

# Striving for efficiency

BY TRACY ILENE MILLER



Workers at Northwoods Nursery apply a 1-mil. plastic sheet over a raised bed. These beds are used for seed and cutting propagation. By adding them, Northwoods was able to grow its seedlings 1.7 times more efficiently.

PHOTO BY JIM GILBERT

**W**HEN GROWERS are faced with a worker shortage and higher employment costs, efficiency is the logical response. That means finding ways to grow more material with the workforce that is available and affordable.

“A big thing for labor strategies is being more efficient on tasks,” said Carlton Davidson, production manager at Carlton Plants. “Being more efficient includes mechanization. We have an apparatus that pneumatically drives in metal tree stakes, for example. In addition to mechanization, you want to make sure you are running well-maintained machinery and good infrastructure. The bottom line is we are looking at the ways we run our operation and constantly evaluating ways to make our practices

more efficient.”

Most nursery owners and managers have a wish list of mechanization projects that will make their operations better. The challenge is to know which process should be upgraded, how it should be done and when to carry through with it.

Different growers are likely to have different answers, depending on what they grow, what methods they use to do it, what resources they have available and what their market is.

## Laboring over labor

When Jim Gilbert and Lorraine Gardner of Northwoods Nursery went to Korea in 2014, they couldn't help but notice the intensive growing of trees with small crews, but with a big difference.



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Zosimo Carrero-Cruz uses an adjustable dibble wheel to make holes in the plastic-covered bed. Seeds, liners or rootstock with a compact root system are planted in the holes. PHOTO BY JIM GILBERT

“They were getting bigger trees with much less labor in a shorter amount of time,” Gilbert said.

How? With plastic-covered raised beds that heat up the soil faster, have better drainage and more overall growth in a season than trees grown in flat ground.

“We were impressed by the quality of the plants they were growing,” Gilbert said.

Also intriguing was the idea of reduced labor to grow the plants — if the process could be mechanized. In Korea, they weren’t using machines to put down the plastic.

When Gilbert and Gardner returned to Oregon, they did what many nursery owners do — they found a company with a machine close to what they wanted, and they had it customized. Kenngo Manufacturing in Ruskin, Florida, offers a small-scale, reasonably priced (\$6,683, including freight) machine that could be customized. Other clients use the system for strawberries and other vegetables, but no one, as far as Gilbert knows, is using it to grow trees.

The machine built for Northwoods makes a 20-inch bed, puts down drip tape underneath the plastic, covers the bed with 1-mil. plastic and then covers its edges with soil. The only other cost was an adjustable dibble wheel for \$250 from Two Bad Cats LLC in Clarendon, Vermont, for making two uniform planting rows.

Northwoods received the machine in October 2014. Essentially, the return on investment occurred the very first year. Gilbert and Gardner were able to double the number of trees planted per acre, and the growing was 1.7 times more efficient.

What Northwoods accomplished through automation is emblematic of efforts at other nurseries, and the process generated a checklist for assessing whether automation is worth the investment.

### Higher yields and better quality

High on the checklist of factors for determining the value of automation is whether it will in some way result in higher production, better quality plants and/or

greater market share.

Woodburn Nursery & Azaleas has from its beginnings been a proactive user of automation. In recent years, a pot-in-pot operation was installed specifically to expand plant offerings.

“It put us in a whole new market that we weren’t servicing,” general manager Tom Fessler said.

In addition, several years ago Woodburn moved to more on-ground, flood floor operations. This required increased use of forklifts and tractors, but resulted in greater uniformity of the plants and more versatility of the crops being grown.



### Labor reorganization

Another significant criterion for automation is how it influences use of your workforce.

“Automation has never been about eliminating people,” Fessler said. “That’s not our philosophy. We try to expand our process and give them a better job.”

When Woodburn installed a buffer belt to automate gathering of pots and putting them in rows, after some minimal training, it made staff’s job easier and the process smoother, and allowed two people to move from the potting line to other posts.

It is that kind of efficiency that leads nurseries to consider pruning for its lower-priced options (relative to other parts of nursery work) for automation because of its concentrated need for labor. When

mechanized, pruning allows a smaller workforce to achieve greater results.

Fessler constructed pruning equipment in-house nearly 15 years ago for under \$10,000. At the time, he researched European manufacturers and found their products too slow. It took experimentation to get to the right design, but the trial and error paid off.

“We started with one, ran it for a year, and added one or two more per year,” Fessler said. “It was probably a two-year process from prototype to the final design.”

Once they settled on a design and built eight pruners, there was the payoff: The pruning teams were reduced immediately from six to three people per machine.

With eight crews, “that’s 24 people we can use elsewhere,” Fessler said.

### Quantification

Fessler said he knew the pruning machines would pay off, and estimated the return on investment (ROI) was one to two years. He admits he didn’t have hard numbers, but that didn’t matter. He needed to automate pruning, and the expense was contained enough to warrant the risk.

“ROI is always a tough one,” Fessler said. “I can figure what labor it saves. But to me, it is a gut feel. I pencil it out, and sometimes you make a decision not on dollars and cents, but improving the job that people are doing.”

Lorne Blackman, owner of Walla Walla Nursery in Walla Walla, Washington, had the same instinct when the nursery went to purchase a flat trimmer. The effort involved was worth an investment — even without hard data.

“We spent a lot of labor hand-pruning 3.5-inch ground covers, herbs and grasses,” Blackman said. “We did not have good data, but I knew we could save. So, looking forward, I made the call on that one.”

A one-year ROI is an ideal payback on an investment in automation, but less than five years is comfortable, and even longer timeframes may pencil out.

