



Bulletin E-3538

JANUARY 2026

# MICHIGAN CHESTNUT COST OF PRODUCTION, 2025



**AUTHORS:**

Chris Bardenhagen  
and Erin Lizotte

MICHIGAN STATE  
UNIVERSITY

Extension



## EXECUTIVE SUMMARY

Michigan chestnut acreage is growing. Planted acreage doubled from 675 acres in 2017 to over 1,300 acres in 2022. However, only 63% of the total acres in 2022 were bearing. The lengthy establishment period for these orchards will result in production volumes increasing steadily and substantially over the next five to ten years. Accordingly, industry actors will need to address how to meet higher demands for harvesting equipment and processing infrastructure in the coming years.

The costs for establishment of chestnut orchards are estimated at \$21,257 per acre. Given the long life of chestnut trees, this cost can be allocated over 32 production years, for a per-year establishment cost of \$664 per acre. The ongoing operating costs during production years—the costs needed to grow the nuts—came to \$1,541 per year for an acre.

For harvest costs, this study looked at both hand harvest and machine harvest. Hand harvest is often associated with on-farm packing activities, and so those related costs were included in the hand harvest budget. Hand harvest costs average \$3,182 per acre. Adding together the establishment, operating, and harvest costs, the grand total economic costs during production years come to \$5,387 per acre for hand harvested chestnuts (\$2.15 per pound).

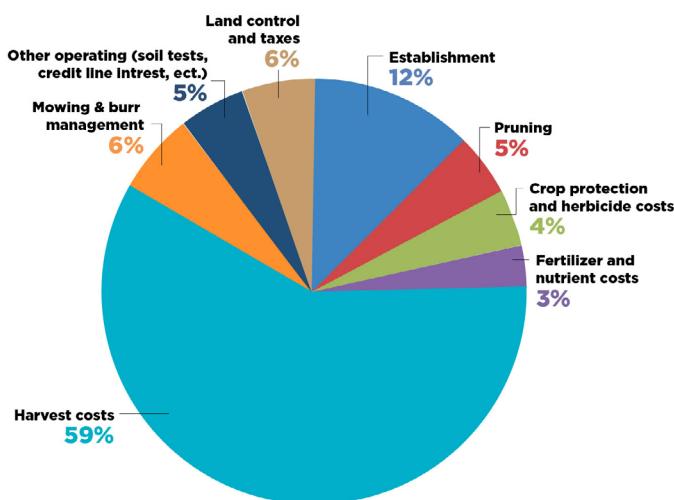
Machine harvest is generally associated with packing and marketing by a cooperative. As a result, we included trucking in the machine harvest budget. Machine harvest costs averaged \$859 an acre, with total economic costs during production years amounting to \$3,064 per acre for machine-harvested chestnuts (\$1.23 per pound).

At current prices and costs, chestnut production is profitable for both categories. Hand-harvested, direct-marketed chestnuts have the highest profitability and return on investment. This mode of operation does, however, require high levels of management and substantial time for marketing efforts. As a result, growers with smaller acreages tend to focus on direct sales. Growers that utilize machine harvest are garnering a strong return on investment. They can focus their efforts on managing larger acreages to obtain higher overall volumes.

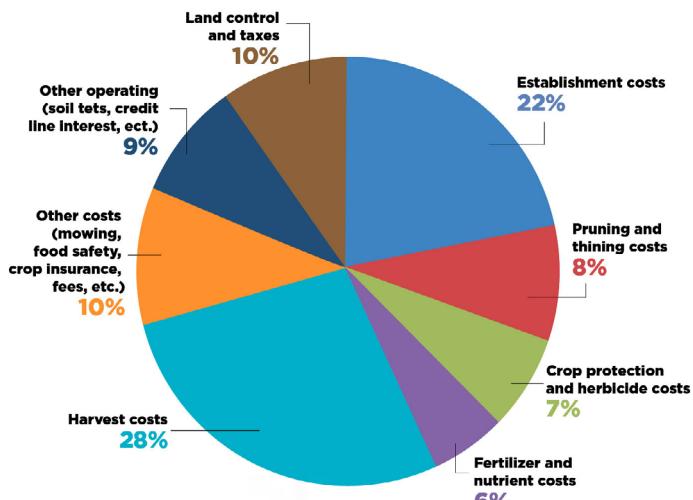
Note that many of the costs allocated to different production activities represent additional profits to growers who are doing those tasks themselves. A substantial percentage of chestnut growers, of all acreages, perform some or all of these for their farm (for example, pruning). However, as real economic costs, those labor allocations are directly included in our budgets.



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025



**Figure 1.** Costs by category for hand-harvested, farm-packed chestnut production.



**Figure 2.** Costs by category for machine-harvested, co-op packed and marketed chestnuts.

## INTRODUCTION

According to the 2022 Agricultural Census for Michigan, there are 216 chestnut farms in Michigan covering 1,322 acres (NASS 2024). The interest in chestnuts is clear, with 73 new farms and acreage having doubled from 2017.

However, chestnut production takes substantial time to develop. Trees require nearly a decade to produce significant yields, and full production occurs about 15 years after planting. While a few orchards in Michigan date back 35 years, the vast majority of orchards are less than 20 years old. The result is that only 63% of Michigan chestnut orchards are bearing (NASS, 2024). The Michigan chestnut industry is still, in some sense, nascent, with orchard system design approaches just reaching the age to evaluate the relative success of each approach. On the other hand, a well-connected network of growers and researchers exists in Michigan. These industry actors have persistently developed infrastructure for processing, marketing, and research activities.

The majority of Michigan's chestnut acreage is located in the west central and southwest areas of the state, with the densest

production region extending from Ludington south, in areas adjacent to the Lake Michigan shoreline. However, significant chestnut plantings also exist in both the northern and southeastern regions of lower Michigan. Chestnuts grow well in acidic soils and well-drained, upland loamy sand sites that support cold air drainage. Chestnut trees have similar cold tolerance levels as cherry and peach, making winter injury to wood an issue, particularly when major temperature swings occur in late winter. Frost can also affect yields. Close proximity to Lake Michigan can help moderate temperatures providing some relief from winter injury and frost damage. Full-sized chestnut trees can grow as large as 40 feet in crown diameter and 40 feet tall.

While chestnut seedlings of Chinese origin used to be the dominant species planted in Michigan, the industry has moved toward the use of grafted, hybrid cultivars of European and/or Japanese origin. Grafted hybrids have a quicker onset of production, produce larger average nut sizes, and can produce higher yields than the Chinese cultivars. "Colossal" and "Bouche de Betizac" (BdB) are popular cultivars for Michigan growers.

Pollination is an important consideration for chestnuts because they are somewhat unique amongst Michigan horticultural crops. Chestnuts are self-sterile, and some are also



pollen sterile. Chestnuts are also primarily wind pollinated so orchard design needs to integrate all these factors to ensure adequate pollination. To optimize pollination and yield, growers plant an average of 5 different cultivars in every orchard, positioning heavy pollen producers upwind and avoiding large pockets of pollen sterile cultivars. The pollinators themselves produce good quality chestnuts, though yields and/or size may not be as optimal as the main varieties used.

## METHODS/ INFORMATION SOURCES

This study was conducted in the spring of 2025. Interview guides were developed using background information from previous studies (Black et al., 2013; Hochmuth et al., 2021) as well as interviews with key informants. Several individual interviews were then conducted with chestnut growers to better understand the current state of production and cost levels. These interviews informed the development of the focus group questionnaire/guide. The focus group was held in a central location to gather further production details from growers with diverse farm models to develop cost averages.

The resulting information was used to develop a cost of production spreadsheet that details various cost categories. Budgets were developed for two primary production phases (establishment and production) and also split into two categories based on harvest technique (hand harvest or machine harvest). Revenues and profits were calculated using a number of assumptions, and tables were developed to assess outcomes for different yield and price levels.

## ASSUMPTIONS

To create our cost budgets, we developed a number of assumptions. These were informed by the data we gathered from growers in 2025. A few of the main assumptions were:

- Seventy-two trees are planted per acre (20 feet x 30 feet), eventually thinned to 36 trees per acre
- Ten percent of trees need to be replanted throughout the early years, due to tree mortality
- Substantial production starts at year 8, and full production starts at year 15
- Land control/rental cost is \$250 per acre, and property taxes are \$50 per acre
- Local labor price is \$20/hr (manual and skilled)
- Average full production yield is 2,500 pounds per acre
- Prices:
  - Direct to consumer price is \$6 per pound
  - U-pick price is \$5 per pound
  - Local wholesale is \$4 per pound (also known as direct-to-retail)
  - Price to growers from local co-op is \$2.75 per pound (for delivered, packed chestnuts)

**Equipment.** Many of the assumptions for this study relate to equipment. Growers use a number of different approaches. Some utilize smaller-scale equipment to the extent they can, for example, zero-turn mowers. These growers might use a quad or side-by-side along with a small sprayer for crop protection, and a pull-behind spreader for fertilizing. However, as orchards get larger, it is not uncommon to pay someone to spray their orchard on a custom basis, using larger air-blast sprayers. Other growers have their own tractors and Airblast sprayers and use large orchard mowers.



