

Hoop Houses in Rural Alaska

Twenty Questions and Answers to Get You Started

by Jeff Smeenk and Anthony Nakazawa

HGA-00028

Question 1: When we talk about a hoop house, what are we talking about?

A hoop house, also called a high tunnel, is a covered structure at least 4 feet high that is used to trap the sun's heat to provide a warmer climate for the plants growing inside. Hoop houses tend to be fairly simple structures that usually don't need building permits since they aren't considered permanent structures.

Question 2: How is a hoop house different than a greenhouse?

Structurally, there may be very little difference between a hoop house and a greenhouse. In fact, many of the hoop houses operating in Alaska are sold as 2-layer "poly" greenhouse kits. The primary difference between a hoop house and a greenhouse is the level of complexity inside. Many greenhouses have lights and heating systems to create the desired growing conditions. Hoop houses usually don't have supplemental lighting, and if there is a heating system, it is used mainly for frost protection rather than for maintaining a warm growing environment. With the high cost of energy in Alaska, many greenhouses are

operated primarily as hoop houses, with supplemental heat used only in March, April and early May.

Another major difference is that hoop house crops are usually planted directly in the ground, while greenhouse crops are usually grown in containers on benches or other similar structures.

Question 3: I live in rural Alaska and I want to grow something to feed my family. How can a hoop house help me do this?

A hoop house can help feed your family in two different ways. First, by protecting plants from frost and hard freezing, it will extend the growing season by allowing you to plant crops a few weeks earlier in the spring and harvest crops a few weeks later in the fall.

The second way the hoop house helps to feed your family is by providing a place to grow warm-season crops such as tomatoes, cucumbers and peppers. These types of vegetables don't do well outside in most of Alaska, but the protection from cold and the higher temperatures that hoop houses provide allow these crops to thrive. Hoop houses will also protect crops from excess moisture in areas with high levels of rainfall.

Question 4: What sizes do hoop house come in?

Hoop houses are available in an incredible size range. There are small 4- × 6-ft greenhouse kits available in some of the big box stores in Anchorage. At the other extreme are hoop houses that cover entire fields by connecting many tunnels together to create a single large structure. In Alaska, it is much more common to see hoop houses measuring 10 × 20 ft, 20 × 48 ft and 30 × 96 ft. If you are consid-



ering one of the commercial kits, the widths range from 10 ft to 35 ft. The most common lengths are 24 ft, 48 ft and 96 ft, but most kits can be ordered in any length you desire (in 4-ft increments). Before getting the structural kit for a custom-sized hoop house, make sure that you are able to get the greenhouse covering plastic for the proposed size.

Question 5: Does the structural design of the house make a difference?

The Quonset style looks like an arch while the Gothic style comes to a peak in the center. The peaked roof of the Gothic style allows the trusses that provide additional support to be well above head height, and it is able to shed snow better than the Quonset style. Another advantage of the Gothic style of structure is that the walls go straight up, allowing equipment such as rototillers or cultivators to work closer to the wall. The traditional Quonset style usually begins its curving arch right at soil level.



Question 6: What about the cost?

The cost will depend on the size and the level of sophistication of the kit that you wish to purchase. Small hoop houses with no options are sometimes available at box stores for several hundred dollars, while a commercial-scale hoop house with a number of options may be close to \$20,000. There are a lot of options in the \$1,000 to \$2,000 range. Constructing the hoop house with locally available and/or recycled materials can reduce your costs significantly. Small hoop houses can be constructed with pipe, rebar or even with young saplings bent to shape and smoothed off.

Question 7: Does that include shipping?

Shipping costs to your anticipated site really depend on how creative you are. Conventional shipping services to rural Alaska can cost as much as the original purchase price of the house kits. If you are driving to the Lower 48, one of these kits would easily fit on a trailer behind the car. It is amazing how small these structures break down for shipping. If you buy

one of the small kits available in local box stores, shipping is usually included in the purchase price. Creative recycling and use of local products can cut shipping expenses even more.

