

NEEDS ASSESSMENT

Overview of Inputs Required for
Apple Juice Production in
Montezuma County



Components of Overall Project

- ✓ Updated Market Study for Montezuma County Apples (Complete and Available)
- ✓ Needs Assessment of Business Requirements for Apple Juice Production
 - Description of the Montezuma County Apple Juice Product*
 - Key Market Segments for Apple Juice from Montezuma County*
 - Overview of the Value Chain for Pasteurized Apple Juice*
 - Business Models for Producing Pasteurized Apple Juice*
 - Overview of the Value Chain for Apple Juice as Ingredient for Cider*
 - Business Models for Producing Apple Juice as Ingredient for Cider*
 - Summary of Key Inputs and Investments Required for Apple Juice Production*
- ✓ Business Plan for Apple Juice Production by MORP (To Be Developed)



As described in more detail in the Montezuma Valley Apple Market Study, Montezuma Valley's farmers started growing apples over a century ago. The story of these apples is unique and valuable -- and potentially "taste-able" and marketable. Over 3,000 trees planted prior to 1920 and another 4,000 trees planted between 1920 and 1960 remain in today's landscape.

The diverse flavors that result from the apples of vintage trees that thrive in the soil and climate of Montezuma Valley can be enjoyed as:

- fresh products,
- pasteurized apple juice or
- hard cider after the juice has been fermented.

The pages that follow describe the value chain and summarize requirements for producing juice for either direct consumption or for further fermentation.



The final drinkable products, pasteurized apple juice and hard apple cider, are both first pressed into a non-pasteurized apple juice. As shown in the picture to the left, MORP piloted this pressing process with a mobile juice press in 2016.

To make pasteurized apple juice, the non-pasteurized juice ingredient is then put through a pasteurization process. This pasteurization can be done with a piece of equipment on the mobile juice press.

To make hard apple cider, the non-pasteurized juice must be shipped to a cider maker who will mix it with other ingredients and ferment it into hard apple cider.

NOTE: Hard cider can also be made from pasteurized juice. Some hobbyists may purchase pasteurized juice for this purpose. However, most commercial cider makers prefer non-pasteurized juice for the fermentation process.

MORP will use a mobile juicer to make apple juice to be sold either:

1. Retail by MORP as pasteurized apple juice;
2. Wholesale by MORP or farmers to commercial cideries as an ingredient for cider (see picture to the right).

MORP will sell both the product (apple juice) and the service (pressing and pasteurization of the apples).

Product or Service	Customers
Retail Product = Pasteurized Apple Juice (produced and sold by MORP)	Local community and visitors to events
Retail Product = Pasteurized Apple Juice (produced and sold by MORP)	Hobbyists making hard cider
Wholesale Product = Unpasteurized Apple Juice (produced and sold by MORP)	Commercial Cideries
Service = Juicing and Pasteurization of Apple Juice for Consumption or Gifts (not for resale)	Farmers
Service = Juicing of Apple Juice as Ingredient for Cider	Farmers or Commercial Cideries

NOTE: Retail businesses are interested in purchasing and reselling pasteurized apple juice from MORP. Given the requirements for a HACCP plan (and an approved permanent building to house the press while doing such juicing), MORP considers this wholesale juice market a future opportunity.



Brant Clark from Widespread Malus transfers wholesale juice received from MORP into Settembre Cellars' steel drums for fermentation (2016 pilot)

Apple Production



Apples grown on over 100 different orchards close to Montezuma County

Apple Harvest



Apples harvested and sorted to meet specifications required for apple juice

Apple Juice Production



Apples juiced, pasteurized and boxed – and waste pulp spread as fertilizer on fields