On average, it might be assumed that growers start out with smaller-scale equipment during the substantially long establishment period and then acquire some larger-scale equipment as time goes on. Many growers will have a small tractor (40 horsepower) to use to flail mow the chestnut burrs and do other odds and ends work, such as pulling prunings from the field and hauling. It is common to use a pruning bucket machine for pruning activities.

When we estimated the costs of large-scale versus small-scale equipment, a number of trends came to light. First, while small-scale equipment is cheaper to purchase initially, it has a shorter useful life (and potentially smaller salvage value). This means that, when looking at the equipment over time, the smaller-scale equipment can have a similar hourly cost as the larger-scale. Second, while less capital is needed for smaller-scale equipment, tasks such as mowing take much longer for smaller equipment. Since hourly equipment costs are similar, but more labor is needed, the use of small-scale equipment actually has a higher economic cost in many cases. The countervailing benefit is a lower initial capital expenditure.

As a result of these findings, we created a number of custom rates for different tasks. These were informed by grower information, custom rates from other studies, and cost estimates we performed. We did develop a breakdown of hourly equipment costs that can be found in Table A13 in the appendix. We assumed that a pruning bucket machine (such as a Brownie) would eventually be acquired by the time the trees became substantially large. We also assumed a 40 horsepower general-use tractor will eventually be purchased. Note that the per-acre custom rates we developed do not include the cost of materials (crop protectants, herbicides, fertilizer). Materials are accounted for separately. The custom rates are:

- Crop protection spray (includes equipment usage AND labor): \$24 per trip

- Fertilizer spreader rental: \$10 per trip
- Herbicide spray: \$13 per trip
- Orchard mowing: \$22 per trip
- Flail mowing for burr management: \$27 per trip

The custom costs are multiplied by the number of trips required per year for the respective tasks. For example, herbicides are generally sprayed twice a year. Note that the machine harvest and trucking cost assumptions are detailed in the Harvest section of this report.

## ORCHARD ESTABLISHMENT

Orchard establishment starts with ground preparation, sometimes requiring the clearing of pine stands or old orchards. In some cases, fields are already open, such as when land is converted from row crops directly into chestnuts. Our budget includes costs for the removal of a previous orchard, similar to other tree fruit budgets. This covers many of the usual cases and allows for comparison between the tree fruit alternatives that growers may be interested in (Black et al., 2013).

**Orchard design & planting.** Orchard design and tree density is an important factor in chestnut production. Since chestnuts can grow a crown 40 feet in diameter, trees planted more closely together will require the removal of trees to prevent crowding as the orchard matures. However, planting trees with wide spacing so that tree removal is not required will mean that there is a large amount of unused space for some time. While chestnut trees grow relatively quickly, it can take more than 20 years to get to full size.

There are a few different approaches that growers take to this. Some plant at the desired target spacing, 30 feet x 40 feet, or 40 feet x 40 feet, and during the early years might intercrop with hay or another



crop. Other growers will start out with a closer planting, such as a spacing of 15 feet x 20 feet. At about 15 years old, they will take out every other tree. This will get them to their desired 30 feet x 40 feet average spacing. This approach has a higher initial tree cost, but it enables more production during the early years because there is more surface area under tree canopy. Still other growers plant at densities in between these approaches, for example, targeting a 30 feet x 30 feet spacing. This density has advantages but might require more aggressive pruning to keep the trees within their space during mature production years.

Pollinizer tree placement is another important aspect of orchard design. Some orchards have been planted with each row having pollinizers mixed in with the main bearing cultivars (Colossal, BdB). However, the standard many growers are following with new plantings is to plant one row of pollinizers for every three rows of main varieties. Growers will often plant that pollinizer row with three to six different cultivars, staggered down the row. In terms of pollinizer effectiveness relative to overall orchard density, growers don't seem to find a difference in plantings that are lower density from the start (36 trees per acre) versus higher (72 to 100 trees per acre). Both seem to ensure adequate pollination.

Trees are usually planted in fall, to match when most tree nurseries ship (though some growers do prefer planting in the spring). Sourcing of trees has caused some past planting constraints for growers. Currently, for large orders, growers need to order the trees from the nursery two or three years ahead of planting. In terms of quality, some growers have found that bigger and larger diameter trees experience less winter injuries.

Stakes are used to support newly planted trees. Bamboo can be used, but reusable steel conduit poles are popular with growers. A wire cage, or tree tubes, are used to keep deer away from the growing shoots for the early years. Approaches at early year fencing vary, but some find that a 3.5 foot

radius circle of fencing is sufficient to deter wildlife. Permanent deer fencing should be considered in high pressure areas to protect growing trees and nuts at harvest.

**Orchard floor.** For the orchard floor, many growers plant an orchard mix, while some let native grasses grow into the row middles. Note that in the early years, more mowing may be required to cover a greater surface area. As trees grow, the drip line under the tree canopy becomes wider and easier to maintain. Whatever is selected for the orchard floor, growers should focus on species that hold up to equipment and make harvesting off the ground as easy and clean as possible.

**Irrigation.** In early years, one drip line per row is normally installed, running near the trunks of the trees. This line could have press-in emitters or might have built-in emitters every four feet. The standard emitter used is .92 gallons per hour. For new orchard establishment, we allocated some cost for a pump/well and mainline development (Table 1). If a particular orchard already has a well and mainline, this cost can potentially be taken out; however, pump maintenance or replacement might still be required where there is an existing system.



Chestnuts ready to fall out of the husk.  
(Erin Lizotte, MSU Extension)



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

**Table 1.** Pre-plant and planting costs for Michigan chestnuts.

| ESTABLISHMENT COSTS for CHESTNUT PRODUCTION            | Time       | Labor Rate | Materials              | Equipment Rate          |                           | Subtotal                     | TOTAL<br>\$/Acre |
|--|------------|------------|------------------------|-------------------------|---------------------------|------------------------------|------------------|
|  | Hours/Acre | \$/Hour    | or Custom Cost \$/Acre | \$/Hour Variable (cash) | \$/Hour, Fixed (non-cash) | \$/Acre                      |                  |
| <b>Pre-plant (Year 0 or Spring Year 1)</b>             |            |            |                        |                         |                           |                              |                  |
| <b>Land clearing</b>                                   |            |            | \$600.00               |                         |                           | \$600.00                     |                  |
| <b>Roots and rocks</b> — all in cost                   |            |            | \$350.00               |                         |                           | \$350.00                     |                  |
| <b>Tillage</b> — various tasks, all in                 |            |            | \$100.00               |                         |                           | \$100.00                     |                  |
| <b>Cover crop</b> (or grass strip) — all in            |            |            | \$50.00                |                         |                           | \$50.00                      |                  |
|  |            |            |                        |                         |                           | <b>Total Pre-plant Costs</b> | <b>\$1,100</b>   |
| <b>Planting — Fall of Year 1</b>                       |            |            |                        |                         |                           |                              |                  |
| <b>Tree costs</b>                                      |            |            |                        |                         |                           |                              |                  |
| \$35 per tree (including shipping) x 72 trees per acre |            |            | \$2,520.00             |                         |                           | \$2,520.00                   |                  |
| <b>Planting</b>  |            |            |                        |                         |                           |                              |                  |
| Preparation and row marking                            | 1.0        | \$20.00    |                        |                         |                           | \$20.00                      |                  |
| Labor for 72 trees, hand dug                           | 15.0       | \$20.00    |                        |                         |                           | \$300.00                     |                  |
| <b>Tree guards</b> — \$.35 per tree                    |            |            | \$25.20                |                         |                           | \$25.20                      |                  |
| <b>Stakes</b> — metal conduit, \$4.78 each             |            |            | \$344.16               |                         |                           | \$344.16                     |                  |
| <b>Fencing</b> — wire cages, \$6 per tree              |            |            | \$432.00               |                         |                           | \$432.00                     |                  |
| <b>Trickle</b>   |            |            |                        |                         |                           |                              |                  |
| Line — one above ground drip line                      |            |            | \$270.00               |                         |                           | \$270.00                     |                  |
| Mainline cost  |            |            | \$300.00               |                         |                           | \$300.00                     |                  |
| Allocation for well                                    |            |            | \$700.00               |                         |                           | \$700.00                     |                  |
| Labor for drip/main line install                       | 10.0       | \$20.00    |                        |                         |                           | \$200.00                     |                  |
|  |            |            |                        |                         |                           | <b>Total Planting Costs</b>  | <b>\$5,111</b>   |

**Early/pre-production years.** While chestnuts grow quickly, they take several years to produce measurable amounts of nuts. We consider the first eight years as the “early years”, when certain specific costs are incurred before substantial production sets

in. For example, tree painting is often done several times during the early years, and trickle will often be re-installed right before the production years start. See Table 2 for more details.