Question 8: Is it easy to construct? Do I need any tools?

Easy is a relative term! Instructions are included in the kits and some of the manuals are excellent. If you are purchasing a kit from a greenhouse supplier, they usually have knowledgeable people who can answer assembly questions over the phone. A 12-year-old assembled the frame of a 10- × 20-ft hoop house in an afternoon. On the other hand, it took a skilled worker a week to assemble all of the bows and trusses of a 30- × 96-ft hoop house. It took two days to drive all the upright posts and then an additional three days for a crew of four workers to assemble the structure. As you would expect, the larger structures take more time to erect. There are numerous websites illustrating the process. In general, a basic tool set (pliers, wrenches, screwdrivers and a drill) is all that you need. Essentially, you are putting together a giant Erector Set. The kit parts are usually premeasured and precut; they just need to be bolted together. If you are modifying a kit, you can anticipate some additional drilling, cutting and fitting. When you actually assemble the structure, it is good to have some friends come over and turn it into a hoop house-raising party. The parts are not heavy, but they are awkward to work with alone.

Question 9: What type of soil do I need?

Most hoop house producers prefer a soil that is well drained and has adequate levels of organic matter. It is useful to add appropriate amendments to make sure the soil nutrient level is adequate so the plants can fully benefit from the warmer hoop house environment and are not limited by water or nutrition. The better the soil you can build, the more you can take advantage of the benefits of the hoop house. (See the numerous CES soils publications.)

Question 10: How about containers and raised beds?

In the cool climate of Alaska, plants in raised beds perform better than those planted directly into the

ground. At UAF's Matanuska Experiment Farm in Palmer, crops are grown in machine-created raised beds. Many hoop house producers, however, make their raised beds by hand. Some even construct permanent raised beds that have wooden frames to hold them in place. Containers are another effective way to grow crops in a hoop house. However, if you want to hang numerous containers from the hoop house structure, check with the manufacturer to see how much hanging weight is recommended.

Question 11: How about sunlight? Does the hoop house need to be in an open, level area?

The more sun that the hoop house receives, the better the plants will grow. Because of Alaska's long summer days, it is possible to have a successful hoop house on sites that are in shade for part of the day, as long as the plants still receive adequate sunlight. However, since the hoop house depends on the sun for heat, the more sunlight the house receives, the more efficient it will be.

Question 12: How about an electric heater or an oil heater? Do I need one?

Oil or electric heaters are beneficial, especially in the late spring or early fall when a cold night's frost could put the crop at risk. When the temperature outside falls below the freezing mark for a lengthy time, the heat trapped in the house won't be enough to protect the crop, and a supplemental heater can delay frost damage. If you plan on using a heater on a consistent basis, then you are running a greenhouse more than a hoop house. If you choose a hoop house design that has two layers of plastic with an air space in between them, you won't have to add as much additional heat since this design is more efficient at holding in the heat.

Question 13: How early in the season can I start growing things in my hoop house and how far into the late summer or fall can a hoop house extend my growing season?

The answer to these questions depends on where you live in Alaska and on the specific site where the house is located. It also depends on how much the sun warms the air and soil compared to how much heat is lost from wind, cold air and nighttime

temperatures. Some Palmer growers are planting in hoop houses at the end of April while Fairbanks growers often wait until May. Growers in colder regions may need to wait until the end of May. In many situations, a hoop house allows you to plant two weeks earlier than you would plant in the garden outside, and gives possibly two or three weeks of protection from the frost at the end of the season.

Question 14: Which crops will be most successful in my hoop house?

Many of the cold-season crops will grow faster in a hoop house, and using a hoop house will make growing some of the warm-season crops like tomatoes and cucumbers possible. Salad greens work very well in a hoop house. Some producers have been able to pay off the cost of a hoop house in a single season by selling to their local market.

Question 15: Given the size of my hoop house, how much will I produce my first season?

