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Center for International Food and Agricultural Policy



Research, Food and Nutrition, Commodity and Trade,
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Finding Value-Added Uses for Apples: A Case Study
For Hoch Orchards of LaCrescent, Minnesota

by

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For
Hoch Orchards of LaCrescent, Minnesota**

**A Paper Presented
For
The International Italian-American
Conference
Duluth, Minnesota
August, 2006**

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Associate Professor & Extension Economist
Department of Applied Economics
And
Students Enrolled in ApEc 3991-2
Fall, 2005**

This paper summarizes the results of a pilot course in Value-Added Entrepreneurship in agriculture which was offered in the fall semester of 2005 under the title-ApEc 3991-2. It will describe the course content, the manner in which the project was chosen, the work which was undertaken by students enrolled in this class and finally, the manner in which the materials developed in the course were used in the actual restructuring of Hoch Orchards.

Origin of the Course

The course proposal for *Value-Added Entrepreneurship in Agriculture* was first conceived in annual review session with the department chair of the Applied Economics, beginning with Dr. Vern Eidman and currently with Dr. Rob King. It was suggested that an alternative to tradition job placement at the end of an academic program, that an alternative would be for students to start their own businesses. Colleges of Agriculture have been familiar with this alternative to some extent due to the number of students, particularly from farm operations, who return home to work in a family business. This alternative will remain viable for some students; however, many more do not have this alternative available due to smaller size and discontinuation of farm businesses. It would be possible for students to start a different type of business- perhaps in organic production. With this concept in mind, Professor Nefstead used the class time allocated to a previous class to teach a pilot course in the fall of 2005.

Selecting Course Content for Value-Added Entrepreneurship

Once the decision had been made to offer this course, it was necessary to construct a curriculum which would address these topics. An extensive survey of entrepreneurship courses in the U.S. , the U.K and other countries was undertaken in the summer of 2005 in preparation for the offering of this course. It was apparent from the results of the survey that traditional entrepreneurship courses offered in colleges and universities needed to be substantially augmented to achieve the course goals. It was decided to incorporate many materials from operational centers focusing on business development of value-added businesses. To this end, materials from Iowa State University, the Universities of Kentucky and Tennessee, the Ag. Innovation Centers at Michigan State University and Purdue University and other sources were incorporated in different sections of the course. An Excel template for a small scale apple winery developed at Iowa State University was used as a prototype for planning the expansion of Hoch Orchards to be described in more detail later. Materials from the Kauffman Foundation dealing with research on entrepreneurship were incorporated more fully in the second course offering to be planned for fall semester of 2006. Course credits have been augmented to allow students to complete an individual as well as group project. The first syllabus is presented in Appendix 1.

The Joint Class Project for Value-Added Entrepreneurship

One of the decisions which was made early on in the development of this course is that students would be required to work on a joint project assisting someone in developing a new business concept, create their own individual business concept or form a student business which would be made operational by the end of the course. Due to circumstances at the time of the first course offering, the decision was made to have this initial group of students work on joint project. It should be noted that a group of students are operating an organic farm through the cooperative of MISA- a center focusing on sustainable agriculture using land adjacent to campus. This would be an example of a student operated business. The opportunity to participate in a business expansion was made possible by contacts made with the Southeast Minnesota Initiatives fund in the person of Ms. Erin Tiegmeier. It appears that Mr. Harry Hoch had approached the SE Initiatives group for assistance in restructuring an apple orchard which was already selling fresh apples, apple cider and other products. Mr. Hoch was starting an organic conversion which was in the first year at the time of initial contact. His desire was to research a larger scale of processing facility which would process over 200 gallons per hour of apple cider. This facility could be used as a commercial processing facility which would process apples for other growers in the area. Several commercial kitchens are operating in the state of Wisconsin using this model.

After initial conversations with Mr. Hoch and Erin Tiegmeier, a contract was drawn up to summarize what the class would deliver at the end of the semester. Appendix 2 shows this contract. Mr. Hoch was currently selling apples and cider in whole foods

markets such as the Wedge and Mississippi Market as well as farmers markets in two cities in Wisconsin. He had developed website and logo for this operation.

How the Class Developed an Initial Feasibility Study for Apple Cider

This first step undertaken by the students enrolled in this class (Ahmad Lewis, Tricia Miller, Nathan Bostom, Brad Peterson, and Travis Holt) was to research the equipment needed for this new operation and investigate the market for organic apple cider. An extensive search produced several contacts. A food equipment company located in New York supplied the quotes requested for both new and used equipment required for the project. The total equipment cost for the project totaled over \$350,000. A more detailed summary is shown in the business plan summary.

