

Ergonomics in Agriculture

Farm workers suffer from musculoskeletal disorders and lower back pain at a [disproportionate rate](#). This won't be a surprise to anyone who's worked in agriculture; the job often involves awkward postures and repetitive motions.

Musculoskeletal disorders caused by these workplace motions make up a third of the injuries that cause farm workers to take sick days. Back injuries make up a full quarter of them.

This isn't just tough on families and disastrous for productivity; it's expensive for growers. In 2001, when the [National Institute for Occupational Safety and Health](#) and the [Centers for Disease Control and Prevention](#) studied ergonomics in agriculture, workers' compensation for farm workers cost more than \$20 million — in the state of California alone.

The key to preventing sprains, strains, and lower-back pain is to improve ergonomics in agriculture generally. In order to accomplish this goal, you must develop a keen understanding of what ergonomics really is, and how it can help create a safer, more productive agricultural venture.

A Brief Introduction to Ergonomics

Ergonomics can be explained in a single sentence: It is the science of matching workers to their jobs as closely as possible. This involves studying the biomechanics of work and redesigning workplace tasks so that they fit within the natural limitations of the body itself.

Ergonomic hazards include all sorts of motions that workers in agriculture must perform: kneeling, squatting, lifting, bending, twisting, and carrying heavy items, among others. Repetition of these actions adds considerably to the risk of injury. How can the science of ergonomics help?

The Occupational Safety and Health Administration divides ergonomic solutions into three tiers, of greater to lesser effectiveness. In order of preference, these are:

1. **Engineering controls**, in which employers physically change the worker's relationship to the work. This often involves the use of material handling equipment designed to take over ergonomically risky jobs such as lifting, transporting, and emptying containers.
2. **Work-practice controls**, such as rotating workers through different jobs to prevent repetitive motions; requiring two-person lifts for heavy objects; and enforcing mandatory work breaks at regular intervals, among others.
3. **Personal protective equipment**, which can be as simple as a layer of padding on sharp edges or the addition of handles to picking tubs.

For the most part, engineering controls will be most effective at removing the risks associated with these demands. When a machine does the lifting for you, you're far less likely to injure your back.

The written proceedings of a NIOSH conference, "[Prevention of Musculoskeletal Disorders for Children and Adolescents Working in Agriculture](#)," provide evidence that engineering controls are the gold standard of ergonomic improvement.

"In other industries, engineering controls have been shown to be the most effective method of reducing the risk of WMSDs [work-related musculoskeletal disorders], especially when emphasizing a more mechanized approach," the writers of the proceedings state.

For example, in the nursing home industry and in hospitals, where numerous non-engineering techniques (e.g., teaching, education) were the sole intervention strategy, only limited success has been demonstrated. When engineering controls, such as patient transferring devices and ergonomic beds were properly implemented, however, there were marked decreases in the incidence/risk of injuries, lost work days, and workers' compensation claims.

Agriculture is not medical care, of course. But the two industries have more in common than it may seem. They both require staff to lift heavy loads, and they both place repetitive stress on workers' bodies. What works in an assisted living center should work on the farm, too, even if the particular workplace tasks differ from one another.

Tasks in Agriculture that Create a Greater Risk of Injury

Many agricultural tasks involve stooped postures and heavy lifting. Some of the greatest risks come from everyday jobs on the farm, including:

- **Harvesting fruits and vegetables** - Reaching, bending, and carrying heavy picking tubs all place stress on the worker's muscles.
- **Handling animal feed** - Large, unwieldy bags of feed are awkward, and the act of emptying them into feeding troughs requires a twisting motion that can injure the worker's back.
- **Weeding in fields and plant nurseries** - This task requires workers to spend long periods of time bending at the waste, straining the muscles of the lower back.
- **Composting animal manure** - A single producing dairy cow can leave farmers with 150 pounds of manure every day. This can be composted into powerful fertilizer, but it must first be collected, transported, and emptied into the composting area.

This list is by no means exhaustive, and you may find that you have unique challenges depending on the crops and animals. The suggestions below provide general guidelines, and, as the [NIOSH guide](#) to agricultural ergonomics tells us, "solutions discovered for one type of crop can be modified for use with other kinds of crops."

Solutions to WMSD Hazards Associated with Animal Husbandry and Crop Farming

As stated, NIOSH published a set of ergonomic guidelines for agricultural workers. They divide their suggestions into four categories, each based on a type of common farm work.