Apple Juice Storage and Distribution



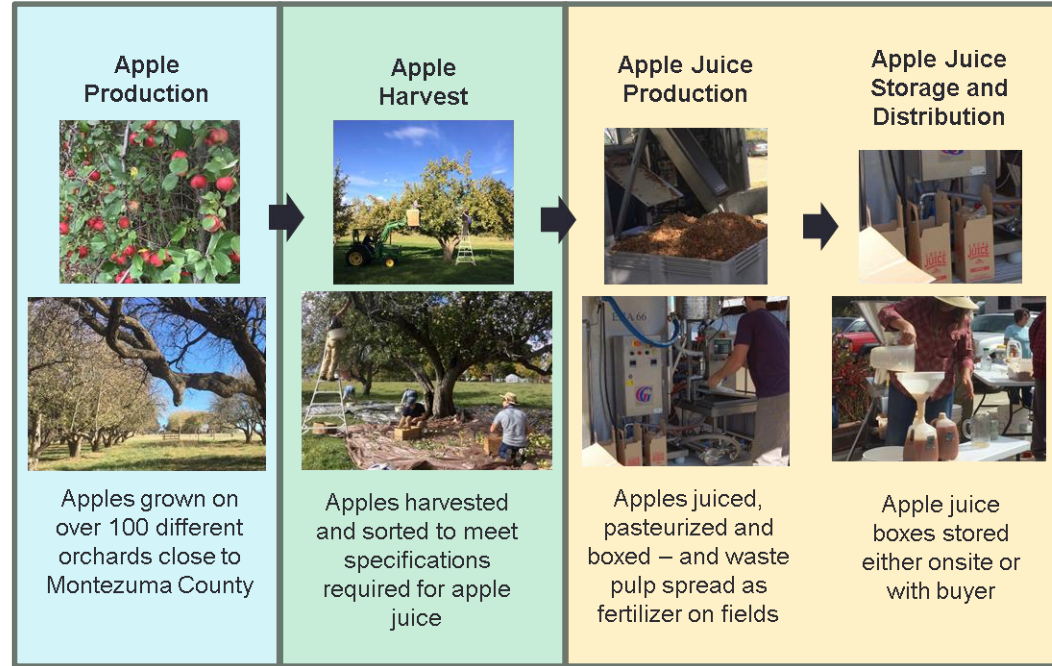
Apple juice boxes stored either onsite or with buyer

Model One (Product):

MORP buys apples from farmer, presses them, pasteurizes the juice and sells apple juice retail.

Consumers purchase the apple juice at events and on location. Hobby cider makers also purchase the apple juice as an ingredient for their cider.

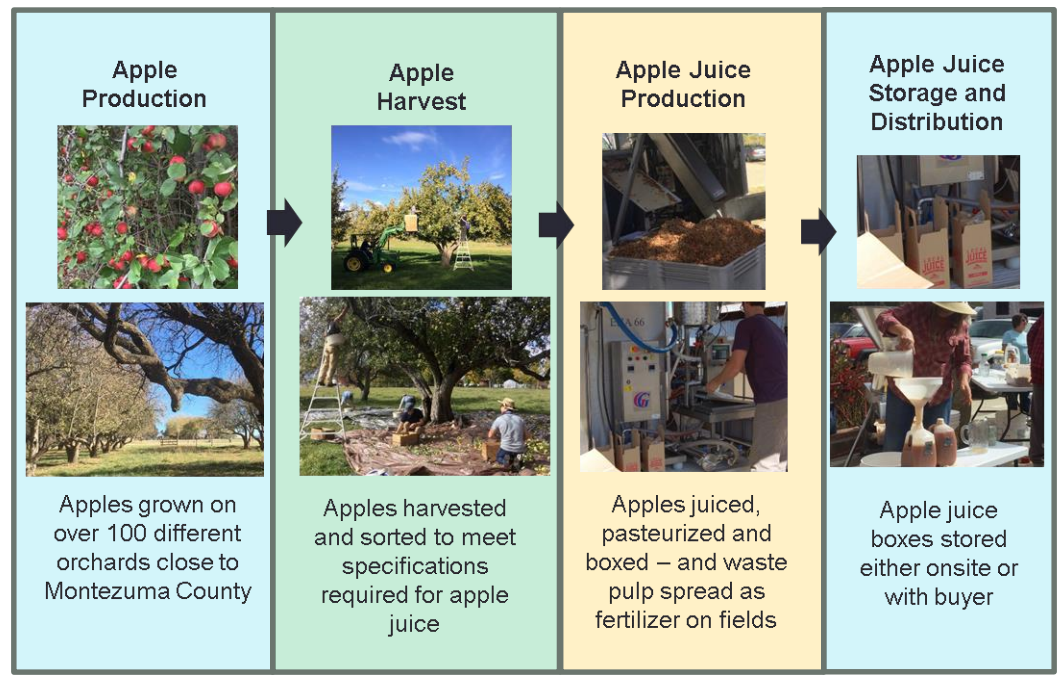
A future potential market for this juice would be online retail sales.



