

## **U analysis: small scale passive greenhouses operating in the black**

*Deep winter greenhouses could expand farm business through cold months*

ST. PAUL, MINN. (8/14/2015) – University of Minnesota Extension Educator Ryan Pesch has released an enterprise analysis detailing the financial performance of small-scale passive solar Deep Winter Greenhouse operations in Minnesota and Wisconsin. Of the seven deep winter greenhouses surveyed, all but one had positive cash flow. The operations grew mostly salad greens such as lettuces, kales, mustards, and arugula. The report is available at [z.umn.edu/dwg15](http://z.umn.edu/dwg15) and was made possible by funding by the University of Minnesota MnDrive program.

“The average cost of the greenhouses we looked at was \$25,000, with an overall return on investment of 3 percent,” said Pesch. “We also found three factors critical to a greenhouse’s success, which we hope will help existing growers improve their operations and assist prospective growers in planning.”

The success factors for operating a profitable deep winter greenhouse were identified as:

- 1. Maximizing use of space.** Producers can grow crops directly in the ground as well as in hanging gutters or trays utilizing three dimensional space.
- 2. Pursuing direct-to-consumer marketing channels.** Successful operators sold directly to consumers thereby eliminating costs associated with passing through a distributor.
- 3. Keeping startup costs as low as possible.** The range of costs for greenhouse construction was \$6,000 to \$73,000. High depreciation expenses and additional features cut into the profitability of the system.

Although start-up costs are significant, at an average of \$60 per square foot, study participants’ overall return on investment (ROI) ranged from -3.6 percent to 21.5 percent to net the 3 percent average, with a median payback time of eight years. In terms of annual expenses and returns, variable costs such as propane, seeds, and soil mix were an average of \$4.10 per square foot of growing space. All but one participant experienced positive operating revenue for an average of \$1,717 per enterprise, or nearly \$7 per square foot of growing space.

Deep Winter Greenhouses are a newly emerging technology that enable small scale producers the capability of producing vegetable crops with passive solar energy throughout the winter with minimal externally delivered fuels, thereby decreasing the carbon footprint of food. With the small scale of these structures and the minimal heat input costs, the technology is accessible to a wider range of producers for whom conventional greenhouses might not be an option.

With the possibility of winter production, small-scale vegetable producers have the ability to produce products throughout the year thereby increasing the viability of the farm business. As deep winter greenhouse technology is not yet widespread, analyses of financial production are important to provide a better understanding for those looking at producing with the system, or financing such systems.

University of Minnesota Extension, Regional Sustainable Development Partnerships (RSDP), and other University units are pursuing a number of research projects to improve and highlight small-scale passive solar growing operation in the winter, including a producing a set of producer bios, connecting deep winter greenhouse operators, and measuring the performance of different inputs and designs. Deep Winter Greenhouse resources are collected and maintained by RSDP at [z.umn.edu/dwgr](http://z.umn.edu/dwgr).

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