“If you have a real good situation,

## Growers are looking to workflow improvement and automation so they can protect their margins and stay in business.

if your labor and other savings outweigh your finance fees and your maintenance costs, you can finance the project over five to 10 years,” Blackman said.

To get to that decision, it’s important to track labor usage against outputs to determine total costs, Blackman said.

“We have been doing that pretty regularly for five years,” Blackman said, “and that gives you the tools for making decisions and determining mechanization priorities.”

When he considered whether to invest in a flat filler for propagation, the data suggested payback would take 10 years, so he scratched that item off his list. Other improvements with a shorter ROI were bigger priorities, he said.

At Woodburn, Fessler is considering mechanizing spacing, but he is taking a more measured approach than he did with pruning, carefully collecting extensive

data to assess the costs. Why? Because the required capital could reach as high as \$200,000, Fessler said.

Nonetheless, it’s a priority and the next step now that potting — the lower-hanging fruit of automation — is dialed in.

### Maximizing value from existing resources

When deciding whether to automate a process, it is important to consider whether existing equipment can be used for greater value.

For instance, Fessler is reviewing several setups that use existing buffer lines with possible add-ons, such as more conveyors and a spacing robot. He also needs to make sure there’s space on the floor for more equipment, before committing to a huge investment.

Bringing in experts to help with data

collection and brainstorming designs, and researching existing setups at other operations, will help to determine whether the expense is justified and make the decisions more meaningful.

At Northwoods, their ability to use existing machinery as a complement to new equipment influenced their purchase. By having Kennco customize the plastic mulching machine to make beds to a specific width and plant spacing, the nursery was able to use its existing tree-digging machine, thereby eliminating the need for an additional equipment purchase.

### Eliminating steps

Outlining the complete process and figuring out whether mechanization will actually save labor are necessary to ensure savings. At Northwoods, putting down plastic has all but eliminated weeding >>



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after the intense, beginning-of-the-season bed preparation.

“We used to have a weeding crew running all summer,” Gilbert said, “but once it’s done, it’s done for the season.” Now Gilbert can redirect labor elsewhere and potentially save additional resources.

### Saving resources

Does mechanization save resources? Thanks to the new plastic mulch at Northwoods, trees grew better with fewer inputs. Fertilizer and water had to be held back into the second growing season, because the first season with the new system yielded plants that in some cases were too big.

Land is also being conserved. More condensed growing means less fertilizer is necessary on acreage grown in cover crops, thus improving the land’s fertility for future planting dates.

Eliminating weeding has also reduced the use of herbicide and fuel, as the nursery no longer runs tractors for summer weeding.

At Walla Walla Nursery, one of the main goals of a 2012 overhaul was to increase outputs by buying a potting machine and moving the tray filler, thereby allowing material to be run on two separate lines. One ran full time, the other when shipping people were available. Simultaneously, a soil-mixing machine was installed, leading to significant cost savings on freight. The nursery now recycles compost from its own dump pile, Blackman said, further increasing ROI.

### Uncharted benefits

In the process of automating, other benefits may not necessarily be calculable up front, but still prove valuable in the long run.

Brentano’s Tree Farm in St. Paul, Oregon, took on container planting a few years ago. They started the old-fashioned way, with a pile of soil and a scoop shovel; however, as the quantities expanded, they automated the process. “It was the only way we were going to get the job done,” co-owner Pete Brentano said.

Brentano worked with designers at Wurdinger Manufacturing to push the envelope on ergonomics. The goal to lift as little as possible was important for two reasons: safety and employee durability.

“We don’t want our employees worn out,” he said. “They are doing repetitive processes. If you’re taking a 50-pound container and moving it from the end of the conveyor to the trailer and twisting every time, it can give you back strain.”

Instead, the system includes a draw-bridge for trees to slide, no lifting and twisting needed, just pulling and pushing. A foot-operated saw cuts the roots, and a custom-built crane with a soft end (instead of an employee) grabs the tree and holds it suspended while the employee removes the container and moves it to the conveyor.

The result is a better, more efficient process, yielding a better product, Brentano said. There’s also the benefit of happier employees, which is not completely measureable.

“The biggest thing is this made their lives easier, and that leads to more productivity and employee retention,” Brentano said. “Those are the parts that you can’t put an economic value on, but you know that this is a lot better. We have a lot of employees who have been here a long time, and we need to make the process easier.”

The intangible payoff of happier employees was nonetheless complemented by the tangible. The automated potting machine, in place for 80 percent of the time last year, allowed the nursery to produce 15 percent more trees with the same payroll while paying workers a higher rate. “We gave a 10-percent pay increase,” Brentano said.

Brentano said he expects to recoup the costs of automation in seven years. “We’re not always the most analytical to put all the costs on paper, but sometimes you have the sense this is what you need to do” — and then you plan well enough, budget and make it happen, he said.

### Facing failure — happily

Every nursery has examples of failed attempts at process improvement, which is why Blackman said it can take years of stops and starts to culminate in a full system of mechanization. He recommended starting out with standard equipment, rather than customized systems, on first go-rounds.

When Walla Walla put in a new shipping process five years ago, it struggled for a month before it realized that the process was increasing labor by 30 percent.

That failure led them to better organize the old system. By then, though, the nursery had spent \$10,000 on conveyers and rollers, but because it was standard equipment, the financial impact was minimal.

“We’ve since used them on the potting line, the new trimming line and in propagation,” Blackman said. “Although we had a few sitting around for a few years, we found uses for them.”

By using standard conveyors, rollers, forklifts and the like, there’s less chance of losing your investment if one application of mechanization doesn’t go well. ☺

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