, the irrigation system was modified for chemical spraying. Sometimes in the spring and fall, Jack briefly flooded the bogs to control some insect populations.<sup>8</sup>

Since the berries on Flax Pond Cranberry Company were produced and sold as the whole fruit, the requirements on pesticides and herbicides were even more restrictive. There was always the potential concern of chemical residue on the skin of the fruit. Plus, with the dry harvest, Jack could not use the flooding the bogs which essentially provided an extra washing of the fruit.

Further complicating the spraying process was that the farm was essentially a wetland, and there were environmental concerns about using chemicals. When pesticides were applied through an irrigation process, there was always a residual contact issue concerning the chemicals. Jack had to guard against chemicals floating through the air and he had to spray when wind conditions were just right, generally in the early morning. He also had to be careful about chemicals passing through and contaminating the irrigation equipment itself. Jack had standard procedures to flush out his systems after a chemical application.

Flax Pond and other growers were subjected to unannounced testing by both Ocean Spray and government regulatory associations. If the farm was not in compliance with pesticide regulations, the operation could be shut down.

### **Wet Versus Dry Harvest**

Almost all cranberry harvesting used a wet method. Production efficiencies and the ability to harvest in all weather conditions tended to make this the harvest method of choice by most of the cranberry farmers and large cooperatives. Plus, over 95% of the cranberry product demand could be met by the less expensive and more efficient wet harvesting method. Many of the farmers in Jack's area converted to wet harvesting years ago, which also eliminated the weather as an element of risk from the harvesting process.

Wet harvesting began the night before. A grower flooded the dry bog with up to 18 inches of water. The next day, water reels, or "egg beaters," loosened the berries from the vines. Since cranberries contained pockets of air, freed berries floated to the surface of the water and were corralled and loaded into trucks. Wet-harvested berries—used for processed foods, juices, and sauces—were shipped by truck to a central receiving station for sorting and inspection.<sup>9</sup>

To dry harvest cranberries for the fresh fruit market, growers had a choice of three commercially available motor-driven dry-harvest machines, the Furford, the Western and the Darlington models. All the machines somewhat resembled a large lawnmower. Jack used a Furford harvesting machine, which had the most sophisticated pruning mechanism. Jack had six Furford harvesting machines.

The machines had to be pushed manually through the bog and covered about a 2-foot swath. Several inverted, V-shaped tines passed through the bush and pulled the berry toward the machine as they were picked off the vine. At the front of the tine was a reciprocating cutter that pruned vines and prevented them from becoming entangled in the machine and pulled up from the main plant. The berries were picked up on a conveyorlike series of rubber slats that lifted them into the burlap sack. Once the sack was full, the berries were dumped into large square bins.

The bogs were completely surrounded by irrigation ditches and covered by the cranberry plant. It was not feasible to bring large equipment or vehicles on the bogs. Therefore, a helicopter came and hovered over the bogs, dropped lines, and airlifted the bins of harvested cranberries to waiting flatbed trucks. All of Jack's cranberries were then shipped to Ocean Spray.

Ocean Spray judged cranberries by color, size, freshness, and, oddly enough, their ability to bounce. An early New Jersey grower, John "Peg-Leg" Webb, first noted this special property of the cranberry. Because of his wooden leg, he could not carry his berries down from the loft of his barn where he stored them. Instead, he would pour them down the steps. He soon noticed that only the firmest and freshest berries bounced to the bottom; the soft and bruised fruit remained on the steps. His observations led to the development of the first cranberry bounceboard separator—100-year-old technology still used by Ocean Spray today to remove damaged or substandard berries.<sup>10</sup>

Jack had an antique bounceboard separator using wooden slats in his gift shop that dated back to the early 1900s. He used the machine to demonstrate the bounce test process to tourists and customers and also to separate a residual crop of fresh berries, which he sold over the counter. All fresh cranberries—great for cooking and baking and sold in the produce section of supermarkets each fall—were harvested using the dry method.<sup>11</sup>

### **The Wet versus Dry Harvest Decision**

Jack, very much the traditionalist, enjoyed the challenges of dry harvesting. He liked the fact that he was one of a diminishing number of farmers proficient in the dry-harvest process. The extra compensation from Ocean Spray also served as an incentive.

In spite of the many benefits, unless the weather dramatically improved this year, all of his profits and more could be wiped out if he could not complete his harvest on time. Because of the novelty of the harvesting process and with Jack's large contingent of family and friends in the area, he was frequently able to rely on volunteers to help with the harvest, especially on weekends when people were not involved with other jobs. This saving in labor costs helped Jack financially and provided a social outlet for all involved.

If Jack could not find volunteers for the harvest, hired labor would cost \$20 per hour. In a worst-case scenario, if Jack had to hire all of his help, it would take 700 man hours to harvest all of his bogs. These higher labor cost could easily offset any favorable price

considerations received from Ocean Spray. Normally he had to hire out about 100 hours of help, with the remainder of hours provided by family and friends.

There was also the cost of renting a helicopter. He had been using a local service that specialized in assisting in the dry harvest process. The helicopter that charged by the lift rented at \$500 per hour. Jack tried to work out the production process where the helicopter did not have to stay on-site for the entire day but could preset a couple of runs during the day, which took about 45 minutes to complete. Each time the helicopter came out there was a minimum one-hour charge. Last year, Jack had 18 different helicopter runs.