- **Lifting** - The NIOSH guidelines for lifting on farms include attaching handles to containers, avoiding lifts from ground level, carrying loads against the body, tucked in close, and using dollies, pallet trucks, and carts rather than manually carrying loads.
- **Stooping** - On the subject of "stooped work," in which workers must bend at the waste to harvest greens or pull weeds, NIOSH suggests taking frequent breaks for sitting or walking tasks. They also suggest that employers attach long handles to farming implements, allowing staff to stand with a straight back while they complete their tasks.
- **Manual work** - Generally, the agency recommends that employers store tools and other necessary items where workers can reach them without having to reach, stretch, or twist. They also recommend providing stools for seated work and rotating staff through various jobs to prevent repetitive motions.
- **Working with tools** - The firm grip required by many non-powered farming tools can obstruct blood circulation, leaving hands numb or tingling. The NIOSH guidelines encourage employers to provide tools that fit workers' hands, such that the forefinger and thumb overlap slightly. They also suggest covering handles with plastic or rubber for a sure grip without tissue compression. Pruning shears should have handles that are at least 5 inches long and a spring return that pushes the blades open after each use.

These guidelines can be helpful, but remember that the most powerful ergonomic intervention is the introduction of material handling equipment that protects workers from risky movements in the first place. Recently, employers in the agricultural industry have been exploring equipment more commonly associated with warehousing, and for good reason.

Using Bin Tipper to Eliminate Ergonomic Hazards

Increasingly, farmers are beginning to explore a powerful engineering control, a special piece of material handling equipment called a [Bin Tipper](#). These devices lift and empty containers of all types, making them ideal in the agricultural setting. They are particularly useful for handling animal feed, manure, and picking tubs.

The [Dumpmaster Bin Tipper](#) from BHS uses a safe and efficient lift-and-tip action to keep loads within the frame's footprint during use. Custom cradles latch firmly onto preferred containers, whether you work with rollie bins, smaller picking tubs, or even drums. This model has a capacity of 660 pounds, which is more than enough to handle the daily manure output of four lactating dairy cows in a single load.

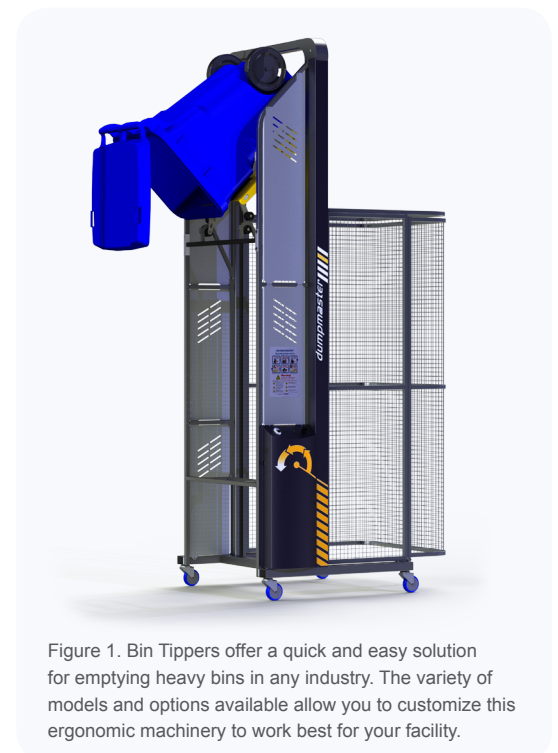


Figure 1. Bin Tipper offer a quick and easy solution for emptying heavy bins in any industry. The variety of models and options available allow you to customize this ergonomic machinery to work best for your facility.

The frame and components are made of galvanized steel with zinc-plated guarding, and the controls are all weather-proof. This allows farmers to store Bin Tippers in a barn, ready for use without having to haul them with a tractor. Dumpmaster Bin Tippers roll on four 4-inch casters with dual brakes for stability.

For farmers who deal in high-capacity bulk materials, the [MegaDumper Bin Tipper](#) offers a heavy-duty capacity of 1,300 pounds. Full-cage guarding protects the operator, and the optional PET-G Operator Guard will prevent any scraps falling onto staff—which your employees will appreciate if you use the MegaDumper to handle large loads of manure.

Material handling equipment will continue to increase productivity on farms. Growers rarely pay the workforce to till by hand; instead, they use tractors and rotary tillers. The same principle should apply to lifting and emptying animal feed, picked crops, and manure. The safety benefits of Bin Tippers and other machines that improve ergonomics in agriculture will keep employees on the job and uninjured, which is also the path to a healthy business.

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