Model Two (Service):

Farmer hires MORP to make apple juice that the farmer consumes or gives to others (not to be resold).

A related version of this model might be a farmer hosting an apple picking event and visitors “hiring” MORP to make juice from the apples they had just picked.



Farmers

Farmer or MORP

MORP

Apple Production



Apples grown on over 100 different orchards close to Montezuma County

Apple Harvest



Apples harvested and sorted to meet specifications required for cider production

Apple Storage and “Ripening”



Apples aggregated and “ripened” for cider production

Apple Juice Production



Apples juiced (not pasteurized) and “toted”— and waste pulp spread as fertilizer on fields

Apple Juice Storage and Distribution



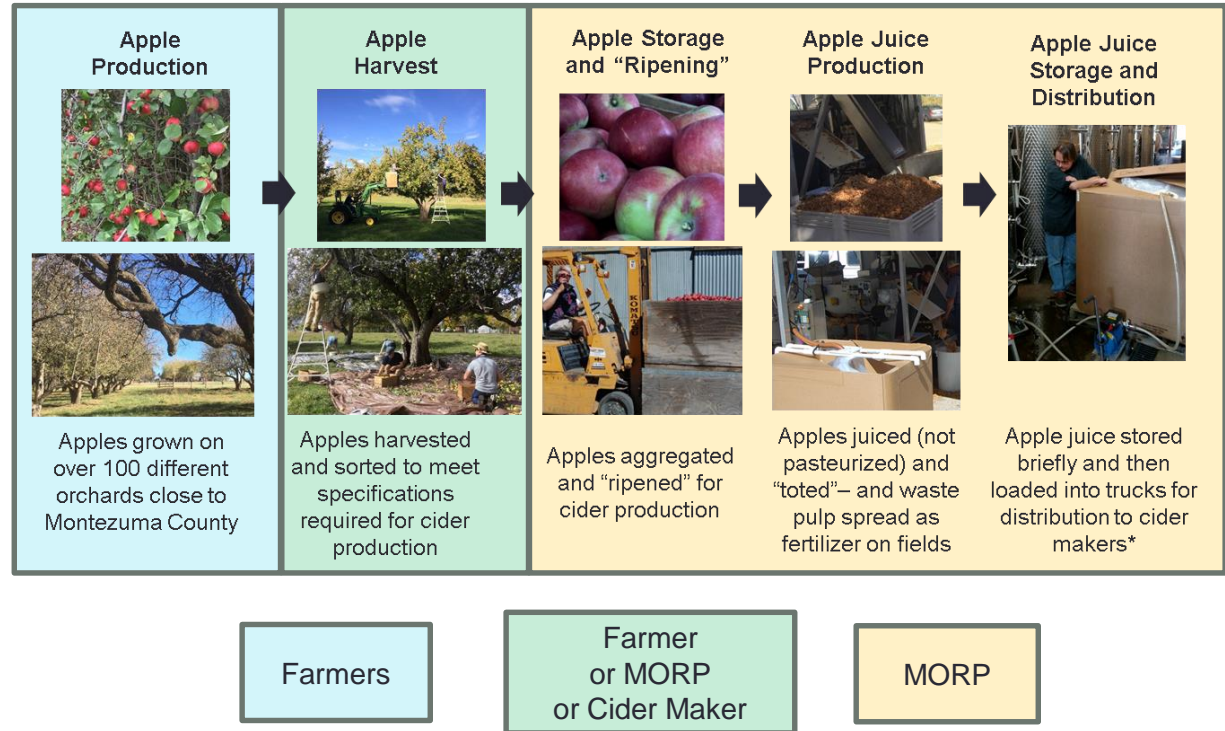
Apple juice stored briefly and then loaded into trucks for distribution to cider makers*

