



Ornamental Horticulture Team Logic Model 1

Name of Program: Nursery and Greenhouse Production Systems

CSREES Goals:

1. An agricultural system that is highly competitive in the global economy
4. Greater harmony between agriculture and the environment
5. Enhance economic opportunity and quality of life for Americans

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Situation Statement:

Ornamental horticulture contributes to the economy and environmental quality of the state, where quality of life is of utmost importance to residents and tourists. Horticulture keeps 21,000 acres in agriculture, over 14,000 of which is open space, helping to preserve the state's rural character. The ornamental horticulture industry includes at least 935 businesses in New Hampshire that generate \$438 million or more annually in sales and services, according to a recent New England survey. Greenhouse and nursery crops are the fastest growing component of agriculture in this state, having increased by 87% between 1992 and 1997 (USDA Agricultural Census, 1997). Other important components of the industry include landscape services and retail sales.

New products, technologies, and growing systems are continually needed in order to sustain the growth and profitability of the industry. Consumer demand (often based on media influence) can shift market demand very quickly. Management of nutrients, water, and pests are key components to profitability; as plant size, quality, and time to saleable product are dependent on appropriate nutrition, irrigation and pest control. Because of high capital and operating costs and increasing competition, quantifying the fixed and variable costs of production is also key to ensuring profitability.

External Factors:

Nationwide, protection of water quality from non-point sources of nutrients (nitrogen and phosphorus) and pesticides is a major issue of concern.

There is increasing potential for regulation of water used for irrigation, due to increasing population and competition for water resources.

Increasing cost of production for plastics, peat, steel, fuel, and other production components.

Labor for this industry is in short supply and expensive.

National discount chains are expanding rapidly, influencing local markets and prices for plants. State has placed 3 economically important plants on the invasive species list, to be banned in 2007.

Extension has a strong relationship with industry associations (New Hampshire Plant Growers Association and NH Landscape Association).

Assumptions:

All members of the ornamental horticulture team will contribute to the implementation and evaluation of this program.

Voluntary adoption of environmentally friendly production practices is the best strategy for the industry to avoid both negative public perception and potential regulation. Adoption of environmentally friendly production practices will result in a higher economic value of product.

Barriers:

Limited number of researchers and extension specialists working on production issues in New England.

Limited number of county educators with a major emphasis on ornamental horticulture. Many growers, particularly small operations, are therefore not being reached.

Huge diversity of operations and types of ornamental crops produced.

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Objectives (SMART): 2005-06

1. **Alternative production systems:** development and adoption of systems (such as pot-in-pot nursery systems, organic greenhouse production, cut flowers in tunnels, etc.) that result in higher product value, better market opportunities, and/or reduced cost of production. 20 operations will evaluate and make an informed decision regarding changing production systems.

2. **Greenhouse technology:**

- a. Growers build or modify a greenhouse structure or environmental-control system which enhances energy or operational efficiency leading to improved production facilities in at least 20 operations
- b. 50 growers will adopt an integrated crop management approach to increase productivity and improve crop quality of model crops (poinsettias, garden mums, and bedding plants), while reducing environmental impacts.

3. **Water and nutrient management:** changes in irrigation or nutrient management systems, equipment, and/or management practices that result in higher product value and/or reduced cost of production and prevent potential environmental degradation in at least 25 operations.

4. **Integrated pest management:** 25 producers will adopt Integrated Pest Management practices that will improve accuracy in assessment and identification of pests and problems, and reduce potential negative environmental impacts while maintaining high crop quality.

Outcomes/Impacts

Impact (Long-term)

1. **Alternative production systems:**

- Depending on the alternative system implemented, growers will improve product quality and/or product value, develop new market niches, reduce winter loss of nursery stock, and/or reduce the cost of production.
- The changes made will lead to increased profitability of products grown in the alternative systems.

2. **Greenhouse technology:**

- Greenhouse growers will increase economic productivity through reduced production costs or increased net returns.

- Greenhouse growers will improve environmental quality by improving energy efficiency and reducing amount of waste materials flowing into disposal facilities.
- Growers will have access to and use new information technologies (software and training tools) to reduce crop losses, produce higher-quality products to market specifications, and increase profitability.

3. **Water and nutrient management:**

- Growers will produce higher quality and higher value products.
- Growers will get higher economic returns by increasing efficiency of water and fertilizer use.
- Growers will become more aware of their impact on the environment and work to minimize this by better nutrient management, leading to less leaching of nitrogen and runoff of phosphorus.
- More efficient use of irrigation water will lead to water resources conservation and perhaps help prevent regulation.