Another step was to explore the markets for apple-based secondary products. Extensive research was conducted on the demand for and utilization of apples. A recent study completed at Cornell University summarized the changing market conditions in the apple industry. The key conclusions reached in the study were a concern for the lack of new products and import pressure for China on apple concentrates. The study suggested seven new product concepts which might be used for new apple-based products. The class performed market research via a taste test on all seven products using students and staff at the University of Minnesota. It was from this study that the possibility of differentiated organic products and development of a premium hard apple cider were identified as potential future expansion products.

The analysis of distribution outlets for Hoch Orchards started from their existing distribution pattern. Hoch Orchard was using the Wedge- a Twin Cities whole foods market for fresh apple cider as well as farmers markets in Onalaska and Eau Claire, Wisconsin as well as the sale of items including fresh apples from its farm location. A website had been developed to order some products from Hoch Orchards.

The change in distribution pattern envisioned by the class members was to gain access to the Rochester market in Minnesota in that the demographics of organic production fit the population profile extremely well. Entrance into the Minneapolis or St. Paul farmers market was also seen as an outlet that could support the new volume of production for organic apple cider and other future products. Many mainstream supermarkets such as Rainbow foods are also offering a wide assortment of organic and natural products. This was also seen as a viable distribution choice.

Having developed the cost of equipment, it became necessary to analyze technical aspects of apple cider and other derivative products. The source of information on technical coefficients was a pilot mini-processing plant at Cornell University. The manager supplied the necessary information to allow the class to complete financial projections for this project.

A major change in the project occurred when the class investigated the possibility of a hard cider product to be added to the potential list of products. Mr. Hoch has originally dismissed the possibility of expanding into this area. However, the growth in the category of Flavored Alcoholic Beverages (FAB) warranted a closer look at this possibility. During the process of discovering the feasibility for this product, it was discovered that very few hard apple ciders were available to the public and none from a

local source that could be branded. Because of the complexity of regulations regarding alcoholic beverages, it was suggested that apple juice be supplied to a licensed winery which would produce and label the product for distribution. A complete marketing plan for *Red Tree Hard Cider* was developed after the class was finished in the fall semester of 2005. This marketing plan was presented as part of the National AgriMarketing Association student marketing competition in Kansas City, MO in April of 2006. The judges confirmed the potential of this product and endorsed the marketing strategy proposed. This marketing plan was also given to Hoch Orchards. A major advertising firm in the Twin Cities has offered “pro bono” assistance on the advertising portion of the final plan.

This previously neglected option would replace organic apple cider in terms of a revenue stream within five years.

Research Yield New Apple Alternatives

Substantial research was conducted on the apple industry, where it was going and what new alternatives may be possible. A large study by Cornell University in 2004 concluded that new consumer alternatives must be made available and that the apple industry in the U.S. had been too complacent and not expanding its market. It should be noted that the University of Minnesota has been very active in development of new apple varieties such as Honeycrisp, etc. The varieties have found their way into orchards in Minnesota. Producers were looking for a good value-added market for apples which could not be used for fresh consumption. Organic apple cider was certain one of the

alternatives. Further research indicated that apples could be processed into apple vinegar and hard cider. In the business plan that originated for Hoch Orchards, all three products were proposed with the greatest growth in the hard cider business. Mr. Hoch was not eager in our first meeting to explore this idea, but was more receptive later in the process of developing the business plan. Agri-tourism also played a role in this process in that wineries offer tastings, full scale wine tours and other activities for the whole family. Large apple orchards offer entertainment in the fall when apples become available.

Conclusion of the Project/ Handoff to CDS

A final class session at the end of the class involved the class sharing results with Mr. Harry Hoch , Erin Tiegmeier and Mr. Nate Dorn of the Cooperative Development Service(CDS)/USDA. Mr. Nate Dorn was responsible for the final loan application that Mr. Hoch initiated using the model of a community kitchen. Harry could charge a processing fee for his neighbor's apples and involve them in a cooperative arrangement. A final evaluation at the end of the class concluded that the class had been successful and that students had learned a great deal about business startups. Evaluations for this five member class were 7 out of a seven point scale. The class will be repeated during the fall semester of 2006 in its present form and then proposed as an addition to the permanent class schedule. It is contemplated that an Extension program on *Value-added Entrepreneurship* will be developed to serve other customers in the near future. The potential for students starting their own business as they exit from our university is high given the addition of this course to our curriculum. One of the challenges in establishing this course as a permanent addition to our curriculum is the presence of an Entrepreneurship curriculum and major as the Carlson School of Management. It will be