* Commercial cider makers will be encouraged to attend the pressing day(s) and load juice into their truck for same-day delivery.

Model One (Product):

MORP buys apples from farmer, stores and ripens some varieties in order to make apple juice for cider from a mix of the apple varieties.

Commercial cider makers purchase and transport the apple juice to their facilities for fermentation.

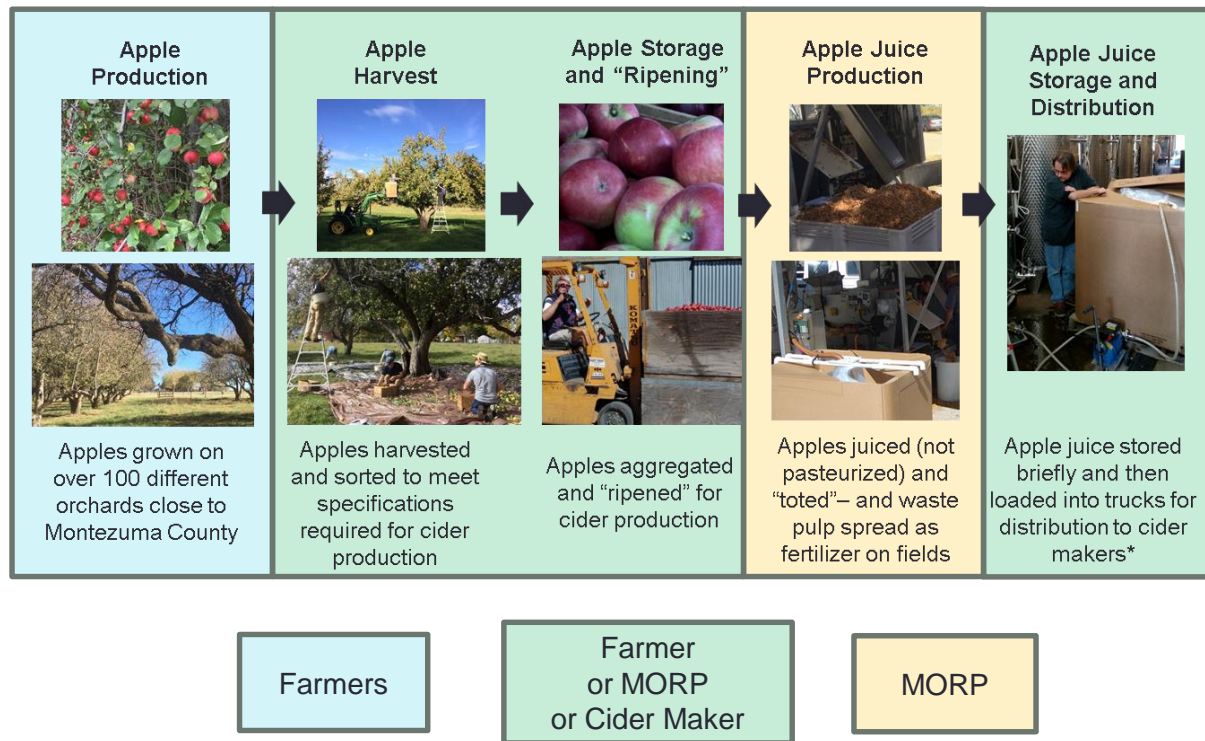


* Commercial cider makers will be encouraged to attend the pressing day(s) and load juice into their truck for same-day delivery.

