

Ten Ideas to Improve Your Next Greenhouse

John W. Bartok, Jr.

Professor Emeritus – Agricultural Engineering

Experience is a good teacher. Most of the changes to greenhouses have come from someone that is dissatisfied with the present method and strives to improve it. Each greenhouse you build should be better than the previous one.

It is important that you continually search for new ideas, materials and techniques that may apply to your facilities. Trade magazines, conferences, and grower organizations help in that respect.

The next step is to put the ideas into practice. I know several growers who if they had made the changes they talked about several years ago would be much better off today.

In my many visits to growers I usually ask myself the question, "What would I have done differently if I were the owner?" Here are a few ideas of mine that may help you.

Make the greenhouse higher. The trend is up. A higher greenhouse has more volume to buffer temperature. By adding two feet to the height, the volume is increased 18% to 20%, but surface area, which is directly related to heat loss is only increased 3% to 8%. Roof vents work better. The taller structure also creates less direct shadows as the frame members are further from the plants. A good HAF air circulation system will keep temperatures roof to floor uniform during the winter.

Install adequate drainage. Spend a little more for gravel to raise the level of the floor higher above the surrounding terrain. This will lower the water table quickly after a rain and keep the inside floor drier. It could also reduce heat loss as a high water table moves heat to the ground.

Install adequate electric service. Many greenhouses end up with low voltage as more equipment is added or expansion takes place. This results in motor failures due to overheating. It is not much more expensive to install the next larger service. The additional cost is for the distribution box and larger wire as the installation labor is essentially the same.

Make provisions for pest exclusion. Install insect screening and

tight doors and vents to reduce the potential for insect entrance. The vent system needs to be designed for the increased air flow resistance. Also clear and maintain an area around the greenhouse that is free of weeds, bushes and trees that could harbor insects.

Install an irrigation system to provide most of the plants water and nutrient needs. This can be a large labor saver. Continual manufacturer improvements in nozzles and drippers have provided systems that fit all styles of greenhouses and all crops. Systems are low cost, easy to install and have a short payback.

Purchase meters to measure pH, EC and moisture levels.

Frequent use of these devices to monitor conditions will give an indication of changing plant needs. These meters are low cost and have good accuracy. Visual inspection is not adequate today to get top quality plants.

Install solid state temperature controls. Electronic thermostats and temperature controllers provide more accurate control than mechanical thermostats. Their slightly greater cost is paid for by savings in fuel and improved plant quality. Digital readout, adjustable differential, day/night setback and integral alarms improve their effectiveness.

Install an HAF air circulation system.

Good air circulation is important to provide uniform temperature, leaf moisture removal and carbon dioxide enhancement. The HAF system should be designed to complement the air flow of the heating system. Install at a capacity of two cfm/sq. ft of floor area. The fans should operate continuously except when the exhaust fans are running or vents are open.

Employ some labor saving equipment.

With labor being the largest component of the production cost, the greenhouse should be designed to minimize materials handling.

Conveyors, carts and container filling equipment can help to improve plant handling. Payback should be less than three years.

Locate the greenhouse where there is room for expansion.

Develop a master plan covering the next five years. Show existing structures, work areas, parking, water supply and storage areas. Locate the greenhouse in an area where addition expansion can take place.

Most growers would build their facilities differently if they were doing it today. Use the latest and best technology and ideas to get a greenhouse that is easy to operate and maintain.

