GROWERTALKS

Features

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The Helping Robotic Hand

Amanda Williams

Mechanical developments in agriculture have experienced a booming growth trajectory since the early 19th century. Greenhouse technologies have now far surpassed human capabilities and will dictate the future of our labor force. Benefits to automation include minimizing crop failure and disease loss by creating and maintaining an optimal growing environment. Greenhouse operations can save money by reducing labor and energy by investing properly from the start, utilizing hydroponic systems and integrating automation tools and controllers when possible.

Automating any single aspect of a greenhouse operation saves on labor costs and makes an operation more profitable. Increasing the efficiency of a greenhouse ultimately leads to increased profits, but properly investing in automation from the start is essential. Spending the time and money to plan for automation from square one helps growers avoid costly mistakes that could lead to ineffective growing practices and poor harvests.

How automation saves on labor costs

The variety of automated technology is truly quite remarkable. One of the major economic costs of a growing operation is hired help. Even if a greenhouse has automated irrigation, fertigation and climate control, come harvest time, costs will inevitably be higher. For some operations, automated harvesting technology is being used to eliminate this cost.

The cost of labor is rising steadily and impending immigration reform may result in a vacancy of a major piece of the production process. In anticipation of potential labor shortages, automated harvesting tools can be the future of the agricultural labor force.

One of the most time-consuming practices of a greenhouse operation is transplanting seedlings. Starting seed and transplanting them into larger pots is essential to providing young plants with the space to grow healthfully. Transplanting can require multiple laborers, and takes up valuable time on the farm. For medium- to large-scale growers with at least 3 acres of greenhouses, implementing an automatic transplanter can drastically lower overall costs of producing a flat of seedlings.

Agricultural accuracy and the success of America’s farms are prioritized by the USDA. The U.S. Department of Agriculture offers a free virtual greenhouse calculator, which is called Virtual Grower

(www.virtualgrower.net). Virtual Grower provides growers with yearly costs of heating, cooling and lighting needs.

Heating costs for greenhouses are some of the largest wastes of funds and energy. Virtual Grower provides options to input greenhouse materials, location, type of plants grown, amount of light and size of greenhouse. In general, this can help any low or high-tech operation, but can be especially useful if you're considering automating an operation.

Automating a greenhouse operation allows growers more time and energy to spend on more important growing and business needs. Automation eliminates human error in application and precision, reduces energy costs and replicates success with ease. Regardless of the size of your operation, high-tech automation can help lighten the workload, as well as increase production and profitability. While the initial cost of some of these new toys may seem discouraging, there is an array of pricing options and a range of high-tech tools. Automating one part of a greenhouse will provide you with drastic savings.

Water & nutrient efficiency

Hydroponics is arguably the future chosen method of growing. Some of the most wasteful parts of greenhouse production can reside in watering practices. Traditional watering methods of overhead sprinklers waste significant amounts of water. Overhead watering also promotes bacteria, mold, disease and pests.

Pictured: Smart technology combined with hydroponics can help reduce wasteful watering practices.

Drip irrigation has helped combat water waste for years, but the latest technology takes this efficiency to a new level. Using Dutch buckets or NFT systems can help direct water and nutrients to the plant's roots and can be automated, making it a truly superior and cost-effective way of controlling your input. Smart technology combined with hydroponics can also provide helpful automatic timers, determine moisture levels and turn different systems on and off to maintain optimal growing conditions.

Nutrient application comes in various forms, most commonly as a foliar spray. The same problems found in overhead watering are expressed in foliar spraying. Precision nutrient distribution is a major saver of money in the greenhouse and is simple when utilizing hydroponics.

Vital and expensive nutrients should be applied efficiently through injectors or tanks that automatically distribute a programmed amount of nutrients to plants. Precise nutrient application will help avoid damage to plants done by over-applying or losing nutrients through waste. Automated nutrient application is less wasteful, more efficient and a more direct path to the roots of the plant, which most effectively soak up nutrients, eliminating nutrients wasted on the soil surface.

Ventilation & light-deprivation

Poor ventilation is one of the most common challenges faced by greenhouse growers. Insufficient ventilation can create a breeding ground for mold, disease, bacterial growth and pests. Proper ventilation systems can help cut costs by improving crop success considerably. For efficient ventilation, there are many low-tech and high-tech options available.

Vents and exhaust systems can be automated to respond to greenhouse conditions. A more mid-tech option is a remote controlled or electric vent or exhaust system. Roll-up and drop-down sides or manual vents can greatly improve airflow, but often don't change the fact that without circulation, air exchange and shade, ventilation alone can still leave you with a greenhouse that's too hot or humid for your plants.

Too much sun, heat or humidity can combine to create a dangerous environment for a crop's survival, wasting money spent on labor and inputs. Using a combination of shade cloths, cooling systems and ventilation is a great way to combat this issue. For those looking to automate more of their system, there are full light deprivation options and automated shade cloths, as well as automated cooling systems.

Other automated growing systems

With automation, growers can obtain information on individual plants and have the ability to address problems before they spread. Using precise information and dosing tools, fungicides, pesticides and herbicides are minimized and applied only when necessary. This is not only a money-saving technique, but lightens the amount of damaging chemicals in food and the environment.

Many automation products come with sensors that send vital information to cloud servers, which can be accessed by computers or mobile devices, providing growers convenient access to the information they need without the leg work of going through and manually determining deficiencies. Sensors that are placed throughout a greenhouse can relay information on ventilation, CO_2, humidity and more. Sensor technology can be permanent or handheld.

Automating your operation helps to address the most minute details lacking in your system. Translating and responding to information acquired by your robots allows more time and energy to put towards understanding what the plants need and where an operation might be dropping the ball. **GT**

Amanda Williams is Content Writer for GrowSpan in South Windsor, Connecticut.
www.growspan.com