Ocean Spray provided the large harvest bins used to collect the cranberries. Jack contracted with a local truck hauler to ship the berries to Ocean Spray. The truck cost \$350 per run and can carry about 40,000 pounds of berries per load. Last year, Jack had 15 truck shipments to the plant. Ocean Spray paid Jack based upon weight at a market rate. They would also reduce the payment to Jack if there were excessive vines, bad fruit, or weeds in the shipment. Jack had a reputation for the highest quality product and last year was not assessed any penalties for inferior product.

Not only were the more labor-intensive harvesting costs higher with Jack's dry harvest method, but he incurred higher costs throughout the year. Jack had to use more environmentally sensitive chemicals and pesticides. Where it was typical to have \$5,000 in chemical costs per year using standard chemicals, Jack's bill was more in the range of \$20,000.

There were also the weather-related costs. To guard against frosts in the fall, it cost Jack about \$50 per hour to use the irrigation system to spray his plants. For every frost warning, he sprayed an average of 6 hours. Last year, with a relatively mild harvest season, he had to spray for frost three times. Jack would not be surprised if he had 10 days of frost this year.

The wet or dry harvest decision was an either/or situation. Jack could not convert from one process to another during the harvest season if it looked like he would not be able to get a dry crop harvested on time, or do a partial wet and partial dry harvest. Plus his commitment to the different fixed equipment costs associated with each type of harvest would make it difficult to switch back and forth.

If Jack switched to a wet harvest method, there would be some initial equipment and set up costs. He would have to purchase two water reels at \$22,000 each which would be used to send vibrations through the water to shake the berries off the plants. He would also have to purchase supporting equipment including a \$35,000 loading/cleaning pump and one rig spray bar pump that sprayed water at high pressure for \$1,000. He would also need around 500 feet of corral at \$7 per foot which was a floating Styrofoam device used to collect and direct the berries to the pumping area for loading onto trucks. He could probably harvest his entire crop in three days with the support of four part-time laborers. His labor requirement would be about 110 hours or about 15 percent of what it

is for the dry harvest. Jack could sell his existing dry harvest equipment, primarily the Furford machines, for maybe \$5,000 each, (new machines retailed for \$16,000).

Jack had thought about trying to get a higher price differential for the whole fruit cranberries, but the company was essentially an agricultural cooperative, and he did not have much influence on determining a final price. Ocean Spray could pretty much dictate the market rate for his product.

Jack also realized that the barrier to entry in this business was relatively high. It was almost impossible for any new farm operation such as his to even consider dry harvesting. The expertise gained through his almost 40 years at the business was not easy to replicate. Individual small family farms were a dying breed. Plus, the complexity and the additional risks associated with the dry versus wet harvest was a deterrent. Start-up and compliance costs could be too high for all but corporate-type farms. The demand for whole berries for fresh fruit sales was also limited, which tended to make the business only marginally attractive.

Foreign competition with its lower labor and land costs and different growing seasons was also having a greater impact both positively and negatively on the whole fruit market. Countries in the southern hemisphere could produce cranberries in the spring which had a positive impact of extending the market for whole fruit, but could also take away from the novelty of cranberries being the seasonal fruit at Thanksgiving. Additionally, third world countries in the northern hemisphere with lower production costs were a direct threat to the growers in the United States.

## Conclusion

Jack had never really determined what a dry harvest would cost versus a wet harvest. His love for the art and science of cranberry growing, his ability to do well at what might be a dying “art,” and even a little of the excitement that came with the risks always motivated him for every harvest. Nevertheless, he needed to give careful consideration on whether to remain a dry harvester or switch to a wet harvester.

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<sup>1</sup> <http://www.flaxpondfarms.com/history.html>

<sup>2</sup> <http://www.flaxpondfarms.com/history.html>

<sup>3</sup> [http://www.oceanspray.com/aboutus/history\\_cranberry.asp](http://www.oceanspray.com/aboutus/history_cranberry.asp)

<sup>4</sup> [http://www.oceanspray.com/aboutus/history\\_cranberry.asp](http://www.oceanspray.com/aboutus/history_cranberry.asp)

<sup>5</sup> [http://www.oceanspray.com/aboutus/history\\_cranberry.asp](http://www.oceanspray.com/aboutus/history_cranberry.asp)

<sup>6</sup> <http://www.oceanspray.com/aboutus/overview.asp>

<sup>7</sup> <http://www.flaxpondfarms.com/history.html>

<sup>8</sup> <http://www.flaxpondfarms.com/history.html>

<sup>9</sup> [http://www.oceanspray.com/aboutus/cranberry\\_harvest.asp](http://www.oceanspray.com/aboutus/cranberry_harvest.asp)

<sup>10</sup> [http://www.oceanspray.com/aboutus/cranberry\\_harvest.asp](http://www.oceanspray.com/aboutus/cranberry_harvest.asp)

<sup>11</sup> [http://www.oceanspray.com/aboutus/cranberry\\_harvest.asp](http://www.oceanspray.com/aboutus/cranberry_harvest.asp)