

Controlling The Future Of Food

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Greenhouse producers play an important role in safely feeding the world's burgeoning population.

E coli outbreak, spinach, 2006: More than two hundred people were affected and three died from consuming fresh spinach contaminated with E. coli. The leafy greens industry lost millions of dollars and suffered a public relations crisis that lasted for the following year. The spinach outbreak led to dozens of hearings and ultimately tougher Federal food safety standards through the U.S. Food and Drug Administration (FDA).

Salmonella outbreak, tomatoes, 2008: The outbreak of a rare strain of Salmonella sickened 145 people who ate Roma or plum tomatoes. Restaurants and grocery chains nationwide did not serve or sell tomatoes for weeks after, and consumers steered clear of the fruit for months, even though the FDA identified California and 25 other tomato-supplying states and countries as not being associated with the outbreak.



In response to these highly publicized food outbreaks, and others that have occurred since, the FDA Food Safety Modernization Act recently passed the U.S. House and is currently stalled in the Senate. The proposed legislation would give the U.S. Food & Drug Administration the power to recall food when it posed a danger to health and safety, and it would require the agency to inspect all high-risk food processors at least once a year. According to a July 2010 poll by Consumers Union, 80 percent of Americans want new food safety legislation passed quickly.

Above: The University of Arizona's field data found that controlled environment agriculture produces 10 times more tomatoes than field production.

Left: Food borne illness outbreaks, including some in the leafy greens industry in the past few years, have not been forgotten by consumers. The majority of U.S. consumers want new food safety legislation passed quickly.

In 2008, a Consumers Union poll found that 48 percent of respondents had decreased confidence in the safety of the nation's food supply. While 54 percent said they felt the government was doing all it could to ensure food safety, 83 percent of respondents were concerned with harmful bacteria or chemicals in food.

A 2008 poll by commissioned by Deloitte Consulting discovered that out of 1,100 respondents, 76 percent were more concerned about the food they eat than they were five years prior and 57 percent of respondents stopped eating a particular food, temporarily or permanently, following a recall.

GROWERS UNDER PRESSURE

With food safety scares still fresh in consumers' minds and the majority of Americans calling for increased government regulation, the produce industry has no room for error. While Best Management Practices and HACCP (Hazard Analysis and Critical Control Points) standards have been



implemented in most operations, growers continue to face challenges developing their own food safety plans, including increased expense and management and labor issues.

Add to this the obstacles of increasing water shortages and urban development encroaching on farmland, and field production is not getting easier. By 2050, the world will inhabit more than 9 billion people with more than 400 million in the United States alone. Growers nationwide will be required to produce twice as many crops with 30% less land available.

Controlled environment agriculture (CEA) is becoming a veritable alternative in the U.S. after years of research and success in Europe and Canada. Today, there are about 900 acres of greenhouse hydroponic tomatoes in the U.S., for a total of approximately 12,000 acres of hydroponic greenhouses. That number is growing exponentially with more traditional vegetable and fruit growers constructing greenhouses annually.



A large variety of crops can be produced in controlled environment agriculture settings year-round, providing additional income for growers and fueling the increasing demand for locally produced food.

CEA DEFINED

Controlled environmental agriculture is the most intensive, high technology form of agriculture in the U.S. and the world. High value crops like flowers, vegetables, culinary and medicinal herbs are produced in carefully controlled greenhouse environments in order to optimize horticultural practices.

CEA is any agricultural technology that enables the growers to manipulate a crop's environment to the desired conditions. Each space may have specific factors that are controlled, such as:

- air temperature and humidity
- sunlight intensity
- gases in the air such as carbon dioxide [CO₂] or ethylene [CH₄]

- plant nutrients and water
- and insects and diseases.

In research, CEA is useful for isolating specific environmental variables for closer study. The advantage is that all other factors can be kept constant, reducing the incidence of another influence on the experiment. Similarly, in commercial agriculture, a controlled environment that is closed off to outside influences allows growers to produce clean crops with precision, which results in increased efficiency, fewer pests and diseases and preserves resources.

CEA: WORTH THE INVESTMENT

While the expense of constructing a greenhouse is an important investment consideration, the payoff is nearly immediate, according to Gene Giacomelli, director of the University of Arizona's Controlled Environment Agriculture Center. Giacomelli notes that the profit differences between hydroponic production and traditional field cultivation are significant.

"Yield data show that tomato production is 600,000 pounds per acre in the greenhouse, versus 60,000 pounds per acre in the field; or 60 pounds per plant in the greenhouse versus 6 pounds per plant in the field."

Unlike field conditions, which are prone to climate changes like drought and extreme weather, as well as outside contaminants from pests and field workers, CEA provides protection from outside forces. CEA is more efficient, less dependent on weather, providing more crop turnover through year-round production in any climate, allowing growers to produce more crops per square foot in a greenhouse than in a field over time.

With the use of integrated pest management (IPM) programs incorporating beneficial insects to target pests, as well as the necessary honeybees to pollinate greenhouse vegetable and fruit crops, growers highly regulate pesticide application and emphasize natural methods, including proper sanitation and cleaning, and pest exclusion through barriers.

This reduction in chemical inputs, coupled with water retention and recycling programs and other land conservation efforts, greenhouse growers are able to reduce their operations' environmental footprint.

HOW WE CAN HELP

With more than 20 years of experience designing heating and irrigation systems for the controlled environment, we can develop a customized solution. Find out how at 800-552-5058 or email info@deltatsolutions.com. ▲



Things To Know About Controlled Environment Agriculture

- 1** Within the next 40 years, growers nationwide will be required to produce twice as many crops with 30% less land available to keep up with the fast-growing world population.
- 2** Yield data from the University of Arizona's Controlled Environment Agriculture Center shows that greenhouse vegetable production is 10 times more efficient per acre than field production, for some crops.
- 3** CEA is more efficient, less dependent on weather, providing more crop turnover through year-round production in any climate, and has a smaller environmental footprint.



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