Model Two (Service):

Farmer or commercial cider maker hires MORP to “custom-make” apple juice for cider from a mix of the apple varieties provided by the farmer. Commercial cider maker transports the apple juice to its facilities for fermentation.

In this model, the cider maker could contract with the farmer for apples (and pay for the juicing service) or the farmer could pay for the juicing service and then sell the apple juice to the cider maker



* Commercial cider makers will be encouraged to attend the pressing day(s) and load juice into their truck for same-day delivery.

Required Inputs for Production of Heritage / Vintage Apples

Apple Production



Apples grown on over 100 different orchards close to Montezuma County

Stage of Production	Required Inputs
Required for All Stages	Available Land, Appropriate Soil and Climate, Water
Rehabilitation (One-Time)*	Existing Trees, Fencing, Equipment and Labor for Pruning
Planting (One-Time)*	New Trees, Fencing, Equipment and Labor for Preparing Soil, Digging Holes and Planting
Cultivation (Annual)	Fertilizer, Pest and Weed Management, Labor for Farming and Pruning

** Certain orchards will need to be rehabilitated; others planted. MORP has developed basic financial models for the costs and returns of both rehabilitated and newly planted orchards.*

Required Inputs for the Harvest of Heritage / Vintage Apples

Apple Harvest



Apples harvested and sorted to meet specifications required for apple juice

Stage of Harvest	Required Inputs
Harvest (Annual)	Equipment (tractors, ladders, tarps, crates, bins), Labor for Harvesting and Sorting

Crates and bins for harvest and storage are a significant cost (with long payback periods) for individual farmers. These costs can be distributed across multiple farms if a single entity like MORP owned and recycled the bins, across a season that could last nearly six months (between the harvest time for different varieties and the ripening periods for some varieties for cider purposes.



Required Inputs for Storage and “Ripening” of Apples (for Cider Product Only)

Apple Storage and “Ripening”



Apples aggregated and “ripened” for cider production

Stage of Storage and “Ripening”	Required Inputs
Transport from Field	Bins for Storing Apples, Forklift for Loading Bins, Truck for Transporting, Labor for Transport
Storage and “Ripening”	Storage Facility and Bins for Ripening Certain Apple Varieties from Multiple Fields for 8-12 Weeks

Early Fall Apple Varieties which are Ready for Juicing for Cider Product at Harvest:

Grimes Golden, **Golden Delicious**, **Winter Banana**, Famuse/Snow, **MacIntosh**, Smith Cider, Senator, **Wealthy**

Late Fall / Winter Apple Varieties which Add Benefits to Cider Product with Post-Harvest Ripening:

Jonathan, Hewes Crab and other unknown Crabs, **Delicious**, **Rome**, Winesap, **Ben Davis**, Ralls, Wagener

NOTE: MORP has found the greatest number of the varieties in **bold**. These varieties would be used as the main juice component. The other varieties listed (and many more not listed) would be mixed into the blend to add character.

Required Inputs for Apple Juice Production

**Apple Juice Production
(for Pasteurized Juice)**



Apples juiced, pasteurized and boxed – and waste pulp spread as fertilizer on fields

**Apple Juice Production
(for Cider)**



Apples juiced (not pasteurized) and “toted”– and waste pulp spread as fertilizer on fields

