UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE
Cooperative Extension Service

Agriculture and Natural Resources

Starting a Greenhouse Business (Part 1) Some Basic Questions

Gerald Klingaman
Extension Horticulturist - Ornamentals

Jim Robbins
Extension Horticulturist - Ornamentals

Greenhouse growing has a long history in the U.S. and has expanded dramatically since the mid-1980s. Greenhouses are expensive to build and operate. As a result, potential profits are high, but so is the risk involved. Greenhouse growing is an intensive form of plant production and has the potential for high returns, but crops grown in greenhouses have exacting requirements and the markets have very high quality demand.

The failure rate for greenhouses is high and mirrors the 80 percent failure rate (firms that fail to stay in business five years) of most start-up businesses. Prospective new greenhouse growers must do their homework by critically evaluating their own experience, their abilities as managers, their stick-to-it-iveness and their financial backing. Most new businesses fail because of a failure to manage the business end of the operation, not the production end. So, if business management experience is an individual weakness, outside assistance should be sought.

The technical details necessary for greenhouse growing can be acquired by trial and error, but there is nothing like firsthand experience in greenhouse production to make the venture more successful. Prospective growers with no firsthand experience are encouraged to start small and learn the technical details first, and then expand as experience increases.

Wholesale or Retail?

Opportunities exist in both retail and wholesale growing. Generally, retail growing works best if you enjoy working with people and helping them satisfy their needs and wants. Wholesale growing is more feasible if a suitable retail location is unavailable or if you have figured out some way of providing a needed wholesale product and delivering it to your customers.

Retail growing and selling directly to the customer is the easiest area to break into at present because growers can obtain higher prices for their products at the retail level. Retail growing requires an area on a paved road which is easy to find and within a reasonably large population center. On average, a population base of about 6,500 people will marginally support one retail greenhouse outlet. When evaluating your potential customer base, consider the size of your community's trade area, not just the size of the town or city. When assessing competition, count both traditional full-service greenhouse and nursery operations, but don't forget to include other plant outlets such as chain stores, feed stores and even some food stores. It is always easiest to come into a market as the population base is expanding, so check local records concerning past and expected future trends. Traditional retailing, where you attempt to buy in all product and resell it to the customer, is increasingly difficult because of competition from mass market firms.

Wholesale production can take several forms. Wholesale growers almost always deliver their product to their retail customers, so transportation logistics becomes an important part of the challenge required to succeed as a wholesale grower. The

customers may be retail greenhouses or nurseries, florists, grocery stores, chain stores, landscape contractors or farm store outlets. Many wholesale growers set up truck routes and stop by their customers' businesses weekly during the busy spring season.

The most common wholesale producer in Arkansas is the **bedding plant-mum-poinsettia grower**. These three crops are produced at different times of the year and can occupy the same greenhouse space. Presently this wholesale market area appears to be overproducing, and product prices have been falling during recent years. Very large regional growers are emerging with 10 to 50 acres of production. These firms are highly automated and

A gutter-connected poly greenhouse with an open-roof design for summer cooling.

are setting up to serve the chain store market. There may be opportunity to play in this market by becoming a **wholesale contract grower**. One of the needs for the bedding plant-mum-poinsettia growers to succeed is to diversify their product offering by growing unique or specialty crops. As such, you might contract your production to one of the larger firms in the area and produce one or more specific product types at a predetermined price.

The **wholesale florist grower** is the traditional wholesale grower in the industry, but this segment has shrunk dramatically over the past 30 years as chain stores became more important in the sale of plants. Florist growers usually produce a very high-quality product and a wide assortment of items. They have scheduled production with items ready for market every week during the year. Crops such as Easter lilies, forced bulbs, pot chrysanthemums, gloxinias, hydrangeas and other less common offerings are just part of the product mix these growers provide their customers. Bedding plants, unless they are grown for local retail sales, are usually not grown because they require too much space and would interrupt the orderly year-round production schedule. This segment of the industry is technically challenging from a growing standpoint and also very competitive.