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

**Table 2.** Early year production costs for Michigan chestnuts.

| ESTABLISHMENT COSTS for CHESTNUT PRODUCTION                                       | Time       | Labor Rate | Materials              | Equipment Rate          |                           | Subtotal | TOTAL<br>\$/Acre |
|---|------------|------------|------------------------|-------------------------|---------------------------|----------|------------------|
|   | Hours/Acre | \$/Hour    | or Custom Cost \$/Acre | \$/Hour Variable (cash) | \$/Hour, Fixed (non-cash) | \$/Acre  |                  |
| <b>Growing Years 1 through 8</b>  |            |            |                        |                         |                           |          |                  |
| <b>Pruning &amp; brush removal — Labor</b>  | 3.0        | \$20.00    |                        |                         |                           | \$60.00  |                  |
| 40HP tractor or equivalent  | 1.0        |            |                        | \$9.95                  | \$11.47                   | \$21.42  |                  |
| <b>Mulch</b> — 1 bale/tree on years 1, 4, and 7 (cost spread over 8 years)        |            |            | \$72.00                |                         |                           | \$72.00  |                  |
| <b>Tree Painting</b> -- On years 1, 4, and 7, \$14 per time (spread over 8 years) |            |            |                        |                         |                           |          |                  |
| Labor — 4 hours per event   | 1.5        | \$20.00    |                        |                         |                           | \$30.00  |                  |
| Materials — \$42 over 8 years   |            |            | \$5.25                 |                         |                           | \$5.25   |                  |
| <b>Fertilizer</b>   |            |            |                        |                         |                           |          |                  |
| Labor for 2 trips including material pickup & spreader return                     | 1.0        | \$20.00    |                        |                         |                           | \$20.00  |                  |
| Spreader rental x 2   |            |            | \$20.00                |                         |                           | \$20.00  |                  |
| Materials (assume same as full program)   |            |            | \$140.00               |                         |                           | \$140.00 |                  |
| <b>Mowing</b>   |            |            |                        |                         |                           |          |                  |
| Labor — average between approaches  | 3.8        | \$20.00    |                        |                         |                           | \$75.00  |                  |
| Custom machine rate \$22 x 3 trips  |            |            | \$66.00                |                         |                           | \$66.00  |                  |
| <b>Crop Protection</b>  |            |            |                        |                         |                           |          |                  |
| Materials — 1/2 full production rate  |            |            | \$30.00                |                         |                           | \$30.00  |                  |
| Custom rate which <b>includes labor</b> : \$24 x 7 applications                   |            |            | \$168.00               |                         |                           | \$168.00 |                  |
| <b>Herbicide</b>  |            |            |                        |                         |                           |          |                  |
| Materials   |            |            | \$10.00                |                         |                           | \$10.00  |                  |
| Labor   | 1.3        | \$20.00    |                        |                         |                           | \$26.00  |                  |
| Custom machine rate \$13 x 2 trips  |            |            | \$26.00                |                         |                           | \$26.00  |                  |
| <b>Replants</b> — 10% over 8 establishment years                                  |            |            | \$31.50                |                         |                           | \$31.50  |                  |
| <b>Trickle</b> (Year 8, spread over 8 years)                                      |            |            |                        |                         |                           |          |                  |
| Drip line — two lines/row below ground at \$540 total                             |            |            | \$67.50                |                         |                           | \$67.50  |                  |
| Labor time for install 6 hours total  | 0.8        | \$20.00    |                        |                         |                           | \$15.00  |                  |
| 40 HP tractor 2 hours total   | 0.3        |            |                        | \$9.95                  | \$11.47                   | \$5.35   |                  |



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

**Table 2.** Early year production costs for Michigan chestnuts. (cont.)

| ESTABLISHMENT COSTS for CHESTNUT PRODUCTION | Time       | Labor Rate | Materials              | Equipment Rate          |                           | Subtotal                                    | TOTAL<br>\$/Acre |
|---|------------|------------|------------------------|-------------------------|---------------------------|---|------------------|
|   | Hours/Acre | \$/Hour    | or Custom Cost \$/Acre | \$/Hour Variable (cash) | \$/Hour, Fixed (non-cash) | \$/Acre                                     |                  |
| <b>Soil testing</b> — every 3 years, /acre  |            |            | \$1.00                 |                         |                           | \$1.00                                      |                  |
| <b>Leaf testing</b> — every year, /acre     |            |            | \$3.00                 |                         |                           | \$3.00                                      |                  |
| <b>Land control costs</b>                   |            |            | \$250.00               |                         |                           | \$250.00                                    |                  |
| <b>Real estate tax</b>                      |            |            | \$50.00                |                         |                           | \$50.00                                     |                  |
| <b>Management time</b>                      | 5.0        | \$40.00    |                        |                         |                           | \$200.00                                    |                  |
| <b>Credit line interest</b>                 |            |            |                        |                         |                           |   |                  |
| 8% APR on costs avg 4 months                |            |            | \$37.15                |                         |                           | \$37.15                                     |                  |
|   |            |            |                        |                         |                           | <b>Growing Phase Yearly Operating Costs</b> | <b>\$1,430</b>   |

For trickle re-installation, many growers will bury two drip lines per row about five inches below the surface. These will be placed about four feet from the base of the tree on each side. This keeps the line out of the way for mowing, burr management, and for many growers, machine harvesting. Some growers have created a tool that sits on the back of a tractor for burying the line. Many use drip lines with the built-in .92 gallon per hour emitters. However, another strategy used is to bury blank line first, then install emitters. The cost is slightly higher because more labor is involved, but the emitters can then be placed accurately by the trees, and higher volume emitters can be used if desired.

**Establishment totals.** To calculate total establishment costs, we multiplied annual early year costs by eight years and the added the pre-plant and planting costs (Table 3). We also included an allocation for the starting production years. During the starting production years, full yield is not yet achieved, and the trees are still filling in their space.

The total establishment costs divided are over the 32 production years.

**Table 3.** Total establishment cost calculations.

|   |                 |
|---|-----------------|
| <b>Pre-plant Costs</b>                                | <b>\$1,100</b>  |
| <b>Planting Costs</b>                                 | <b>\$5,111</b>  |
| <b>Growing Year Costs (Total for Years 1 to 8)</b>    | <b>\$11,441</b> |
| <b>Partial Allocation for Early Production Years*</b> | <b>\$3,604</b>  |
| <b>TOTAL CHESTNUT ESTABLISHMENT COSTS</b>             | <b>\$21,256</b> |
| <b>Allocation per year, for 32 production years</b>   | <b>\$664</b>    |

\* Years 9 through 14 have an average of 58% production, therefore  $42\% \times \text{base early year cost/year}$  is attributed to establishment.



## PRODUCTION

Chestnut fruits on current year wood and the trees bloom after the leaves come out. The fruit grows at the end of the limbs and requires plenty of light to support strong nut growth. For chestnut trees, surface area of leaves determines the yield, versus the number of limbs. As a result of all these traits, when trees overlap with each other, they shade out production. This makes pruning and ensuring adequate space exists between trees of very high importance during the production years. Some growers stated that overshading can drop an orchard's yield to half its potential.

**Pruning.** Pruning approaches vary. Some growers prune every year and some prune every second or third year. Disposal of pruned branches also takes a significant amount of time. This is because cuttings are large and generally need to be removed from the field. As mentioned in the Orchard Establishment section, management often requires whole tree removal at different points as the orchards mature. During these years, both pruning and brush/cutting disposal will be greater than average. Our pruning and brush disposal numbers look at the average over all years (see Table 5). The brush removal time of 1.5 hours per acre includes an allocation for burning or chipping once the brush is removed.



Chestnuts packaged for sale. (Erin Lizotte, MSU Extension)

**Fertilizer.** As with many specialty crops, approaches to fertilizing chestnut orchards are becoming more and more individualized. This is in part due to the ability to use soil and tissue tests to create very specific formulations targeted at an orchard's specific needs. Many growers rent the input dealer's fertilizer spreader and so are able to source these inputs and spread them in one package.

At the focus group, growers detailed two basic approaches to fertilizer. The first method includes about 100 pounds of both urea and potash per acre. The second method uses 126 pounds of urea, 80 pounds of potash, 15 pounds of K-mag, and 25 pounds of pelleted lime per acre. Both groups use about five pounds of foliar feed per acre (20-20-20), especially when the trees are young. See Table 4 for more details.

**Table 4.** Fertilizer amounts and costs, as detailed at the 2025 focus group.

| FERTILIZER MATERIAL COST — CHESTNUT FOCUS GROUP |      |                        |                                     |                        |                         |              |
|---|------|------------------------|-------------------------------------|------------------------|-------------------------|--------------|
| Type  | Cost | Approach 1<br>lbs/Acre | Approach 1<br>Cost/Acre             | Approach 2<br>lbs/Acre | Approach 2<br>Cost/Acre |              |
| <b>Urea 46-0-0</b>                              | /ton | \$700                  | 100                                 | \$35                   | 126                     | \$44         |
| <b>Potash 0-0-60</b>                            | /ton | \$520                  | 100                                 | \$26                   | 80                      | \$21         |
| <b>K-mag</b>                                    | /ton | \$670                  |                                     | -                      | 15                      | \$5          |
| <b>Lime-pelletized</b>                          | /ton | \$300                  |                                     | -                      | 25                      | \$4          |
| <b>Foliars (e.g. 20-20-20)</b>                  | /lb  | \$2.00                 | 5                                   | \$10                   | 5                       | \$10         |
| <b>Micros</b>                                   |      | Varies                 | Allocation:                         | \$30                   | Allocation:             | \$30         |
|   |      |                        | <b>TOTALS</b>                       | <b>\$101</b>           |                         | <b>\$114</b> |
|   |      |                        | <b>Average Cost for Focus Group</b> |                        | <b>\$107</b>            |              |



The average cost of the two focus group approaches was \$107 per acre. For our budget, however, we included all of the individual approaches we learned about with the costs identified at the focus group. Using all our information, we determined a \$140 average including foliar feeds and micronutrients (see Table 5).