Stage of Apple Juice Production	Required Inputs
Juicing and Packaging	Mobile Juice Press, Location for Docking Station with Power, Clean Water, Bathroom, Labor for Juicing
Packaging (Pasteurized Apple Juice)*	Five-Gallon Bag-in-Box Packages
Packaging (Unpasteurized Apple Juice for Cider)*	270-Gallon Totes
Waste Disposal	Fields for Spreading Pulp as Fertilizer, Truck / Tractor to Transport / Spread Pulp in Fields, Labor for Spreading Pulp

** Different types of packaging may be required for different customers. The packaging listed above for both the pasteurized apple juice and the cider product is a common way of packaging.*

Required Inputs for Juice Storage and Distribution

Apple Juice Storage and Distribution



Apple juice stored briefly and then loaded into trucks for distribution to cider makers

Stage of Storage and Distribution	Required Inputs
Storage (Pasteurized Apple Juice)	Location to Store (Shelf-stable) Pasteurized Apple Juice in Bag-in-Boxes
Storage (Unpasteurized Apple Juice for Cider)	Forklift-accessible Cold Room for Storing Cider Juice, 270-Gallon Totes, Forklift
Transport	Loading Dock, Labor for Loading Totes on Trucks



Juice transfer to drums at Clear Fork Cider (Denver)

Many commercial cideries are located in metropolitan areas. The cost of disposing of pulp from pressing on-site makes the purchase of juice in 270-gallon totes from Montezuma Valley particularly attractive. While MORP needs the ability to store apple juice for cider for a few days, most cideries prefer receiving the unpasteurized apple juice as soon after pressing as possible. As noted earlier, MORP will encourage commercial cider makers to attend the pressing day(s) and load juice into their truck for same-day delivery.

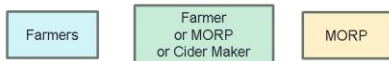
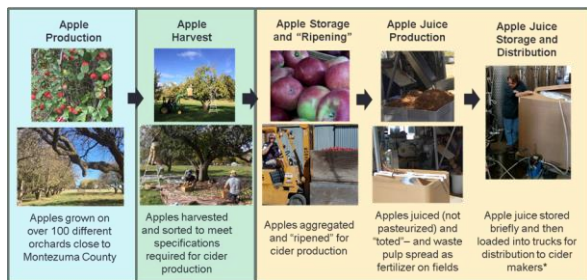
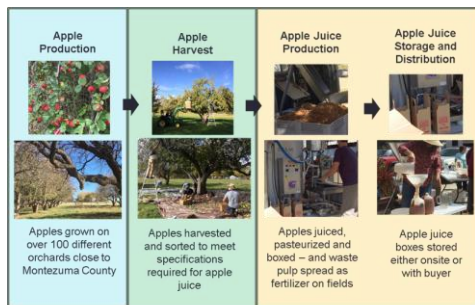


Barrels used by C Squared Cider for Fermenting Cider (Denver)

All Key Inputs and Investments Required for Apple Juice Production

Stage in Value Chain	Required Inputs
Apple Production	Available Land; Appropriate Soil and Climate; Water; Existing and New Trees; Fencing; Fertilizer; Pest and Weed Management; Equipment and Labor for Preparing Soil, Digging Holes and Planting, Farming and Pruning
Apple Harvest	Equipment for Harvesting and Sorting (tractors, ladders, tarps, crates, bins); Labor for Harvesting and Sorting
Storage and Ripening of Apples	Bins for Storing Apples; Forklift for Loading Bins; Truck and Labor for Transporting Apples to Storage Facility; Storage Facility and Bins for Ripening Certain Apple Varieties from Multiple Fields for 8-12 Weeks
Apple Juice Production	Mobile Juice Press; Location for Docking Station with Power, Clean Water, Bathroom; Labor for Juicing; Five-Gallon Bag-in-Box Package; 270-Gallon Totes; Fields for Spreading Pulp as Fertilizer; Truck / Tractor to Transport and Spread Pulp in Fields; Labor for Spreading Pulp
Apple Juice Storage and Distribution	Forklift-accessible Cold Room for Storing Cider Juice; 270-Gallon Totes; Forklift; Loading Dock, Labor for Loading Totes on Trucks