necessary to differentiate our class to allow the addition of the course to the curriculum. The focus on value-added agriculture is the primary distinguishing characteristic that separates this course from others in the general entrepreneurship field. The addition of research from the Kaufmann Foundation out of Kansas City will be another feature of a new offering of this course. Speakers who have started value-added businesses will also be utilized more heavily. The potential for this course seems to be promising at this point

Student Nama Project –*Red Tree Hard Cider*

One of the additions to the student work effort came as the class was finishing in the fall. Our student NAMA team agree to develop a marketing plan for *Red Tree Hard Cider*. This was accomplished and the teams presented the plan in collegiate competition in Kansas City ,MO in April of 2006. These results were shared with the project sponsors as well. The executive summary is shown in Appendix 4.

Details of the Hoch Business Plan

The business plan executive summary is presented in Appendix 3. It shows that hard Cider would replace organic cider in the fifth year of the plans as the leading revenue source. Revenue would initially fall as costs increased and new products were brought on line. The results, however, were promising. The growth of Flavored Alcoholic Beverages (FAB) has been very high with new products having a chance of success. Young adults, microbrew customer's companions and others are logical market segments.

Where the Project is Now and Final Thoughts.

Mr. Nate Dorn of Cooperative Development Services is reviewing the loan request for Mr. Hoch. A final project report was given by the students. Positive feedback has been received by the industry.

References

1. Mainville, Denise and Peterson, Chris. (2004). *Marketing Hard Cider in Michigan*. Michigan State University Product Center.
2. Rowles, Kristin. (June, 2000). Processed Apple Product Marketing Analysis: Hard Cider and Apple Wine. Staff Paper. Department of Agricultural Resource and Managerial Economics. Cornell University, Ithaca, New York.
3. Rowles, Kristin. (June, 2000). Processed Apple Product Marketing Analysis: Apple Cider. Staff Paper. Department of Agricultural Resource and Managerial Economics. Cornell University. Ithaca, New York.
4. ----- (2005). Study of the Apple Industry. Cornell University. Ithaca, New York.
5. ABC Cider Mill Business Plan. Michigan State Ag. Innovation Center.
6. Popa, Darclee and Harte, Janice. (2005). Cider Making From Traditional To Modern. Department of FSCN and MSU Product Center for Agricultural and Natural Resources.

Appendix 1 (Syllabus)

Entrepreneurship Fundamentals for Value-Added
Rural Businesses

ApEc 3991 Section__002__

Instructor: Ward E. Nefstead

Office: 249B ClaOff Blg

Phone: 612-625-7228

Email: wnefstea@aptec.umn.edu

Class Hours: Tuesdays, 3-5 p.m. ClaOffBlg 239/alternate sessions in COB 36

Class Description:

This class will involve the process of starting a new business or organization. It deals with entrepreneurship broadly defined as: "activities related to the process.. that someone follows who creates a new opportunity in business and assembles the resources necessary to exploit that opportunity- money, people and organization(Allen)." The class will involve creating a new *value proposition* in which people are willing to pay for this new product or service according to its perceived value. Starbucks is based upon a simple value proposition-"customers would enjoy an experience with a top grade coffee(upscaling coffee)." Student will identify market niches and develop plans to exploit them. Student-run businesses may be created as well as self-standing independent businesses. Examples of each will be given.

Course Objectives: Upon completion of the course, the student will be able to:

1. Describe the process of entrepreneurship.
2. Demonstrate the steps in formations of a business idea.
3. Complete planning steps including self-assessments, selecting a business model, etc.
4. Complete both business and marketing plans for the proposed product concept.
5. Use Marketing Plan Pro software to create plans.

Class Procedure:

The class will meet from 3-5 p.m. on Tuesdays. Discussion will be the primary teaching technique. Students will be given assignment to read, research and present certain topics. The instructor will coordinate discussion, provide resources and speakers or contacts.

Appendix 2 (Contract)

Hello, Ward - I spoke with Harry Hoch of Hoch Orchard (<http://www.hochorchard.com/>) and he'll make 10/11 work for a conference call - between 3-5PM.