**Pest and disease management.** The spray program varies to some extent as the trees age. Young trees need 3–4 insecticide applications to protect against black stem borer (usually pyrethroids). Young trees are also vulnerable to foliar feeding insects, including rose chafer and Japanese beetle, which generally require 2–3 applications (pyrethroids). Additionally, young trees are treated for potato leafhopper if needed (neonicotinoid). However, as the trees become mature, only about four pesticide application trips a year are needed. In order to deal with increasing fungal pathogens such as *gnomoniopsis*, these four trips include two to three fungicide sprays, one at bloom time and one about two weeks later. Leafhoppers are sprayed for in June, often using an imidacloprid product that can go into the tank along with a fungicide.

Weeds in the tree row are usually managed using herbicides, at least during the early years and the starting production years. After the trees fully mature, some growers have found it possible to forgo the use

of herbicides because the tree canopy shades out the orchard floor plants. However, until the trees are mature, growers usually spray 2.5 feet on each side of the tree going down the row. Approaches vary, but the first spray in late spring often incorporates glyphosate, and the second/final spray in the fall often includes paraquat.

**Mowing and burr management.** Mowing and burr management is an important aspect of production. Keeping the orchard floor clean is important for disease management and harvesting activities. The mowing equipment used varies across growers. Some growers use zero-turn lawn mowers. Others use small pull-behind mowers, towed by a quad. Some growers have large, bat-wing orchard mowers.

Generally, people combine flail mowings and regular grass mowings for orchard floor management. Many growers have some way to flail mow themselves, or they will hire a custom operator. The flail mowers pulverize the chestnut casings, or burrs, enabling them to decompose more quickly. This is an important step to keep the orchard floor clean for harvest and to reduce inoculum of the brown rot pathogen.

Table 5 illustrates the costs of growing the chestnuts during the production years.



Newly planted chestnut orchard. (Chris Bardenhagen, MSU Extension)



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

**Table 5.** Production year operating costs for Michigan chestnuts.

| PRODUCTION Years Budget for Michigan CHESTNUT production, 2025              |            |            |                        |                         |                         |          |              |
|---|------------|------------|------------------------|-------------------------|-------------------------|----------|--------------|
| Based on the 32 full production years during the 40 year total orchard life |            |            |                        |                         |                         |          |              |
| OPERATING COSTS   | Time       | Labor Rate | Materials              | Equipment Rate          |                         | Subtotal | TOTALS       |
|   | Hours/Acre | \$/Hour    | or Custom Cost \$/Acre | \$/Hour Variable (cash) | \$/Hour Fixed (Deprec.) | \$/Acre  | \$/Acre      |
| <b>Pruning</b>  |            |            |                        |                         |                         |          | <b>\$199</b> |
| -Labor hours  | 5.0        | \$20.00    |                        |                         |                         | \$100.00 |              |
| -Brownie  | 4.0        |            |                        | \$7.88                  | \$16.98                 | \$99.43  |              |
| <b>Brush disposal</b>   |            |            |                        |                         |                         |          | <b>\$62</b>  |
| -Labor  | 1.5        | \$20.00    |                        |                         |                         | \$30.00  |              |
| -40 HP tractor  | 1.5        |            |                        | \$9.95                  | \$11.47                 | \$32.12  |              |
| <b>Mowing</b> — Total for 4 trips per year                                  |            |            |                        |                         |                         |          | <b>\$141</b> |
| -Labor  | 3.8        | \$20.00    |                        |                         |                         | \$75.00  |              |
| -Custom machine rate \$22 x 3 trips   |            |            | \$66.00                |                         |                         | \$66.00  |              |
| <b>Crop protection</b>  |            |            |                        |                         |                         |          | <b>\$156</b> |
| -Materials  |            |            | \$60.00                |                         |                         | \$60.00  |              |
| -Custom rate ( <b>includes labor</b> ): \$24 x 4 trips                      |            |            | \$96.00                |                         |                         | \$96.00  |              |
| <b>Herbicide</b>  |            |            |                        |                         |                         |          | <b>\$62</b>  |
| -Materials  |            |            | \$10.00                |                         |                         | \$10.00  |              |
| -Labor  | 1.3        | \$20.00    |                        |                         |                         | \$26.00  |              |
| -Custom machine rate \$13 x 2 trips   |            |            | \$26.00                |                         |                         | \$26.00  |              |
| <b>Fertilizer</b>   |            |            |                        |                         |                         |          | <b>\$180</b> |
| -Labor for 2 trips including material pickup & spreader return              | 1.0        | \$20.00    |                        |                         |                         | \$20.00  |              |
| -Spreader rental x 2  |            |            | \$20.00                |                         |                         | \$20.00  |              |
| -Material costs, including foliars and micros*                              |            |            | \$140.00               |                         |                         | \$140.00 |              |
| <b>Burr management/flail mowing</b>   |            |            |                        |                         |                         |          | <b>\$168</b> |
| -Labor  | 3.0        | \$20.00    |                        |                         |                         | \$60.00  |              |
| -Custom machine rate \$27 x 4 trips   |            |            | \$108.00               |                         |                         | \$108.00 |              |
| <b>Other Operating</b>  |            |            |                        |                         |                         |          | <b>\$572</b> |
| <b>Soil testing</b> — every 3 years, per acre                               |            |            | \$1.00                 |                         |                         | \$1.00   |              |

(more)

MICHIGAN STATE UNIVERSITY EXTENSION

Copyright 2026 Michigan State University Board of Trustees.

**Table 5.** Production year operating costs for Michigan chestnuts. (cont.)

| OPERATING COSTS   | Time       | Labor Rate | Materials              | Equipment Rate          |                         | Subtotal | TOTALS         |
|---|------------|------------|------------------------|-------------------------|-------------------------|----------|----------------|
|   | Hours/Acre | \$/Hour    | or Custom Cost \$/Acre | \$/Hour Variable (cash) | \$/Hour Fixed (Deprec.) | \$/Acre  | \$/Acre        |
| <b>Leaf testing</b> — every year, per acre  |            |            | \$3.00                 |                         |                         | \$3.00   |                |
| <b>Real estate tax</b>  |            |            | \$50.00                |                         |                         | \$50.00  |                |
| <b>Land control tax</b>   |            |            | \$250.00               |                         |                         | \$250.00 |                |
| <b>Management time</b>  | 5.0        | \$40.00    |                        |                         |                         | \$200.00 |                |
| <b>Pickup use</b> — 40 miles/acre x \$.70 IRS rate  |            |            | \$28.00                |                         |                         | \$28.00  |                |
| <b>Farm Credit Line Interest</b> — on variable operating costs, 8% APR for average 4 months |            |            | \$40.01                |                         |                         | \$40.01  |                |
| <b>TOTAL OPERATING COSTS</b>  |            |            |                        |                         |                         |          | <b>\$1,541</b> |

\* Foliar materials are applied with crop protectants, so it is assumed there are no substantial additional application costs.

**Other production activities.** Soil and leaf testing are included in our budgets. Growers keep regular tabs on these nutrient needs so they can plan their inputs accordingly.

Some growers spray pollen during bloom time to help increase yields. This can help boost yield but may increase the risk of biennial bearing. This is still a nascent practice, so the costs and benefits are not included in our budgets.

## HARVEST

Harvest generally occurs from September 15 through November 1 in Michigan, and lasts for about four weeks in any given region. Most growers harvest at least three or four times over the season, sometimes more depending on marketing strategies. For quality considerations, it may be ideal to harvest as frequently as every five days. This is because packouts can be lower for nuts that drop and then dry out before they are harvested and subsequently cooled and the risk of internal rot issues increases with field heat exposure. However, labor and/or machine availability often present constraints to harvesting at such a frequency.

Fencing is used to exclude deer from the orchard during harvest. Many growers use temporary fencing. One common strategy that has been found to be effective is to develop a “3-D” system. For this, two lines are set up around the outside of the orchard, about 2 feet apart from each other. Metal posts are put in the ground permanently at the corners of the orchard, and temporary step-in posts are put up between them along the orchard perimeters each season. Wound, portable electric fencing is installed before harvest and then wound up after harvest using a reel. For the outside line, two wires are set—one at 12 inches high and one at 40 inches high. The inside line has a wire set at 30 inches. While the lines are not high relative to a permanent deer fence, the gap between the lines (the “3-D” effect) deters deer from entering.