Investments Required for MORP to Produce Apple Juice

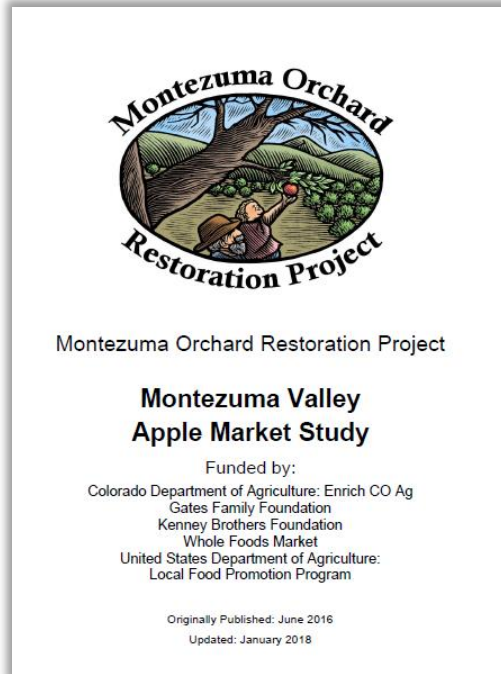


MORP will invest in the capacity to produce apple juice as an ingredient for cider and as a pasteurized juice. Doing so requires purchasing or renting the equipment and hiring the labor listed below.

Growing the apples needed for juice production (the first row) is the role of farmers, not MORP. Nevertheless, MORP will actively help farmers rehabilitate, plant and find funding for new orchards that will result in the needed increase in vintage apple production.

Stage in Value Chain	Required Inputs
Apple Harvest	Equipment for Harvesting and Sorting (tractors, ladders, tarps, crates, bins); Labor for Harvesting and Sorting
Storage and Ripening of Apples	Bins for Storing Apples; Forklift for Loading Bins; Truck and Labor for Transporting Apples to Storage Facility; Storage Facility and Bins for Ripening Certain Apple Varieties from Multiple Fields for 8-12 Weeks
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Apple Juice Storage and Distribution	Forklift-accessible Cold Room for Storing Cider Juice; 270-Gallon Totes; Forklift; Loading Dock, Labor for Loading Totes on Trucks

Additional Resources



The market report is available by clicking on the document above or going to the following website link:

<http://montezumaorchard.org/2016/09/22/montezuma-valley-apple-market-study/>

The Montezuma Valley Apple Market Study provides:

- An Overview of the History and Current State of Apple Orchards in Montezuma County
- An Outline of Potential Markets and Market Hurdles for Heritage / Vintage Apples from Montezuma County
- Financial Models for Projecting Investment Requirements and Returns for (a) Rehabilitating a Vintage Apple Orchard and for (b) Planting a New Heirloom Apple Orchard