Here's a prioritized list of work he's in need of at this point - as pieces of a business plan. We can discuss as a group what will be the best fit for the students, their skill sets, course goals, Harry's needs, etc. Harry may respond to this email with notes, additions, corrections...

1. Market analysis for apple/mixed fruit cider - focusing on organic market, who & where are suppliers/buyers (coops/natural food stores/grocers), wholesale & retail prices, price differentials, product development options
2. Cider processing equipment - manufacturers, features, prices, new/used availability, investigate AURI equipment in Crookston (Todd Sisson may be a contact)

3. Funding sources - public & private opportunities

4. Licensing and training requirements - HACCP, etc.

****PLEASE** confirm the conference call on Tuesday, 10/11, as your plans come together and tell us when to expect the call. Here are our numbers:

Harry: 507-643-6329

Erin: 507-365-8157

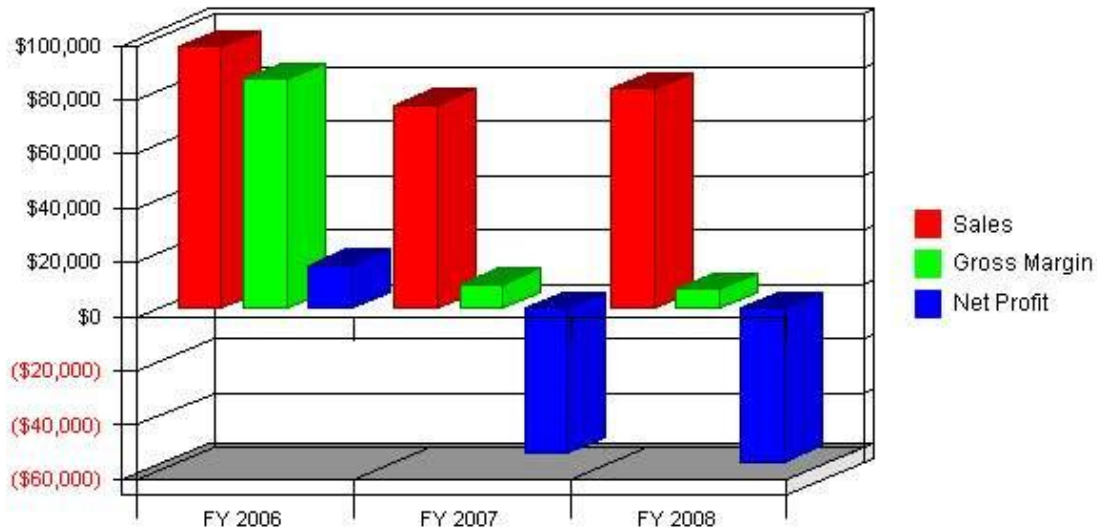
Let me know if you have any questions before next week.

Thanks for your interest in this project. We're excited by the opportunity.

Erin Tegtmeier, Director
Experiment in Rural Cooperation
tegtm003@umn.edu
U of MN, Rochester: 507-536-6313
Cell: 507-272-1956
Fax: 507-536-6311

The Experiment in Rural Cooperation is the

Appendix 3 (Excerpts from Bus. Plan)



1.1. Objectives

Hoch Orchards is embarking on a new venture by positioning the orchard as certified organic (one year into the conversion) and producing new products including organic apple cider, organic and flavored cider vinegar and within a three year period, a branded hard cider product. The key marketing concept is differentiation of the Orchard and its products and positioning within similar orchard operations. The construction of an apple cider processing facility also allows the possibility of processing apples from neighboring orchards- a community kitchen concept. It is assumed that cooperating businesses would either share ownership via a cooperative structure or pay fees for processing. The expansion into organic processed products will serve as an extension of fresh apple and grape sales, as well as some sales of organically-raised chickens. This will allow the business a fully year of operation as opposed to a more seasonal nature of similar orchard operations

One key objective is the construction of a larger apple cider processing facility. Details on this venture will be given later. A phase-in of the hard cider production will be planned in year 3 of the planning horizon. Expansion of marketing outlets will accompany the production expansion. In addition to farmers marketing in Onalaska and Eau Claire Wisconsin as well as sales to

nature and whole food stores in the Twin Cities of Minneapolis and St. Paul, an expansion to restaurants, Mpls./St. Paul farmers markets and upscale supermarkets such as Lunds/Byerlys will be planned.

1.2. Mission

The mission of Hoch Orchards expanded operations is to provide quality organic apple cider beverages to a larger market area in Minnesota and Wisconsin.