Harvest cost budgets were developed for two categories of growers: those that harvest by hand and those that harvest using machines.

**Hand harvest.** Growers that engage in hand harvest will pay people to gather nuts using tools such as a “nut wizard”. These growers tend to market their produce directly to



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

consumers or wholesale to local stores (sometimes referred to as “direct to retail” sales). Some engage in U-pick operations at the farm.

Details of hand harvest costs are illustrated in Table 6. Note that in regard to U-pick costs, the grower saves labor and packing

costs totaling \$1.00 per pound, because the customer picks the nuts. We found that the average U-pick price was \$1.00 less than the direct-to-consumer price—\$5.00 versus \$6.00 per pound. As a result, we do not distinguish between U-pick sales and direct-to-consumer sales within the budget because the net calculation is equal.

**Table 6.** Hand harvest costs for direct market/farm packed Michigan chestnuts.

| HAND HARVEST COSTS for Michigan Direct Market/Farm Packed CHESTNUT production, 2025                              |               |             |                       |                    |                 |
|--|---------------|-------------|-----------------------|--------------------|-----------------|
| HAND HARVEST COSTS   | Cost/<br>Acre | Cost/<br>lb | Harvested<br>lbs/Acre | Subtotal /<br>Acre | TOTALS<br>/Acre |
| <b>Variable cost items — hand harvest, farm packed</b>   |               |             |                       |                    | <b>\$3,125</b>  |
| -Labor costs   |               | \$0.60      | 2,500                 | \$1,500.00         |                 |
| -Packing costs   |               | \$0.40      | 2,500                 | \$1,000.00         |                 |
| -Packaging: bags, quarts, etc.   |               | \$0.25      | 2,500                 | \$625.00           |                 |
| <b>Overhead cost items — hand harvest/farm packed</b>  |               |             |                       |                    | <b>\$57</b>     |
| -Fencing — for harvest period (step-in posts, corners, wire, charger & battery per acre assuming a 6-acre setup) | \$21          |             |                       | \$21.00            |                 |
| -Cooling — estimate for equipment & operating costs, OR fees for custom cooling <b>@ 1 cent per pound</b>        | \$25          |             |                       | \$25.00            |                 |
| -Nut Wizard — replacement cost at one per acre per year  | \$11          |             |                       | \$11.00            |                 |
| <b>TOTAL HARVEST COSTS</b>   |               |             |                       |                    | <b>\$3,182</b>  |

Using these hand harvest costs, we can calculate the total cost of production for hand-harvested, farm-packed chestnuts. As Table 7 shows, these costs include

the operating costs, harvest costs, and an allocation for establishment. Grand total costs are shown on both a per-acre (\$5,387) and per-pound basis (\$2.15).

**Table 7.** Total costs per acre for hand-harvested, farm-packed chestnuts.

| DIRECT MARKET/FARM PACKED CHESTNUT BUDGET TOTALS |                |
|--|----------------|
| <b>TOTAL OPERATING COSTS</b>                     | <b>\$1,541</b> |
| <b>TOTAL HAND HARVEST COSTS</b>                  | <b>\$3,182</b> |
| <b>TOTAL ESTABLISHMENT COSTS*</b>                | <b>\$664</b>   |
| <b>GRAND TOTAL COSTS per Acre</b>                | <b>\$5,387</b> |
| <b>GRAND TOTAL COSTS per lb</b>                  | <b>\$2.15</b>  |

\* Establishment costs include preparation, planting, pre-harvest years, and allocations for early years with less than full yield.



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

**Machine harvest.** Other growers utilize machines to harvest their orchards. They often work with custom harvesters. Growers using machine harvest usually market their produce through a cooperative. The cooperative receives, cools, holds, packs,

and markets the chestnuts for its member growers.

For growers engaged in machine harvest, costs tend to be cheaper on a per acre basis, even after trucking is considered (Table 8).

**Table 8.** Machine harvest costs for Michigan chestnut production.

| MACHINE HARVEST COSTS for Michigan Co-op Packed and Marketed CHESTNUT production, 2025                            |           |         |                       |                            |                 |
|---|-----------|---------|-----------------------|----------------------------|-----------------|
| MACHINE HARVEST COSTS   | Cost/Acre | Cost/lb | Harvested<br>lbs/Acre | Subtotal /<br>Acre         | TOTALS<br>/Acre |
| <b>Variable cost items — machine harvest, co-op packed</b>  |           |         |                       |                            | <b>\$813</b>    |
| -Custom Harvest — \$320 per hour, based on 1,250 lbs/hour average*  |           | \$0.26  | 2,500                 | \$640.00                   |                 |
| -Transport costs for custom-harvest machine**   | \$48.00   |         |                       | \$48.00                    |                 |
| -Trucking to co-op/ packer***   |           | \$0.05  | 2,500                 | \$125.00                   |                 |
| <b>Overhead cost items — machine harvest, co-op packed</b>  |           |         |                       |                            | <b>\$46</b>     |
| -Fencing — temporary (includes step-in posts, corner posts, wire, charger, & battery per acre for a 6-acre setup) | \$21      |         |                       | \$21.00                    |                 |
| -Cooling — estimate for equipment & operating costs, OR fees for custom cooling                                   | \$25      |         |                       | \$25.00                    |                 |
| -Bin replacement — covered by co-op   | —         |         |                       | —                          |                 |
|   |           |         |                       | <b>TOTAL HARVEST COSTS</b> | <b>\$859</b>    |

\* Pounds per hour can vary substantially based on the cleanliness of the orchard (more or less sticks and debris).

\*\* Transport costs are based on an average 10 acre plot needing 3 harvests, assuming 50 miles each way travel at \$80 per hour.

\*\*\* Trucking costs assume \$240/day truck rental, 6 hours of labor time, 80 miles one-way, \$4 fuel, and 16 mpg (total \$400) for 8,000 pounds/trip.

Custom machine costs were based on information provided by a custom operator. We also calculated the costs that a grower would incur for purchasing and maintaining a FACMA harvesting machine. The total we developed included driving time and was similar to the cost of working with a custom operator, provided the machine was used for at least 20 acres. Cost savings might accrue if a grower or group of growers has about 40 acres to harvest with a machine.

One way that growers can minimize custom harvest costs is to ensure that the orchards are very clean when the machine harvester arrives. Fallen sticks and other debris can require the operator to stop frequently, greatly increasing the time needed for harvesting.

Table 9 illustrates the total costs of production including operating costs, harvest costs, and an allocation for establishment costs. Grand total costs are shown on both a per-acre (\$3,064) and per-pound basis (\$1.23).

**Table 9.** Total costs per acre for machine-harvested chestnuts.

| MACHINE HARVESTED, CO-OP PACKED & MARKETED BUDGET TOTALS |                |
|--|----------------|
| <b>TOTAL OPERATING COSTS</b>                             | <b>\$1,541</b> |
| <b>TOTAL HARVEST COSTS</b>                               | <b>\$859</b>   |
| <b>TOTAL ESTABLISHMENT COSTS</b>                         | <b>\$664</b>   |
| <b>GRAND TOTAL COSTS per Acre</b>                        | <b>\$3,064</b> |
| <b>GRAND TOTAL COSTS per lb</b>                          | <b>\$1.23</b>  |

\* Establishment costs include preparation, planting, pre-harvest years, and allocations for early years with less than full yield.



**Other systems.** It should be noted that some growers can hand harvest for the cooperative, and other growers could use machine harvesting for their farm-packed, local/direct sale chestnuts. To mix and match between these two budget categories in order to evaluate your specific farm situation, please contact corresponding author Chris Bardenhagen, [bardenh1@msu.edu](mailto:bardenh1@msu.edu). The spreadsheet can be manually adjusted to help develop a more accurate budget based on your circumstances.

## REVENUES

To calculate revenues for chestnut production, we used price averages based on the information that growers provided. Spreadsheet calculators were developed for both hand-harvested, farm packed-chestnuts and for machine-harvested, co-op packed and marketed chestnuts. These calculators are able to evaluate based on yield, price, and type of sales. They were used to develop our tables that illustrate costs by category and variations in profits.

**Hand-harvested, farm-packed chestnuts.** For this calculator, our beginning assumption is that 50% of sales would be direct-to-consumer (including U-pick) and 50% would be wholesale. Table 10 shows the calculator and its variables.

**Table 10.** Revenue calculator for hand harvested, farm-packed Michigan chestnuts.

| Revenue Calculation Table, Mix of Direct Retail and Farm-Packed Wholesale CHESTNUTS |                      |             |                 |                           |         |                      |               |              |                   |  |  |
|---|----------------------|-------------|-----------------|---------------------------|---------|----------------------|---------------|--------------|-------------------|--|--|
| Direct Sales:   |                      |             |                 | Costs                     |         |                      |               |              |                   |  |  |
| Wholesale Sales:  | Revenues             |             |                 | Operating & Harvest Costs |         | Overhead Costs       |               |              | Net Returns       |  |  |
| 2,500 lbs total yield   | Price                | Yield (lbs) | Totals          | Cultural**                | Harvest | Credit Line Interest | Establishment | Land Control | Other Overhead*** | Net Returns over Operating & Harvest Costs | Net Returns over Total Costs (Profits) |
| Direct:   | \$6.00               | 1250        | \$7,500         | \$940                     | \$1,591 | \$40                 | \$664         | \$300        | \$260             | \$8,338                                    | \$7,113                                |
| Wholesale:  | \$4.00               | 1250        | \$5,000         |                           | \$1,591 |                      |               |              |                   |  |  |
|   | <b>TOTAL Revenue</b> |             | <b>\$12,500</b> |                           |         |                      |               |              |                   |  |  |

\* U-pick prices are \$5 per lb, but \$1 per lb is saved in picking and packing costs. The net being equivalent, “Direct Market” includes U-pick pounds.

