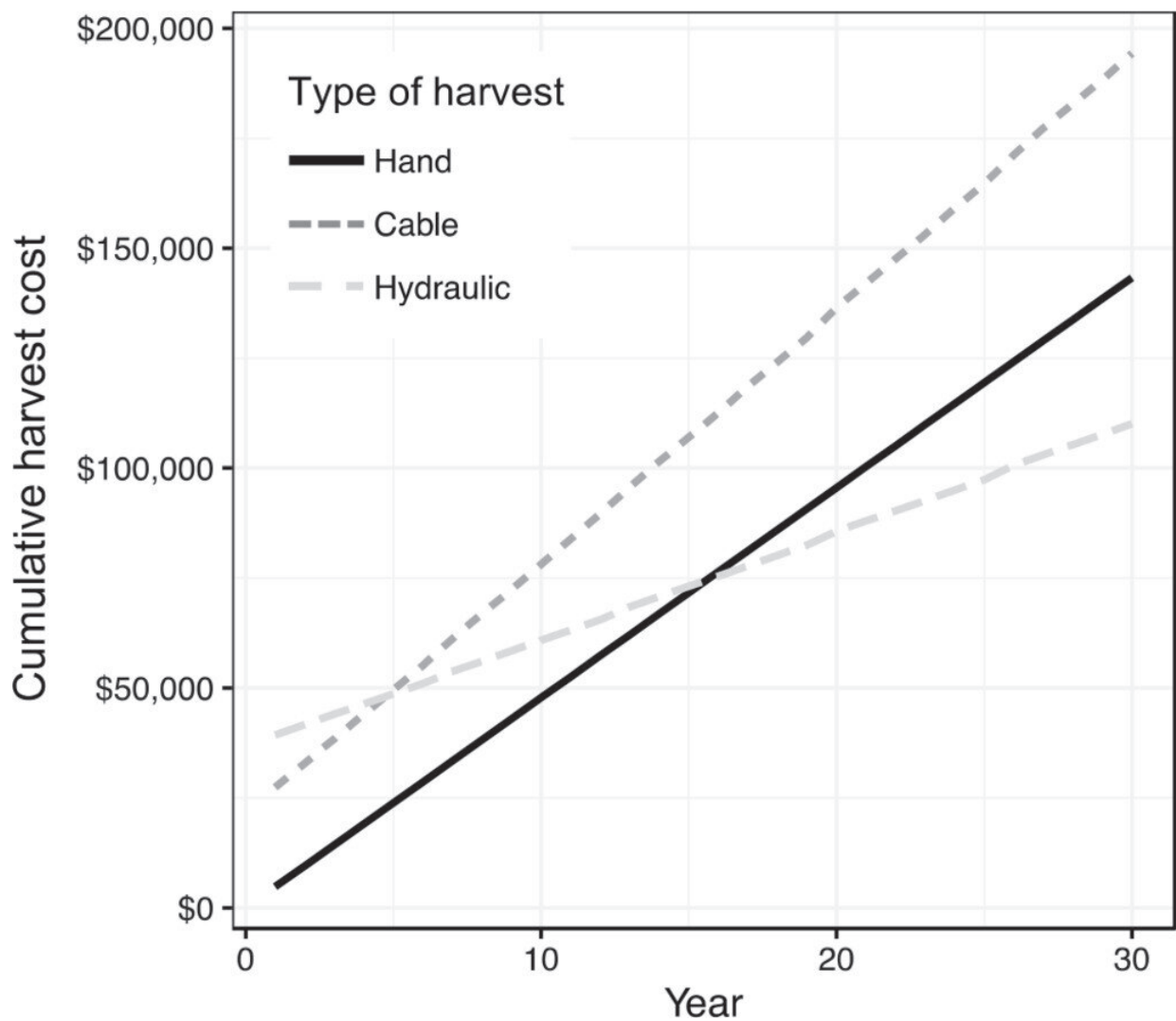


Mechanical harvesting of hard cider apples shown to be more economical than hand harvesting

December 8 2022, by Jane Cerza



Cumulative harvest cost over 30 years for a 5-acre (2.0 ha) model cider apple

orchard using hand labor (Hand), a cable shaker and small mechanical harvester (Cable), or a hydraulic shaker and small mechanical harvester (Hydraulic).

Credit: *HortTechnology* (2022). DOI: 10.21273/HORTTECH04988-21

Nearly all apples grown in the U.S. are currently harvested by hand. Hand harvesting labor is typically the largest variable operating expense for apple orchards. Mechanical harvesting bruises fruit and greatly reduces fresh-market apple storage potential, but it also greatly reduces harvesting costs and is faster.

In Europe, which has a well-established hard cider industry, a wide selection of mechanical [harvesting](#) equipment with varying work capacities has been developed and nearly all European cider apples are harvested in this manner. While mechanical harvesting equipment is available for purchase within the U.S., it is currently not widely used. Adoption of this technology has the potential to greatly reduce [production costs](#), increase the profitability of growing cider-specific cultivars, and support a burgeoning cider industry in the U.S.

Researchers in the Horticulture Section of the School of Integrative Plant Science at Cornell University, led by Gregory Peck, Associate Professor of Horticulture, Sustainable Fruit Production Systems are working to address the challenges of sustainably and profitably producing [fruit trees](#).

The team developed a partial budget model, which is also available as a plug-and-play tool online, comparing the [costs](#) of using small, medium, and large capacity mechanical harvesting machinery to hand harvesting over the expected 30-year lifespan of the machinery. Sensitivity analyses were used to test the cost differential for using each piece of machinery on varying orchard sizes and to model changes in labor costs.

The findings show that with appropriately sized equipment, farmers can effectively reduce harvesting costs in comparison to hand harvesting on orchards as small as five acres. Increasing orchard size resulted in greater returns from mechanical harvesting for all harvester models. Thus, medium and large capacity harvesters offered the greatest reductions in harvest costs, reducing cumulative costs by more than 50% in comparison to hand harvesting.

While profitable at current labor rates, mechanical harvesting became even more profitable under scenarios of increasing wages. This study demonstrates the potential for mechanical harvesting to reduce cider apple growing costs across a wide range of orchard scales. Future work comparing the work capacity, efficiency, and fruit quality of mechanically versus hand harvesting apples using a range of machinery and orchard designs will help to provide direct evidence for the [cost savings](#) of using mechanical harvesters in cider [apple orchards](#).

As the North American cider industry expands, mechanical harvesting offers an opportunity for [apple](#) growers to more efficiently and cost effectively harvest their crops while alleviating some of the strain of an uncertain labor market.

The findings are published in the journal *HortTechnology*.

More information: Adam Karl et al, Mechanically Harvesting Hard Cider Apples Is More Economically Favorable than Hand Harvesting, Regardless of Farm Scale, *HortTechnology* (2022). [DOI: 10.21273/HORTTECH04988-21](https://doi.org/10.21273/HORTTECH04988-21)

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