1.3. Keys to Success

Hoch Orchard expansion will be successful if it allows more full employment of owners and employees and generates additional income beyond the cost of expansion.

2. Company Summary

Hoch Orchard is located in LaCrescent, Minnesota

/Info on Hoch Orchard/

Hoch Orchard is small family farm located West of LaCrescent and South

of Nodine Minnesota. Our orchard's first trees were planted in the mid

1940's. There are only a handful of these old trees left on the farm

today. Our orchard operation consists of about six acres of the original

plantings of large standard size trees. The majority of our orchards are

new young trees planted in the past five years. These new orchards are

high-density plantings on dwarfing rootstock. We now have between 4000

and 5000 young trees planted on approximately fifteen acres. We are

looking forward to the next few years as our new plantings come into

production. There are many new high quality varieties in these new

orchards and we are excited about bringing these new apples to market.

We have over fifty apple varieties planted on our farm. Many of the

newest ones are just coming into production. Some of these new varieties

have been offered at the farmers markets and soon will be available to

wholesale buyers. Our Honeycrisp production should increase drastically

in the next couple years. We should also see Zestar, Sweet 16, Ginger

gold and several other great tasting new varieties increase in

production over the next few years.

Apples are not our only crop. We have about two acres of wine grapes and

a small amount of berries and vegetables. We also grow other tree fruit

for sale at the farmer's markets. We have around 100 young plum trees

that are just coming into production; we have a few apricots, cherries,

pears, and some peach trees. The peach trees are an experiment that we

hope will pay off. The key is finding a growing method that will help

the tender peach trees survive our harsh winters. There is nothing quite

like a tree ripened peach. Hopefully this project will be at least

somewhat successful so we can offer tree-ripened peaches to customers at

the

2.1. Company Ownership

Hoch Orchards is owned by Harry Hoch and his wife. Other business partners may be added in the future depending upon the business model chosen for the community kitchen concept. Some models involve the creation of a new generation cooperative with shares owned by patrons of the facility. An alternative model is private ownership of the commercial kitchen or processing facility. The State of Wisconsin has promoted the creation of community facilities of this nature.

2.2. Start-up Summary

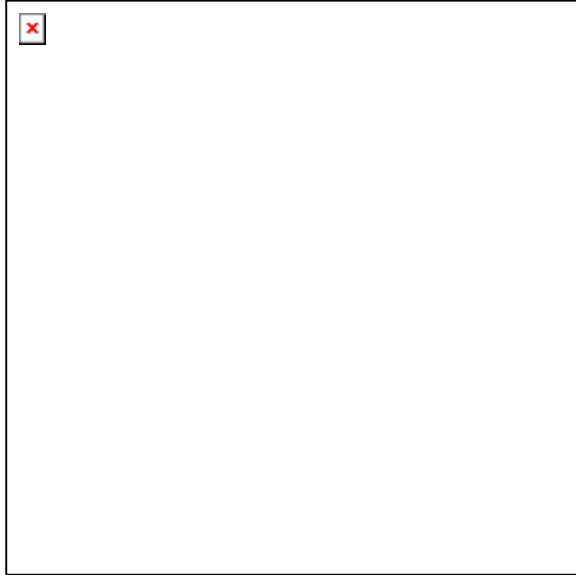
Introduction:

The following report gives information on apple processing equipment. This information includes certain specifications of the equipment price and simplicity of use. Its purpose is to help one determine the best option for upgrading their current cider equipment to a higher capacity system while saving money. Facts are based on research from the internet and interviews.

Findings:

The diagram below illustrates the optimal option for processing apples into apple cider. Research on the main components, which include (9) Chopper, (8) Feeder, (11) Press, (17) Pasteurizer, are summarized in the following research.