\*\* “Cultural” costs include pruning, hand thinning, mowing, crop protection, herbicide, and fertilizer.

\*\*\* “Other Overhead” costs include equipment depreciation and other operating expenses such as soil testing.

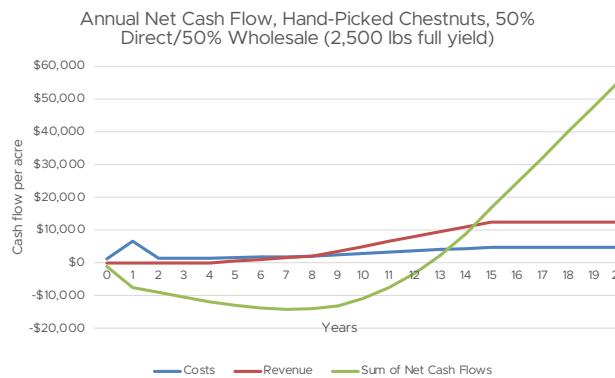


## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

Using this calculator, we created a table that evaluates profits at different splits of direct-to-consumer sales and wholesale sales (see Table A14 in the appendix). Using Table A14, growers can estimate their profits based on their mix of markets.

One method of determining return on investment for an orchard planting is to look at the cash flows over time. Figure 3 illustrates the net cash flows for farm-packed chestnuts, given our assumptions (50% direct sales at \$6 per pound and 50% wholesale sales at \$4 per pound). The first year of positive cash flow occurs at Year 8. The breakeven year, when all of the establishment costs are paid off, occurs on Year 13. After Year 13, the cash flows continue to accumulate. This 50%/50% mix of markets provides a strong 15% return over the assumed 40-year life of the orchard.

**Figure 3.** Net cash flows for hand-harvested, farm-packed chestnuts.



We also created Figure A5 in the appendix to illustrate the cash flows for growers that have 100% direct-to-consumer sales, and Figure A6 in the appendix for 100% wholesale sales.

**Machine-harvested, co-op packed and marketed chestnuts.** Our revenue calculator for machine-harvested, co-op packed and marketed chestnuts adjusts for packout levels (see Table 11). During the packing process, chestnuts are put in a water bath, and those that float are removed as culls. Growers' delivered product has an average cull rate of about 15%, due to issues such as drying out and shrinkage.

While some level of culls is inevitable, various management techniques can improve packouts. These techniques include more frequent harvesting and quicker transfer to the cooler, because cooling slows the shrinkage and internal rots. Note in Table 11 that the "Packed Yield" category is 85% of the "Total Harvested Pounds" categories after the adjustment for culls.

**Table 11.** Revenue calculator for machine-harvested, co-op packed and marketed chestnuts.

| Revenue Calculation Table, Delivery to Cooperative PACKER |               |         |                           |         |                      |                |              |                   |  |  |
|---|---------------|---------|---------------------------|---------|----------------------|----------------|--------------|-------------------|--|--|
| Revenues  |               |         | Costs                     |         |                      |                |              |                   |  |  |
| Total Harvested Pounds:                                   |               | 2,500   | Operating & Harvest Costs |         |                      | Overhead Costs |              |                   | Net Returns                                |  |
| Price   | PACKED Yield* | Totals  | Cultural**                | Harvest | Credit Line Interest | Establishment  | Land Control | Other Overhead*** | Net Returns over Operating & Harvest Costs | Net Returns over Total Costs (Profits) |
| \$2.75  | 2,125         | \$5,844 | \$940                     | \$859   | \$40                 | \$664          | \$300        | \$260             | \$4,005                                    | \$2,780                                |

\* "Packed Yield" is the total pounds delivered minus the pounds that did not make grade. Average packout for the study was 85%.

\*\* "Cultural" costs include pruning, hand thinning, mowing, crop protection, herbicide, and fertilizer.

\*\*\* "Other Overhead" costs include equipment depreciation and other expenses such as food safety, crop insurance, and soil testing.



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

Machine-harvested, co-op packed and marketed orchards have lower net returns due to the ability of direct marketers to achieve higher prices. However, profits are still strong for these growers. Looking at Figure 4, we can see that at the current price average of \$2.75 and a full production yield of 2,500 lbs, the cash flows turn positive at year 10 and breakeven occurs at year 17. The return on investment for this mode of production calculates to 9%, making mechanically harvested chestnuts a strong potential option for tree fruit growers looking to diversify.

**Figure 4.** Net cash flows for machine-harvested, co-op packed and marketed chestnuts.

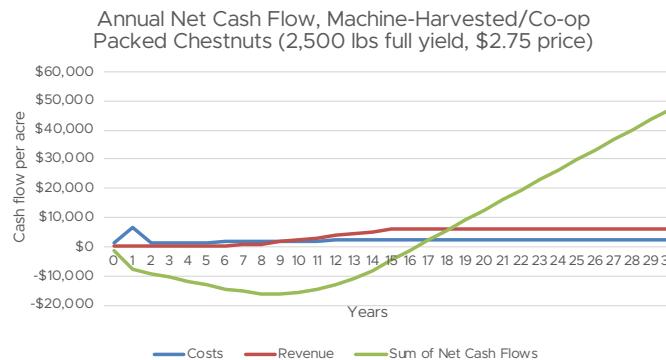


Table 12 provides a look at profits based on different yields and prices for machine-harvested, co-op packed and marketed chestnuts. This table can be used to estimate profits for higher or lower yields than our average 2,500 lbs, as well as higher or lower prices than the current \$2.75.

**Table 12.** Profits at varying yields and prices for machine-harvested, co-op packed and marketed chestnuts.

| Profits per Acre, MACHINE-HARVESTED/Co-op-packed Chestnuts |                                |         |         |         |         |         |         | <span style="background-color: #006400; color: white; padding: 2px 5px;"> </span> = positive profit |
|--|--------------------------------|---------|---------|---------|---------|---------|---------|---|
| PRICE per POUND  | Fresh Yield – Bushels per Acre |         |         |         |         |         |         |   |
|  | 1,000                          | 1,500   | 2,000   | 2,500   | 3,000   | 3,500   | 4,000   |   |
| \$1.75   | (\$1,117)                      | (\$527) | \$64    | \$655   | \$1,246 | \$1,836 | \$2,427 |   |
| \$2.00   | (\$905)                        | (\$208) | \$489   | \$1,186 | \$1,883 | \$2,580 | \$3,277 |   |
| \$2.25   | (\$692)                        | \$111   | \$914   | \$1,717 | \$2,521 | \$3,324 | \$4,127 |   |
| \$2.50   | (\$480)                        | \$430   | \$1,339 | \$2,249 | \$3,158 | \$4,068 | \$4,977 |   |
| \$2.75   | (\$267)                        | \$748   | \$1,764 | \$2,780 | \$3,796 | \$4,811 | \$5,827 |   |
| \$3.00   | (\$55)                         | \$1,067 | \$2,189 | \$3,311 | \$4,433 | \$5,555 | \$6,677 |   |
| \$3.25   | \$158                          | \$1,386 | \$2,614 | \$3,842 | \$5,071 | \$6,299 | \$7,527 |   |
| \$3.50   | \$370                          | \$1,705 | \$3,039 | \$4,374 | \$5,708 | \$7,043 | \$8,377 |   |



# SUMMARY & CONSIDERATIONS

The chestnut industry in Michigan continues to develop. Chestnuts are a long-term investment, but orchards show reasonable profit margins. While growers with small acreages may have limits to the volumes they can produce, they can obtain higher prices through marketing efforts. Larger growers may be limited in the prices they can achieve, but they are able to develop cost efficiencies and produce large volumes of chestnuts.

Many chestnut growers are doing a substantial amount of the tasks that are detailed in our budgets themselves. The amounts allocated for those tasks, therefore, represent additional profits for those growers. This may be important to consider when evaluating the total expected returns for an orchard.

Considering the large amount of recently planted acres that will begin bearing soon, the need for machine harvest equipment is very likely to increase. Growers might consider

cooperating with other growers in their region to purchase and maintain harvest equipment. Higher equipment availability might lead to more frequent harvesting and result in higher average quality for the industry.

In a nutshell, chestnuts continue to be a viable crop and a potential additional crop that tree fruit growers or other farmers can add to diversify their portfolio. Chestnut growers are well-positioned to take advantage of agritourism activities, such as farm visits and U-pick, as well as direct-to-consumer and wholesale sales to local retailers.