User Inputs / Key Assumptions	ORCHARD ESTABLISHMENT			ORCHARD REHABILITATION		
	Scenario #1	Scenario #2	Scenario #3	Scenario #1	Scenario #2	Scenario #3
Trees / Acre	150 trees/acre	150 trees/acre	150 trees/acre	150 trees/acre	150 trees/acre	150 trees/acre
Average Yield / Tree at Year 5	5 bu/tree	5 bu/tree	5 bu/tree	5 bu/tree	5 bu/tree	5 bu/tree
Year 4 Yield as % of Year 5 Yield	60%	60%	60%	100%	100%	100%
Year 3 Yield as % of Year 5 Yield	15%	15%	15%	90%	90%	90%
Year 2 Yield as % of Year 5 Yield	0%	0%	0%	60%	60%	60%
% of Marketable Production - Retail Sales	10%	10%	10%	10%	10%	10%
% of Marketable Production - Wholesale Juice	20%	20%	20%	20%	20%	20%
% of Marketable Production - Wholesale Cider	70%	70%	70%	70%	70%	70%
Price per Bushel - Retail Sales	\$25.00 /bushel	\$30.00 /bushel	\$40.00 /bushel	\$25.00 /bushel	\$30.00 /bushel	\$40.00 /bushel
Price per Bushel - Wholesale Juice	\$2.00 /bushel	\$5.00 /bushel	\$7.50 /bushel	\$2.00 /bushel	\$5.00 /bushel	\$7.50 /bushel
Price per Bushel - Wholesale Cider	\$4.00 /bushel	\$6.50 /bushel	\$11.25 /bushel	\$4.00 /bushel	\$7.50 /bushel	\$11.25 /bushel
Average Labor Costs (\$/hr) - Over 5-Year Period	\$12.00 /hr	\$12.00 /hr	\$12.00 /hr	\$12.00 /hr	\$12.00 /hr	\$12.00 /hr
Outputs	Scenario #1	Scenario #2	Scenario #3	Scenario #1	Scenario #2	Scenario #3
Initial Investment	\$7,536 /acre	\$7,215 /acre	\$6,672 /acre	\$5,654 /acre	\$4,845 /acre	\$4,845 /acre
Annual (Full Production) Revenue at Year 5	\$4,275 /acre	\$6,413 /acre	\$10,031 /acre	\$4,275 /acre	\$6,938 /acre	\$10,031 /acre
Net Operating Profit at Full Production (Year 5)	\$1,798 /acre	\$3,935 /acre	\$7,554 /acre	\$1,557 /acre	\$4,219 /acre	\$7,313 /acre
Accumulated Net Cash Receipts at End of Year 5	-\$5,415 /acre	-\$1,675 /acre	\$4,658 /acre	-\$1,338 /acre	\$7,980 /acre	\$18,808 /acre
Breakeven Year (Assuming Continuing Year 5 Production)	Year 9	Year 6	Year 5	Year 6	Year 4	Year 3

Next Steps

✓ Business Plan for Apple Juice Production by MORP

Feasibility Study for a Mobile Juice Unit for Apple Juice Production by MORP

Overview of Apple Juice and Cider Production Financial Requirements, Thresholds and Risks

Overview of Industry, Market, Key Customers and Potential Competition

Financial Projections and Milestones

Building upon this Needs Assessment, the Business Plan for Apple Juice Production by MORP will model the five-year financials mobile juicing for both products (pasteurized apple juice and apple juice as an ingredient for cider) and services (fee for providing juicing to farmers and commercial cider makers).



MORP will invest in the capacity to produce apple juice as an ingredient for cider and as a pasteurized juice. Doing so requires purchasing or renting the equipment and hiring the labor listed below.

Growing the apples needed for juice production (the first row) is the role of farmers, not MORP. Nevertheless, MORP will actively help farmers rehabilitate, plant and find funding for new orchards that will result in the needed increase in vintage apple production.

Stage in Value Chain	Required Inputs
Apple Harvest	Equipment for Harvesting and Sorting (tractors, loaders, tarps, crates, bins); Labor for Harvesting and Sorting
Storage and Ripening of Apples (Cider Only)	Bins for Storing Apples; Forklift for Loading Bins; Truck and Labor for Transporting Apples to Storage Facility; Storage Facility and Bins for Ripening Cider; Apples from Multiple Fields for 8-12 Weeks
Apple Juice Production	Mobile Juice Press; Location for Docking Station with Power, Clean Water; Bathroom; Labor for Juicing; Five-Gallon Bag-in-Box Package; 270-Gallon Totes; Fields for Spreading Pulp as Fertilizer; Truck / Tractor to Transport and Spread Pulp in Fields; Labor for Spreading Pulp
Apple Juice Storage and Distribution	Forklift-accessible Cold Room for Storing Cider Juice; 270-Gallon Totes; Forklift; Loading Dock; Labor for Loading Totes on Trucks