Apple Cider Processing Equipment



Chopping Equipment

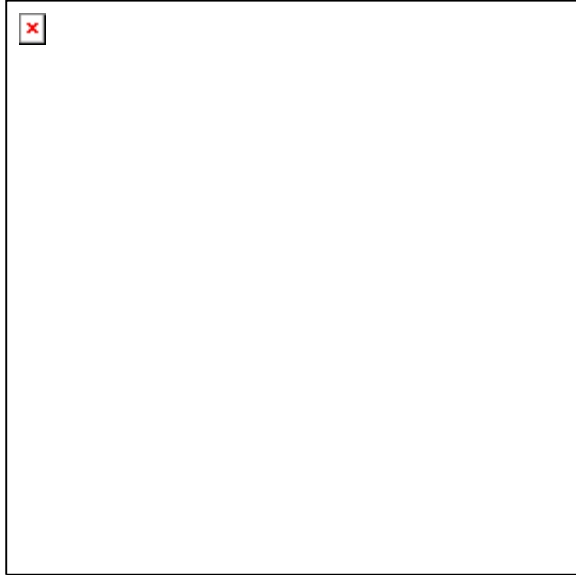
Chopping equipment is made of stainless steel and is used to cut apples into $\frac{1}{4}$ to $\frac{3}{4}$ inch pieces so that they may be pressed. According to the Goodnature representative the chopper should be able to handle 10-20% more capacity than the press₂.

Goodnature Chopper OESCO Chopper/Feed

Feed System

A feed system allows the chopped apples to move from the chopper to the press automatically for you so that the system is continuous. This allows the operator to not interfere with the juice making process in between chopping and pressing.

Goodnature Feed System



Presses

According to the Pennsylvania Tree Fruit Production Guide there are four different options for apple cider presses. They include a vertical hydraulic rack, frame, and cloth press; a horizontal hydraulic rack and cloth-bag press; a continuous belt press; and a pneumatic press¹. It is only necessary to review the facts about the vertical hydraulic rack, frame, and cloth press and the horizontal hydraulic rack and cloth-bag press because they are the only two which fit the capacity of this operation.

Vertical hydraulic rack, frame, and cloth press

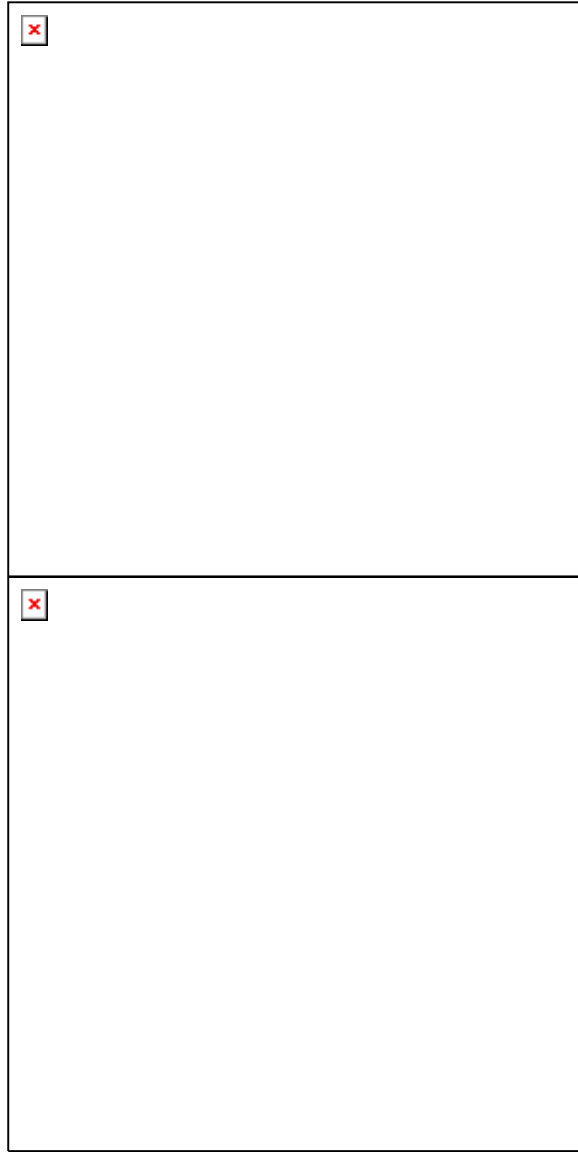
The vertical hydraulic rack, frame, and cloth press is the most common press for small scale operation because its price is significantly lower than other presses. Because of this it is also the most non efficient. "Compared to other presses, the batch-operated rack, frame, and cloth press is inefficient and has the highest labor cost for operating, cleaning, and maintaining the press. Yields may be similar to those from other presses if the particle size, use of a press aid, and fill of the cheeses are managed optimally. In terms of quality, the difficulty of cleaning and sanitizing an older press with wood surfaces increases the risk that the cider will have a higher initial microbial population and a shorter shelf life¹." It is believed that despite the lower yields of juices it produces this kind of press can often create the best flavor juice.