## ACKNOWLEDGEMENTS

The authors would like to acknowledge all of the chestnut growers involved for sharing their knowledge and time. In addition to the interviews and focus groups, we appreciate growers' responses to follow-up questions and their provision of detailed records and information.

## REFERENCES

2022 Census of Agriculture, Michigan State and County Data. United States Department of Agriculture, National Agriculture Statistics Service (USDA-NASS), February, 2024.

Black, R., Betz, R., Lizotte, E., & Fulbright, D. (2013). *Commercial Chestnut Cost of Production and Comparative Analysis with Tart Cherry Production*. Michigan State University. Report available at [https://www.canr.msu.edu/uploads/234/70812/Commercial\\_Chestnut\\_Cost\\_of\\_Production\\_Tool\\_Directions\\_and\\_Description.pdf](https://www.canr.msu.edu/uploads/234/70812/Commercial_Chestnut_Cost_of_Production_Tool_Directions_and_Description.pdf)

Hochmuth, R., Wallace, R., Ven Blokland, J., & Williamson, J. (2021). *Production and Marketing of Chestnuts in the Southeastern United States*. Inst. of Food and Agric. Sciences Univ. of Florida (Vol. 354). HS1155, Staff Report.





## APPENDIX

Table A13. Equipment list and per hour calculations for chestnut production.

| EQUIPMENT                   |           | Item | Cost     | Salvage Value % | Rate Trade-in Value | Years Life | Annual Depr. | Annual Interest/ Inflation @ 4.0% | Fuel /hour | Fuel \$4.00 /gal | Lubrication (10% of fuel) | Repair Maint. Cost 1% | TOTAL Annual Cost | Total of Use/ yr | Variable Cost /hour | Fixed Cost /hour | Total Cost per hour |
|-----------------------------|-----------|------|----------|-----------------|---------------------|------------|--------------|-----------------------------------|------------|------------------|---------------------------|-----------------------|-------------------|------------------|---------------------|------------------|---------------------|
|                             |           |      |          |                 |                     |            |              |                                   |            |                  |                           |                       |                   |                  |                     |                  |                     |
| 85 HP 4WD Spray w/cab       | \$85,000  | 15%  | \$12,750 | 12.5            | \$5,780             | \$7,457    | 2.88         | \$3,456                           | \$346      | \$850            | \$12,109                  | 300                   | \$15.51           | \$24.86          | \$40.36             |                  |                     |
| 40 HP 2WD – used            | \$30,000  | 15%  | \$4,500  | 15              | \$1,700             | \$2,293    | 1.92         | \$1,536                           | \$154      | \$300            | \$4,283                   | 200                   | \$9.95            | \$11.47          | \$21.42             |                  |                     |
| Airblast                    | \$47,000  | 15%  | \$7,050  | 12              | \$3,329             | \$4,257    |              |                                   |            | \$470            | \$4,727                   | 300                   | \$1.57            | \$14.19          | \$15.76             |                  |                     |
| Weed Sprayer                | \$15,000  | 15%  | \$2,250  | 15              | \$850               | \$1,147    |              |                                   |            | \$150            | \$1,297                   | 30                    | \$5.00            | \$38.22          | \$43.22             |                  |                     |
| Fertilizer Spreader         | \$8,000   | 15%  | \$1,200  | 15              | \$453               | \$612      |              |                                   |            | \$80             | \$692                     | 20                    | \$4.00            | \$30.58          | \$34.58             |                  |                     |
| Rotary Mower                | \$8,000   | 15%  | \$1,200  | 10              | \$680               | \$838      |              |                                   |            | \$80             | \$918                     | 40                    | \$2.00            | \$20.96          | \$22.96             |                  |                     |
| Flail Chopper               | \$10,000  | 15%  | \$1,500  | 10              | \$850               | \$1,048    |              |                                   |            | \$100            | \$1,148                   | 60                    | \$1.67            | \$17.47          | \$19.13             |                  |                     |
| Brownie – used              | \$15,000  | 15%  | \$2,250  | 12              | \$1,063             | \$1,359    | 1.50         | \$480                             |            | \$150            | \$1,989                   | 80                    | \$7.88            | \$16.98          | \$24.86             |                  |                     |
| FACMA – used                | \$100,000 | 15%  | \$15,000 | 12              | \$7,083             | \$9,057    | 4.00         | \$640                             | \$64       | \$1,000          | \$10,761                  | 40                    | \$42.60           | \$226.42         | \$269.02            |                  |                     |
| Quad or Side by Side – used | \$12,000  | 15%  | \$1,800  | 7               | \$1,457             | \$1,699    | 2.00         |                                   |            | \$120            | \$1,819                   | 100                   | \$1.20            | \$16.99          | \$18.19             |                  |                     |
| Small Sprayer with Boom     | \$1,200   | 15%  | \$180    | 7               | \$146               | \$170      |              |                                   |            | \$12             | \$182                     | 100                   | \$0.12            | \$1.70           | \$1.82              |                  |                     |
| Zero-turn Mower             | \$4,000   | 15%  | \$600    | 7               | \$486               | \$566      | 1.50         | \$960                             | \$96       | \$40             | \$1,662                   | 160                   | \$6.85            | \$3.54           | \$10.39             |                  |                     |



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

**Table A14.** Profits at different prices, yields, and splits for hand-harvested, farm-packed chestnuts.

| PROFITS at DIFFERENT PRICES, YIELDS, and SPLITS |                                     |                    |                    |                    |                    |                    |                    |                    |
|---|-------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Direct Retail Sales / Wholesale Split           | Direct Price/<br>Wholesale<br>Price | 1,000 lbs<br>Yield | 1,500 lbs<br>Yield | 2,000 lbs<br>Yield | 2,500 lbs<br>Yield | 3,000 lbs<br>Yield | 3,500 lbs<br>Yield | 4,000 lbs<br>Yield |
| 20% / 80%                                       | \$4.00 / \$3.00                     | (\$312)            | \$663              | \$1,638            | \$2,613            | \$3,588            | \$4,563            | \$5,538            |
|   | \$5.00 / \$4.00                     | \$688              | \$2,163            | \$3,638            | \$5,113            | \$6,588            | \$8,063            | \$9,538            |
|   | \$6.00 / \$4.00                     | \$888              | \$2,463            | \$4,038            | \$5,613            | \$7,188            | \$8,763            | \$10,338           |
|   | \$7.00 / \$4.00                     | \$1,088            | \$2,763            | \$4,438            | \$6,113            | \$7,788            | \$9,463            | \$11,138           |
|   | \$8.00 / \$5.00                     | \$2,088            | \$4,263            | \$6,438            | \$8,613            | \$10,788           | \$12,963           | \$15,138           |
|   | 40% / 60%                           | \$4.00 / \$3.00    | (\$112)            | \$963              | \$2,038            | \$3,113            | \$4,188            | \$5,263            |
|   | \$5.00 / \$4.00                     | \$888              | \$2,463            | \$4,038            | \$5,613            | \$7,188            | \$8,763            | \$10,338           |
|   | \$6.00 / \$4.00                     | \$1,288            | \$3,063            | \$4,838            | \$6,613            | \$8,388            | \$10,163           | \$11,938           |
|   | \$7.00 / \$4.00                     | \$1,688            | \$3,663            | \$5,638            | \$7,613            | \$9,588            | \$11,563           | \$13,538           |
|   | \$8.00 / \$5.00                     | \$2,688            | \$5,163            | \$7,638            | \$10,113           | \$12,588           | \$15,063           | \$17,538           |
|   | 50% / 50%                           | \$4.00 / \$3.00    | (\$12)             | \$1,113            | \$2,238            | \$3,363            | \$4,488            | \$5,613            |
|   | \$5.00 / \$4.00                     | \$988              | \$2,613            | \$4,238            | \$5,863            | \$7,488            | \$9,113            | \$10,738           |
|   | \$6.00 / \$4.00                     | \$1,488            | \$3,363            | \$5,238            | \$7,113            | \$8,988            | \$10,863           | \$12,738           |
|   | \$7.00 / \$4.00                     | \$1,988            | \$4,113            | \$6,238            | \$8,363            | \$10,488           | \$12,613           | \$14,738           |
|   | \$8.00 / \$5.00                     | \$2,988            | \$5,613            | \$8,238            | \$10,863           | \$13,488           | \$16,113           | \$18,738           |
|   | 60% / 40%                           | \$4.00 / \$3.00    | \$88               | \$1,263            | \$2,438            | \$3,613            | \$4,788            | \$5,963            |
|   | \$5.00 / \$4.00                     | \$1,088            | \$2,763            | \$4,438            | \$6,113            | \$7,788            | \$9,463            | \$11,138           |
|   | \$6.00 / \$4.00                     | \$1,688            | \$3,663            | \$5,638            | \$7,613            | \$9,588            | \$11,563           | \$13,538           |
|   | \$7.00 / \$4.00                     | \$2,288            | \$4,563            | \$6,838            | \$9,113            | \$11,388           | \$13,663           | \$15,938           |
|   | \$8.00 / \$5.00                     | \$3,288            | \$6,063            | \$8,838            | \$11,613           | \$14,388           | \$17,163           | \$19,938           |
|   | 80% / 20%                           | \$4.00 / \$3.00    | \$288              | \$1,563            | \$2,838            | \$4,113            | \$5,388            | \$6,663            |
|   | \$5.00 / \$4.00                     | \$1,288            | \$3,063            | \$4,838            | \$6,613            | \$8,388            | \$10,163           | \$11,938           |
|   | \$6.00 / \$4.00                     | \$2,088            | \$4,263            | \$6,438            | \$8,613            | \$10,788           | \$12,963           | \$15,138           |
|   | \$7.00 / \$4.00                     | \$2,888            | \$5,463            | \$8,038            | \$10,613           | \$13,188           | \$15,763           | \$18,338           |
|   | \$8.00 / \$5.00                     | \$3,888            | \$6,963            | \$10,038           | \$13,113           | \$16,188           | \$19,263           | \$22,338           |