Your production will be influenced by the size of your hoop house, as well as by your level of gardening expertise and the amount of effort you commit. Research trials in Palmer showed an almost doubling of the yield of salad greens grown in hoop houses. Tomatoes and cucumbers grown inside the house also thrived, while adjacent plots outside gave almost no yields.

Question 16: Where can I purchase seeds, fertilizer, etc. for my hoop house?

That is the perennial Alaska gardening question! When looking for more exotic seeds, online sources are your best bet. There are many good seed companies that offer online and catalog sales. Cooperative Extension publications *Recommended Variety List for Southcentral Alaska*, HGA-00031, and *Recommended Variety List for Interior Alaska*, HGA-00030, both have lists of seed sources for varieties that perform well in Alaska. Fertilizer is always a difficult issue because shipping plays such an important role in the total cost of the material. Whenever possible, use local materials that have fertilizer benefits, such as compost; if fertilizer must be shipped, get it from whomever you can get a good total price (material plus shipping).

Question 17: Will I have problems with moose?

It is not very common, but there are instances where the hoop houses were left open for ventilation and moose went through them. The moose browsed off some of the crops but didn't damage the structure. That said, it is probably not a good idea to spook a moose when it is inside a structure covered in clear plastic. A frightened moose may escape through the side of the house rather than ambling out the door.

Question 18: How many seasons will my hoop house last?

The steel frames should last for many years. It is not certain how long the homemade PVC houses will last — that probably depends on wind, weather and sunlight that can weaken or damage PVC pipe. There are some wooden-framed hoop houses that are many years old. It depends on whether you treat them with an appropriate preservative and how well you protect the wood from the elements.

It is best to use 6-mil greenhouse plastic, which is usually guaranteed for four years of year-around use. People often use regular polyethylene film, which Alaskans usually refer to by the brand name Visqueen, to save money. A regular polyethylene film used on a research hoop house lasted only a single season, which may be fine in some situations. However, regular polyethylene film does not have ultra-violet light inhibitors in it, so at the end of the growing season the plastic may be fairly brittle. If you get strong winds in your area, the wind-caused flapping of the brittle plastic can cause it to disintegrate, and

you will be picking up pieces of plastic all over the area. So, if you don't want to replace the plastic frequently, investing in true greenhouse plastic is probably worth the cost. In a hoop house trial in Fairbanks, 7-mil plastic, which better supports the winter snow load, has been used successfully for three growing seasons. Most growers, however, have success with the more common 6-mil greenhouse polyethylene.

Question 19: What are some good additional resources on hoop houses?

There are several great resources available. *The Hoop House Handbook* by Lynn Byczynski and *Extending the Season* by Elliot Coleman are both very good. There is a huge amount of information on the web. Especially useful is the ATTRA publication *Season Extension Techniques for Market Gardeners* by Janet Bachmann (<http://attra.ncat.org/attra-pub/seasonext.html>).

Question 20: If I need further assistance, where can I find it?

Consult your local Extension agent or any of the numerous publications Extension has to offer. If you are interested in the business aspects of using a hoop house, the newsletter "Growing for Market" has a lot of useful information.

There is also a hoop house listserv on the Internet (www.hightunnels.org/) where people from all over the country — and a surprising number of people with Alaska experience — are constantly exchanging ideas and information.

To simplify information, trade names of products have been used. No endorsement of named products by the University of Alaska Fairbanks Cooperative Extension Service is intended, nor is criticism implied of similar products that are not mentioned.

www.uaf.edu/ces or 1-877-520-5211

Anthony Nakazawa, Extension Economist. Originally produced by Jeff Smeenk, Extension Horticulture Specialist, and Anthony Nakazawa.



Published by the University of Alaska Fairbanks Cooperative Extension Service in cooperation with the United States Department of Agriculture. The University of Alaska Fairbanks is an affirmative action/equal opportunity employer and educational institution.

©2014 University of Alaska Fairbanks.

2-11/JS-AN/4-14

New February 2011