Horizontal hydraulic rack and cloth-bag press

The horizontal hydraulic rack and cloth-bag press is a very efficient machine. It can be used with or without a press aid which reduces prices. It is easily operated by one person, which makes it a very versatile machine. The yield which and quality of the juice is very high and the juice does not need to be filtered. "Only

the last 3 to 5 percent of the juice squeezed with a high-yielding press system is lower in flavor quality when tasted separately¹." The press is also easily cleaned and maintained so shelf life of final product is longer.

OESCO Press Goodnature Press

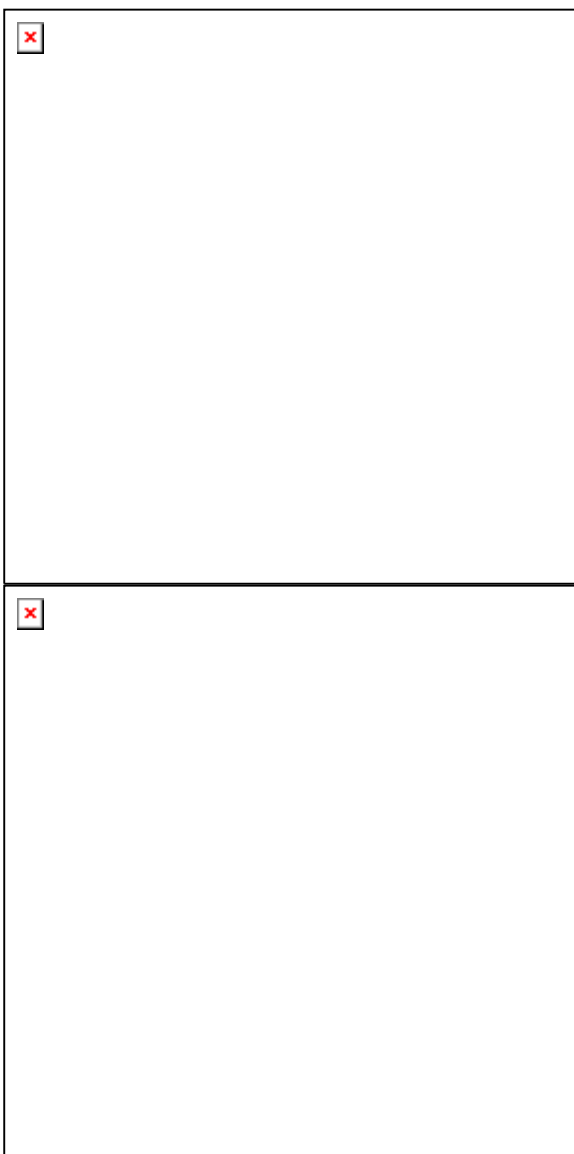


Pasteurizing Equipment

The two most effective ways to pasteurize juice without losing flavor are ultra violet and flash pasteurization. This is because according to The Food Safety Network "heat treatment destroys the vitamins and enzymes in the juice." With these two new technologies no vitamins or enzymes are harmed in the treating

process. In the case of ultra violet pasteurization it is a low cost option for operations this size. "Tests have shown that this particular design reduced *E. coli* 0157:H7 contamination from 100,000 microorganisms per ml to 1 organism per ml in a single pass." Flash pasteurizing is very similar in that the cider is heated for only a short amount of time which saves the flavor and vitamins from being changed. Both of these pasteurizers have been shown to increase shelf life as well. For example one farmer who uses flash technology stated, "What's nice about it is after we pasteurize, we don't have the sediment like we usually did. We get a longer shelf life, too. At least a week to 10 days longer." Both pasteurizers meet FDA requirements for elimination of E.Coli bacteria.

OESPasteurizer Goodnature Pasteurizer



Conclusions:

Goodnature System	Material	Capacity	Output	Size(LxWxH)
EG 400/50 Crop Chopper	Stainless Steel	6 tons/hr		42x20x39.93
150 Pomace Feed System	Stainless or Carbon Steel	600 Lbs.	1800 GPH	48x48x87.6
SX200 Squeezebo x	Stainless Steel	1.25 tons/hr	150- 200 GPH	81.5x58.5
Micro Flash Pasteurizer	Stainless Steel		600 GPH	51x43x74
Total			200 GPH	

The Goodnature representative suggested a customized system to the capacity standard that was needed. This system includes all of the aforementioned equipment (Findings) including a horizontal hydraulic rack and cloth-bag press. He ensured that all of the equipment was the best if needing a low maintenance, affordable option. He provided me the following information on features.