Another type is the **wholesale specialist grower**. This area of specialization might include anything from a bread and butter item such as perennials or fern hanging baskets to specialty items such as bromeliads or fancy leafed begonias. The more specialized the product, the larger the market area will be required to support the business. Sometimes a specialist grower simply takes a common plant and produces or packages it in some unique way. Another area of specialization that is often overlooked is the possibility of becoming a propagator and producing either vegetatively or seed grown liners which would be sold to retail growers for finishing. Wholesale specialist growers sometimes market their product by working with national companies that sell on commission a full line of plants directly to retail growers.

How Big a Greenhouse Is Needed?

Deciding on how much greenhouse space is needed requires that one must first determine who the customers will be. If you find there is room in the market for your product, then do some quick math to test the feasibility of the idea. Let's assume you want to make $24,000 a year growing bedding plants (two-thirds of the money) and poinsettias (one-third of the money). Just guessing, you figure you can make $2.00 a flat profit on bedding plants and $1.00 per pot on poinsettias. That means you would need to grow 8,000 flats of bedding plants and 8,000 pots of poinsettias to earn your $24,000. Now that you have some very rough numbers, you can begin to assess the ability to actually sell that much product. In any given market, selling the bedding plants at the retail level might be relatively easy, whereas moving that many poinsettias could be a challenge. You might choose to reassess your plan and consider selling 8,000 flats of bedding plants, 4,000 garden mums and 4,000 poinsettias. This production plan would probably be easier to accomplish.

Now, given that you have estimated a need to produce 8,000 flats of bedding plants in the spring, you can work backwards and estimate the greenhouse space needed. Most bedding plant growers have an early and a late crop, thus producing two "turns" of their space each spring. That means that 4,000 flats would be grown in the first turn and 4,000 in the second turn. If a bedding plant flat occupies 1.5 square feet per flat, then 6,000 square feet of growing space would be needed for each crop. Assuming that 70 percent of the greenhouse space is in "production space" and the remainder is in walks and isles, then a greenhouse with 8,570 sq. ft. would be needed (6,000 ÷ 0.7 = 8,570). Our proposed poinsettia crop is grown on 14 inch centers, therefore each plant will require 1.36 sq. ft. ($14^2 \div 144 =$ 1.36 sq. ft.). Our 4,000 plants would require

5,440 square feet, so we have sufficient room to grow the crop in the space provided for the spring bedding crop. This example approximates what is needed for a full-time greenhouse business. Most experts say that at least 6,000 sq. ft., but preferably 10,000 sq. ft., of greenhouse space is needed for a full-time operation.

Wholesale growing usually requires more space because the profit margin per unit of production is usually less. In the example cited above, the potential profits might be only half of what would be expected for retail sales. Therefore, twice as much space would be required to produce the same profit margin. In recent years, a new kind of wholesale market has emerged, the "landscaper market." These individuals install landscape plants and flowers for their customers and often maintain their planting beds. Most wholesale growers sell their largest volume to the traditional retail outlets, with the best prices afforded to their best customers. The landscaper market usually purchases sufficient plants to buy wholesale but not enough to command the best wholesale price. Many wholesale growers provide the landscaper a price midway between their best wholesale price and what would be a retail price for their product.

What Will a Greenhouse Cost?

Greenhouse costs vary considerably depending on the permanence of the structure. Simple overwintering houses with minimal heating capability can cost as little as $2.00 per square foot while quonset-style poly greenhouses with heating and cooling capacity typically cost in the $4.00 per square foot range. Table 1 compares the cost of some modern types of greenhouse construction while Table 2 gives the actual bid estimate on a quonset-style house.

Table 1. Approximate square foot cost of several greenhouse styles.

