

Harvest and Handling Small Volumes of Diverse Crops

Examples of tools and techniques in the field and packing shed.

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Harvest and packing produce are the two biggest labor expenses for most crops on farms so they have the biggest opportunities for cost savings from incremental improvements. I've tried to take key concepts, that are really common sense, and apply them in my thinking about how to streamline harvest and packing while keeping the level of quality, safety and ergonomics high. The 1948 children's book "Cheaper by the Dozen" was my first introduction to the idea of time and motion and efficiency experts, but my father, having worked on factory floors was also quick to point out the potential pitfalls of taking the process too far, as it often has been. In the 1990's the Food Bank Farm folks made an excellent video on their harvest techniques that looked to the efficiencies of large industrial agriculture and scaled down the concepts to systems that fit into a small, diverse farm. Ben Hartman's new "The Lean Farm" talks about a lot of these same concepts, borrowing the language and framework developed by Toyota, which has been applied in factories all over the world on all different scales.

In looking for more efficiency/less waste I find myself focusing on three basic things: thinking through the physical motions of an activity, good communication, and mise en place, or making sure everything has a place, is kept there, and is orderly. These are all parts of creating good systems and having established systems are important to me. Being able to improvise is important, but systems set the foundation.

Field

When I'm harvesting I think about my motions in the field. For example, if I'm harvesting a bed of carrots I start at the far end of the bed and harvest back toward the cart at the beginning of the bed. This way I'm walking the long distance with an empty container, and the short distance with the full container. I also find it works better for me to pick a single row at a time for most crops instead of jumping back and forth between two rows as I move down the bed. If I'm picking two rows I have to move my body twice as far, but my attention and arms aren't constantly jumping back and forth so I ultimately save time and don't unintentionally miss short sections as often.

If you're unsure if one way is actually better than another or if there's dissent on the crew take the Food Bank Farm's approach and have a race, or do a time trial to compare the two methods.

Many of the improvements I'm thinking about don't require any investment in equipment, but I also think about how new tools or improvements to current tools will help, and I make evaluations of what the ROI (return on investment) will be – in dollars, environmental impact and crew morale. The farm carts I've been designing came out of years of working with garden carts and wanting some upgrades to the ergonomics and functionality. Garden carts are great tools, but there were lots of little improvements I wanted: the handle was low to pick up and then caused the cart to tilt back too much

when hauling, sometimes tipping tall loads over; the high side walls made loading harvest bins from the side or back difficult, they were too narrow and low to straddle our beds and take into the field for harvest, the frame was a little flexible and didn't always transfer pushing or pulling energy efficiently, the wheels had low quality bearings. My designs worked on making all of those improvements. They have been very successful in improving the ergonomics and usability of the cart on the farm. The improvements aren't necessarily huge, but remember that incremental improvements on something that is used consistently add up over time.

Creating systems for clear, complete communication, especially on a farm where the tasks are highly diverse and there are a lot of transitions, is crucial for limiting transition time and avoiding mistakes and misunderstandings. For field harvest I've developed a standard pick sheet that includes all of the information needed for someone in the field to know exactly what they are harvesting, how and in what quantity. Having the sheet in the field also means they know what the next task is without asking, and there is space for them to communicate and the other folks on the crew what is already complete, and who completed it and how long it took in a quick, concise, and easy to understand way. We also have a standard tape labeling system for harvest totes that minimizes mistakes and helps us keep track of produce as it moves through the farm without having to constantly search for things.

Mise en place is a French term borrowed from kitchens and is similar to the English phrase, "a place for everything and everything in its place." In restaurant kitchens, the same as any production setting, being able to find exactly what you need, when you need it is critical to saving time. The easiest way to do this, both for an individual and especially when multiple people are using the same space is to make sure there is a standard place for everything, that tools and supplies always are put there when they are not being actively used, and generally that all spaces stay tidy and well organized. Factory floors use yellow tape to mark lanes for moving people and products, and it is understood that nothing ever gets left in one of these lanes; there is a pre-designated place for everything, including traffic.

The most common harvest tool, the knife, is one that I prefer everyone have their own, personal version of, and that they keep it on them through the harvest to save time when it is needed. For that reason I personally wear a tool belt and prefer knives that have good sheath options like the Morakniv. I've found that when knives are not personal property they tend to get misplaced more easily, and they rarely stay as sharp. Misplaced knives don't just waste time and money, they are a real safety hazard. I also make everyone brand their knife so we know whose it is if it gets misplaced.

We have clear labeling systems for where harvests are coming from. We also have clearly designated places for all of the supplies for harvest and a waterproof bin that all of the usual supplies sit in that travels out to the field with us on harvest days. The bin keeps picking sheets dry, has tape and markers for labeling totes, twist ties for bunching, and a first aid kit in case of accidents.

Pack Sheds

Similar to the pick sheet for the field, there is a pack sheet for the packing shed, and in the same way when orders are packed a record that the task is started and completed is made to let the other folks who are packing know. There is also a record sheet as everything comes in from the field that helps us keep track of yield information for future planning and cost evaluation.

Having an electronic bench scale sitting right at the entrance of the packing shed is a simple way to check everything in. I use a version rated at 200 pounds, which means it can weigh more than we can lift onto it without getting overloaded. We put it on a custom bench, attached to the wall at the a height that makes it easy to set our harvest totes on without having to bend over, or to lift the totes up high. The display mounts on the wall at eye level which makes it easy to read, and there's a light right there to make it even easier on dim days – all small, but important ergonomic considerations for something that is used regularly.

I designed our washing and sorting tables to be simple, easy to move, and ergonomic. They are sized for one person to work on so they are roughly as wide as someone can reach from side to side. There are little benches on either side of the table for our harvest totes, usually dirty, unsorted product is on one side and it's moving across the table to a clean tote on the other side. The low bench keeps the totes just below the edge of the table so produce can be slid off the side of the table into the tote. A backstop keeps things from sliding off the back. The table top is made from lath which is cheap, easy to build, light, gets smoother with use and doesn't sag (unlike hardware cloth which is commonly used) and gaps between the strips let soil and water through. Scrap metal roofing under the table stiffens the table and directs spray water away from the user's feet keeping them much drier and more comfortable. The tables are very light weight but stable. They are easy to move for cleaning, or reorganizing the space when needed. Typically we use them in the same spot every time though and we have hanging hoses with spray heads over each table location. This means hoses aren't in the way on the floor, and aren't getting dirty, and they're always right there when you need them.

For moving materials around the pack shed I favor hand trucks with simple hand truck pallets. The pallets keep the harvest totes off the ground which improves cooling air flow, and also keeps them away from contact with potential contaminants on the ground. We also use pallet jacks for larger loads, but for the majority of trips we're moving just a few totes at a time so the hand truck pallet is more appropriately sized.

These are just a few examples and with most of these we are still constantly improving so they are not systems or tools that are as good as they can be. These are systems and tools that work well, are better than what we were doing before, and will probably be improved on in the future.