Maintenance	5 Log Ecol i	HiTemp./Low Time	Price
LOW			\$9,700.00
LOW			\$12,900.00
LOW			\$33,400
LOW	YES	YES	\$24,500.00
Total			\$80,500.00

OESCO's system options include a vertical hydraulic rack, frame, and cloth press. The representative informed me that the press requires about four people to operate. This is due to the fact that it cannot be self loaded and must be reloaded after every batch. He also informed me that the machine must be cleaned very frequently. However, this is why the price is much lower than other presses available. The following specifications were provided on the machinery.

OESCO System	Material	Capacity	Output	Size(LxWxH
Sanifeed and Grinder	Stainless Steel	440 bushels/hr		N/A
PLASTIC CIDER PRESS RACKS 32"	Polyethylene	ANY	ANY	32"
Orc 32D Press	Stainless Steel	1.00 tons/hr	150 GPH	N/A
CiderSure UV cider	Stainless		250-300	24x24x45

processor	Steel		GPH	
Total			150 GPH	

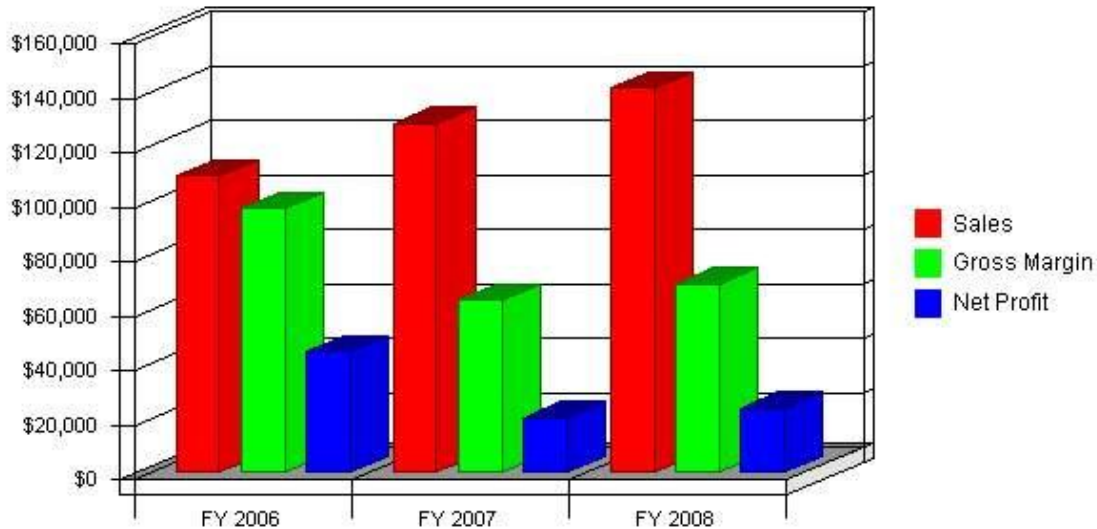
Maintenance	5 Log Ecol i	HiTemp./Low Time	Price
HIGH			\$7,869.00
HIGH			\$95.67
HIGH			\$22,887
HIGH	YES	YES	\$20,900.00
Total			\$51,751.67



Appendix 4(Red Tree Hard Cider Mk't Plan)

1. Executive Summary

Highlights



1.1. Objectives

Hoch Orchards is embarking on a new venture by positioning the orchard as certified organic(one year into the conversion) and producing new products including organic apple cider, organic and flavored cider vinegar and withing a three year period, a branded hard cider product. The key marketing concept is differentiation of the Orchard and its products and positioning within similar orchard operations. The construction of an apple cider processing facility also allows the possibility of processing apples from neighboring orchards- a community kitchen concept. It is assumed that cooperating businesses would either share ownership via a cooperative structure or pay fees for processing. The expansion into organic processed products will serve as an extension of fresh apple and grape sales, as well as some sales of organically-raised chickens. This will allow the business a fully year of operation as opposed to a more seasonal nature of similar orchard operations

One key objective is the construction of a larger apple cider processing facility. Details on this venture will be given later. A phase-in of the hard cider production will be planned in year 3 of the planning horizon. Expansion of marketing outlets will accompany the production expansion. In addition to

Apple Cider Processing

HACCP Plan: Apple Cider and Juice
Iowa State University
Ames, IA 50011

Flow Diagram for Apple Cider