Quonset-style poly house with no heating or cooling	$ 1.25
Quonset-style poly house with heating	2.00
Quonset-style poly house with heating and cooling	4.00
Quonset-style gutter-connected house with heating and cooling	4.50
High sidewall, gutter-connected poly house with heating	6.00
Open-roof type (z-top style)	8.00
Retractable roof style with drop sidewall	10.00
Aluminum frame, glass or polycarbonate panels	20.00
Benching costs $1.00 to $2.50 per square foot	
Concrete flooring costs from $0.80 to $1.00 per square foot, excluding labor	

Table 2. Estimated cost for a 30 ft. by 96 ft. double-poly quonset-style greenhouse with 2,880 sq. ft. of growing space.[1]

Structure and Covering	Cost/ sq. ft.	Actual Cost
Dirt work – pad leveling and drainage	0.34	$1,000
Frame bows (galvanized steel tubing) for 6 foot spacing with ground pipes and fitting hardware ($2,300 for 5 foot spacing)	0.64	1,843
Framing materials for endwall construction, brackets for hanging fans and a 36" door and a 42" door	0.24	677
Two layers 3-4 year polyethylene sheeting (inner 4 mil, outer 6 mil)	0.17	481
Base perimeter treated 2x6 lumber	0.05	145
Flooring		
Ground cloth for weed control	0.06	185
Concrete 5 foot wide center walkway	0.11	320
Heating and Cooling Equipment		
Two gas heaters (215,000 btu each)	0.42	1,215
Heating accessories (valve, venting and hanging kit)	0.12	343
Two 3/4 hp 42" angle flow fans	0.50	1.454
Four horizontal air flow fans	0.14	400
Cooling pad system (4 inch Cool-Cell with in-ground tank and pump)	0.63	1,827
Electrical service work	0.17	500
Plumbing service work (gas and water)	0.17	500
Add ons		
Assembly and installation (frame assembly only)	0.53	1,480
Benching (1" grid, 14 gauge coated wire with 2x4 frame)	0.97	2,800
Total	5.26	$15,171

[1]Costs vary depending on location, terrain, distance from utility services.

What Is the Best Location for a Greenhouse?

Once the decision has been made between becoming a retail grower or a wholesale producer, several considerations must be taken into account before locating a greenhouse. Few sites will have every desirable feature, but the more closely the site can match the ideal, the more efficient the operation will be.

Location for retail growing. Retail growers must have highly visible sites that have adequate room for parking and easy on and off road access. The ideal site would be visible from a highly traveled road yet not dangerous for customers to enter or exit. Your local state highway engineer can provide information on traffic volume counts for various locations. Some room for expansion of a retail site is always desirable. Most good retail locations will be provided with adequate utility services such as natural gas, city water and electricity. Sites that are too brightly lighted by street lights may cause problems in growing stray-light sensitive crops such as poinsettias. Good retail sites will be expensive to acquire, but keep in mind that as long as the city is expanding in your direction, the land value will only increase over time. City zoning ordinances should be checked prior to signing any agreements to make sure that the type of business you are proposing is permitted in the area you are considering.

Wholesale growing requirements: A readily available, high-quality, year-round supply of water is one of the most important requirements for wholesale growing. Water quality, especially if taken from a well, must be checked for irrigation purposes before deciding to build a greenhouse range. Your local Cooperative Extension Service office can arrange for the test. The water requirements of a greenhouse range vary according to the kind of crop being grown but range from one-fourth gallon to one gallon per square foot per day during periods of peak demand.

Ideally, access to natural gas would be desirable because it is usually about one-half the cost of propane. The site should have good truck access and there should be room for future expansion. Greenhouses should be oriented north and south for best light coverage.

Level locations, so long as they are out of flood-prone areas, are less expensive to build on. Make sure that there is some up-front provision for storm water runoff from the site and that waste water from production facilities is retained on the site. At present Arkansas has no requirements for containing crop production waste water on the site, but surrounding states are requiring it, so it would be prudent to design a wholesale greenhouse range with that goal in mind in anticipation of future requirements. Individual greenhouse pads should be built up 6 to 12 inches above surrounding grade, or drainage swales should be cut to prevent a loblolly from forming around individual houses. The greenhouse pad should also be crowned to provide drainage before the structure is built. Drainage issues are easy to deal with on the front end but difficult later on. Standing water and/or wet spots encourage disease development and reduce efficiency of workers as they work around wet locations.

DR. GERALD KLINGAMAN is Extension horticulturist - ornamentals, Cooperative Extension Service, University of Arkansas, Fayetteville, and **DR. JAMES A. ROBBINS** is Extension horticulturist - ornamentals, Cooperative Extension Service, University of Arkansas, Little Rock.

FSA6051-1M-11-99N