4. **Integrated pest management:**

- Growers will produce higher quality and higher value crops by reducing injury and damage due to pests.
- Potential negative environmental impacts due to inappropriate selection and application of pesticides will be avoided.

All of the above impacts together lead towards economically and environmentally sustainable greenhouse and nursery operations that contribute to a healthy agricultural economy and community.

Action Outcomes:

1. **Alternative production systems:**

- Growers will do a cost analysis for the systems under consideration.
- Growers will do a market analysis for the products of the systems under consideration.
- Based on the above, growers will implement selected alternative systems, adopt the associated production technology, and develop new market niches.

2. **Greenhouse technology:**

- Greenhouse growers will adopt appropriate greenhouse technologies, alternatives and practices that will improve energy efficiency.
- Growers will build/modify their layout, design or structures to improve operational efficiency.
- Growers will obtain and/or adopt appropriate technologies and equipment that will enhance operational efficiency.
- Growers will adopt production tracking software and internet resources to improve decision-making and crop quality.

3. **Water and nutrient management:**

- Growers will regularly monitor the condition of their plants and identify abnormal plants or conditions.

- Greenhouse and container nursery growers will increase their use of laboratory media and water testing and/or will implement regular monitoring of the growing medium by conducting pH and EC testing.
- Field nurseries soil will take and submit soil samples every 2-3 years as the basis for fertilizer management decisions.
- Growers will adopt fertilizer management practices that lead to better plant nutrition and higher quality plants (based on testing, specific plant requirements, etc.)
- Growers will purchase and use EC meters to calibrate their fertilizer injectors.
- Growers will calibrate fertilizer injectors or other applicators.
- Growers will calibrate or calculate water application rates and uniformities for their irrigation systems.
- Growers will adopt low-volume irrigation systems where appropriate, or reduce water use through better irrigation system design and management.

4. Integrated pest management:

- Growers will adopt regular scouting and monitoring of crops for pest and disease problems.
- Growers will select the most appropriate and effective pest management techniques
- Growers will apply pesticides, when needed, correctly and safely.

Learning Outcomes:

1. Alternative production systems:

- Growers and potential growers increase awareness of options in production systems and the advantages and disadvantages of each.
- They will learn what are the structural and material inputs for the alternative system(s).
- They will increase their knowledge of production technology for the system(s). This includes how to build or install the systems or structures; how to manage water and nutrients, pest management, harvesting and postharvest handling requirements.
- They will learn what are the economic costs and returns associated with the system(s), such as labor, cost of materials and supplies, investment expenses.
- They will learn how to do a market analysis and a cost analysis.

2. Greenhouse technology:

- Greenhouse growers will learn about greenhouse technologies, alternatives and practices that will improve energy and operational efficiency.
- Growers will learn how to take an integrated crop management approach to greenhouse production that will include monitoring of nutrients, pest levels, height, and climate, and use this information to improve decision-making.

3. Water and nutrient management:

- Growers will increase knowledge and skills for identifying nutrient deficiencies and toxicities.
- Growers will learn about the effects of pH on nutrient availability.
- Growers will increase their knowledge of pH and nutrient requirements for specific plants.
- Growers will gain knowledge and skills for conducting media pH and EC testing.

- Growers will learn how to use EC meters to calibrate fertilizer injectors.
- Growers will learn how to calibrate or calculate water application rates and uniformities for their irrigation systems and how to improve irrigation efficiency.

4. **Integrated pest management:**

- Growers will increase their knowledge of how to correctly identify weed, insect and disease problems.
- Growers will learn the most appropriate and effective techniques to manage pest problems.
- Growers will learn how to safely and correctly apply pesticides to manage pests.
- Growers will increase their knowledge of and learn how to monitor and scout for pest problems (timing, thresholds, record-keeping).
- Growers will increase their knowledge of biological control options to manage pests.

Activities: Applied research and demonstration work
 Field days and twilight meetings
 Seminars and workshops
 Presentations at industry local, regional, and national meetings and conferences
 Publications (newsletter, fact sheets, articles in trade and refereed journals)
 Maintain and expand information on UNHCE web site
 Direct contacts (specialists and educators working directly with growers)
 In-service training for staff
 Ornamentals Team meetings

Participants: Greenhouse owners, managers, growers
 Nursery owners, managers, growers
 Garden center managers, growers
 Cut flower growers

Inputs: UNHCE specialists and educators
 Regional specialists
 Industry cooperators
 Publications (fact sheets, etc.)
 Analytical Services lab
 Plant Diagnostic lab
 Supplies (pH and EC meters, etc.)
 Reference materials
 Facilities (UNH Hort Farm and Research Greenhouses)
 External and internal funding

Evaluation Plan – Attached
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 Action Plan – Attached