Overview - Irrigation

Use of irrigation can prevent crop losses, support crop yield and quality, and allow for the production of a greater variety of crops. Even in areas where crops have historically been produced without supplemental irrigation (e.g. the Northeast United States), the economic benefits of using irrigation are now clear. As climate change increases the frequency and severity of extreme weather patterns, such as heat and drought interspersed with heavy precipitation events, the need for and benefits of irrigation are likely to increase.

There are a variety of irrigation systems that farmers may consider installing. Two options suitable for small and medium New England farms are drip and solid set sprinkler irrigation.

Drip irrigation brings water to crop root zones through low pressure devices, such as micro spray, bubblers and tape, that are operated just above or directly on the ground, or just under the soil surface. This option works well in orchards and vineyards and in vegetable and flower production. While drip irrigation is easy to install, efficient, effective on sloping fields, and unaffected by wind, it also has high management and maintenance needs, including those related to issues such as clogging and bacterial and algal growth.

Solid set irrigation is a sprinkler system that uses higher pressure and water volume than drip irrigation. It is frequently used on small and medium farms due to its adaptability to a variety of soil and field conditions, the ability to easily automate it, and for its additional use for frost prevention. Due to the high water flow, a substantial water supply, such as that from a pond or large well, is required to support this sprinkler system. Weed control around the sprinkler risers is also needed to maintain their visibility and prevent accidental damage from farm equipment operated nearby. Solid set sprinkler systems may also require close management, ensuring that the rate of application does not exceed the rate of soil absorption to prevent overwatering and subsequent runoff and erosion. Since uniform application of water can be a challenge with sprinklers, attention should be given to all areas of the irrigation system, as some areas may be underwatered while others are overwatered.

Irrigation Trade-offs:

Potential Benefits	**Potential Challenges**
Improves crop quality, consistency, and yield Supports the production of a greater variety of crops Prevents crop losses Drip irrigation is easy to install, efficient, effective on sloping fields, and unaffected by wind	Upfront investment required to install irrigation system Ongoing maintenance and labor costs Adequate and reliable water source required, yet are specific to unique farm settings and locations Drip irrigation is susceptible to clogging and

Solid set sprinkler irrigation is adaptable to a variety of field and soil conditions, can be used for frost prevention, and is easily automated	bacterial and algal growth Solid set sprinkler systems require a substantial water supply, weed control around the risers, and management to prevent overwatering Uniform water application can be a challenge with solid set sprinklers

Additional Resources:

Interested in irrigation? Check out our economic tool to determine the potential costs and revenue here. See what irrigation look like here.

Small Acreage Irrigation Guide (USDA Natural Resources Conservation Service and Colorado State University Extension, Boyd Byelich, Jennifer Cook, Chayla Rowley, Updated February 2019)
Selecting an Irrigation System: Small Scale Solutions for Your Farm (USDA Natural Resources Conservation Service, January 2009)
Getting started with drip irrigation: components and costs (University of Vermont Extension, Rachel Schattman and Chloe Boutelle, Updated November 2018)
Irrigation pays protecting crop revenues (USDA Northeast Climate Hub)
NRCS Economic Tools (USDA Natural Resources Conservation Service)
The Maine Irrigation Guide 2005, Information on Water-Source Development and Irrigation Practices (Central Aroostook Soil & Water Conservation District, 2005)
Benefits of Irrigation: Intervale Community Farm
- Partial Budget (USDA Northeast Climate Hub and University of Vermont Extension, September 2017)
- Case Study (Andy Jones, September 2017)

Drought.gov (National Integrated Drought Information System and National Oceanic and Atmospheric Administration)
Climate Smart Farming Water Deficit Calculator (Cornell University, Cornell Institute for Climate Smart Solutions, 2021)
Drought Resources (USDA Natural Resources Conservation Service