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

**Table A15.** Costs by category for different yields for hand-harvested, farm-packed chestnuts.

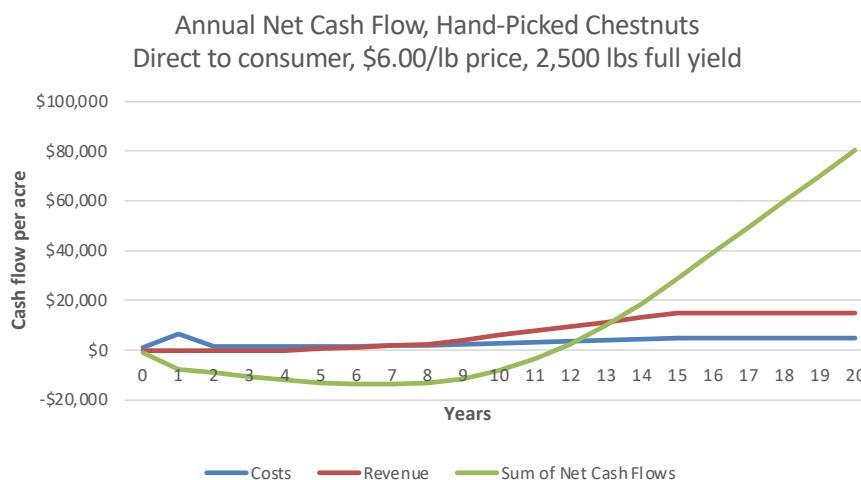
| Direct Retail/ Farm-Packed Wholesale CHESTNUTS*  | YIELD – Pounds per acre |                |                |                |                |                |                |
|--|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|  | 1,000                   | 1,500          | 2,000          | 2,500          | 3,000          | 3,500          | 4,000          |
| <b>Operating &amp; Harvest Costs/Acre:</b>       |                         |                |                |                |                |                |                |
| Cultural** -                                     | \$940                   | \$940          | \$940          | \$940          | \$940          | \$940          | \$940          |
| Harvest -  | \$1,307                 | \$1,932        | \$2,557        | \$3,182        | \$3,807        | \$4,432        | \$5,057        |
| Credit Line Interest -                           | \$40                    | \$40           | \$40           | \$40           | \$40           | \$40           | \$40           |
| <b>TOTAL Operating &amp; Harvest Costs/Acre:</b> | <b>\$2,287</b>          | <b>\$2,912</b> | <b>\$3,537</b> | <b>\$4,162</b> | <b>\$4,787</b> | <b>\$5,412</b> | <b>\$6,037</b> |
| <b>TOTAL Operating &amp; Harvest Costs/lb:</b>   | <b>\$2.29</b>           | <b>\$1.94</b>  | <b>\$1.77</b>  | <b>\$1.66</b>  | <b>\$1.60</b>  | <b>\$1.55</b>  | <b>\$1.51</b>  |
|  |                         |                |                |                |                |                |                |
| Total Overhead*** Costs/Acre:                    | \$1,225                 | \$1,225        | \$1,225        | \$1,225        | \$1,225        | \$1,225        | \$1,225        |
| <b>TOTAL COSTS per Acre:</b>                     | <b>\$3,512</b>          | <b>\$4,137</b> | <b>\$4,762</b> | <b>\$5,387</b> | <b>\$6,012</b> | <b>\$6,637</b> | <b>\$7,262</b> |
| <b>TOTAL COSTS per lb:</b>                       | <b>\$3.51</b>           | <b>\$2.76</b>  | <b>\$2.38</b>  | <b>\$2.15</b>  | <b>\$2.00</b>  | <b>\$1.90</b>  | <b>\$1.82</b>  |

\* Assumes 50% direct retail and 50% wholesale sales.

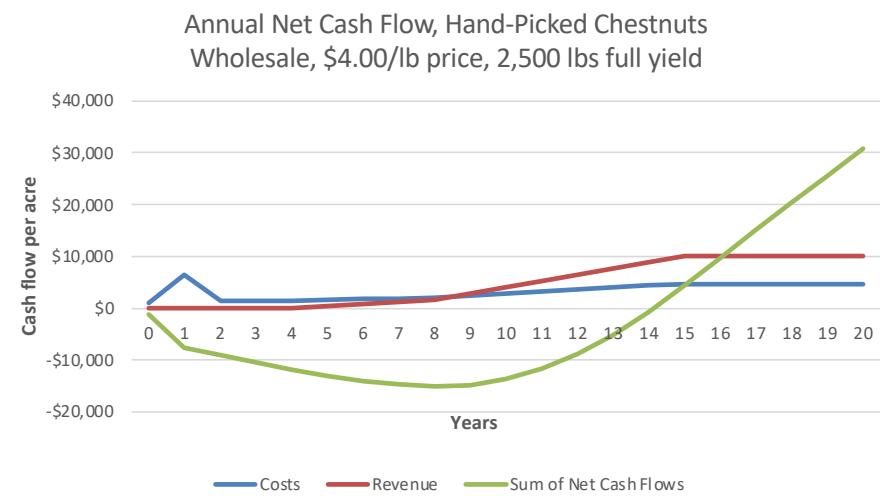
\*\* “Cultural” costs include pruning, hand thinning, mowing, crop protection, herbicide, and fertilizer.

\*\*\* Overhead costs include land control, establishment, equipment depreciation, and other overhead expenses.

**Figure A5.** Annual net cash flow for hand-picked chestnuts, all sold direct-to-consumer.



**Figure A6.** Annual net cash flow for hand-picked chestnuts, all sold local wholesale.



MICHIGAN STATE UNIVERSITY EXTENSION

Copyright 2026 Michigan State University Board of Trustees.



## MICHIGAN CHESTNUT COST OF PRODUCTION, 2025

**Table A16.** Costs by category for different yields for machine-harvested, co-op packed and marketed chestnuts.

| Co-op Packed & Marketed<br>CHESTNUTS             | YIELD — Pounds per Acre |                |                |                |                |                |                |
|--|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|  | 1,000                   | 1,500          | 2,000          | 2,500          | 3,000          | 3,500          | 4,000          |
| <b>Operating &amp; Harvest Costs/Acre:</b>       |                         |                |                |                |                |                |                |
| Cultural* -                                      | \$940                   | \$940          | \$940          | \$940          | \$940          | \$940          | \$940          |
| Harvest -  | \$400                   | \$553          | \$706          | \$859          | \$1,012        | \$1,165        | \$1,318        |
| Credit Line Interest -                           | \$40                    | \$40           | \$40           | \$40           | \$40           | \$40           | \$40           |
| <b>TOTAL Operating &amp; Harvest Costs/Acre:</b> | <b>\$1,380</b>          | <b>\$1,533</b> | <b>\$1,686</b> | <b>\$1,839</b> | <b>\$1,992</b> | <b>\$2,145</b> | <b>\$2,298</b> |
| <b>TOTAL Operating &amp; Harvest Costs/lb:</b>   | <b>\$1.38</b>           | <b>\$1.02</b>  | <b>\$0.84</b>  | <b>\$0.74</b>  | <b>\$0.66</b>  | <b>\$0.61</b>  | <b>\$0.57</b>  |
| Total Overhead** Costs/Acre:                     |                         |                |                |                |                |                |                |
|  | \$1,225                 | \$1,225        | \$1,225        | \$1,225        | \$1,225        | \$1,225        | \$1,225        |
| <b>TOTAL COSTS per Acre:</b>                     | <b>\$2,605</b>          | <b>\$2,758</b> | <b>\$2,911</b> | <b>\$3,064</b> | <b>\$3,217</b> | <b>\$3,370</b> | <b>\$3,523</b> |
| <b>TOTAL COSTS per lb:</b>                       | <b>\$2.61</b>           | <b>\$1.84</b>  | <b>\$1.46</b>  | <b>\$1.23</b>  | <b>\$1.07</b>  | <b>\$0.96</b>  | <b>\$0.88</b>  |

\* “Cultural” costs include pruning, hand thinning, mowing, crop protection, herbicide, and fertilizer.

\*\* Overhead costs include land control, establishment, equipment depreciation, and other overhead expenses.



MICHIGAN STATE  
UNIVERSITY | Extension