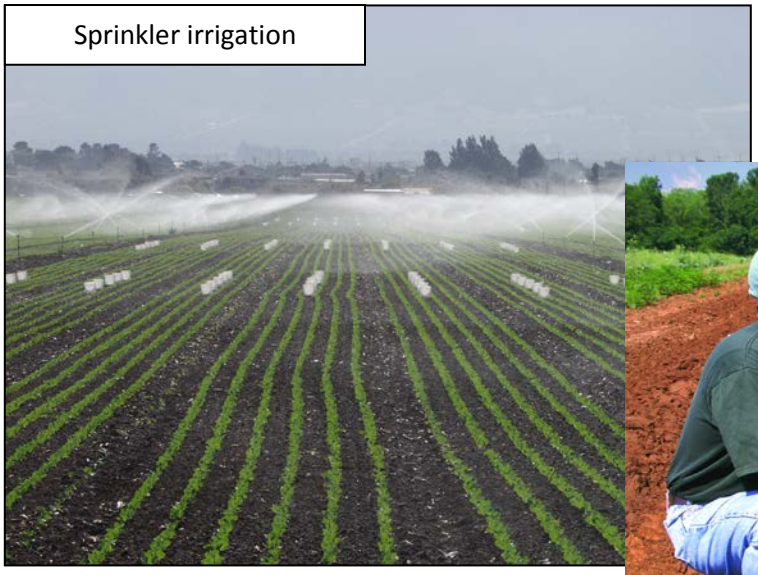
BALANCING FOOD SAFETY AND SUSTAINABILITY

Opportunities for Co-management – Sprinkler and Microirrigation Systems

This is one of a series of resource sheets for food safety auditors that describe conservation practices commonly used in agriculture's production environment.

Images of Sprinkler[1] and Microirrigation[2] systems in production fields

Sprinkler irrigation



Microirrigation

This information can help you to

Recognize Sprinkler and Microirrigation systems in the agricultural environment.

Understand the purposes these irrigation systems serve in the agricultural environment.

Recognize the language growers may use to explain why these practices are important in their production environment.

Understand when audit standards may consider these practices as addressing farming impacts on the environment and biodiversity and/or as potential contributors to food safety risk.

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[1] This practice is currently listed as Sprinkler Irrigation #442 by the USDA Natural Resources Conservation Service. The NRCS National Practice Standards are updated regularly. Some states may include additional guidance; consult your local NRCS field office.

[2] This practice is currently listed as Irrigation System, Microirrigation #441 by the USDA Natural Resources Conservation Service. The NRCS National Practice Standards are updated regularly. Some states may include additional guidance; consult your local NRCS field office.

These practices are generally used to deliver irrigation water directly to a production field.

Sprinkler irrigation systems that are properly designed, operated, and maintained can efficiently and uniformly apply water by means of perforated pipes or nozzles operated under pressure. Nozzle size and condition should be calibrated to meet plant water needs and to reduce excess irrigation that can cause erosion and transport agricultural chemicals (e.g. fertilizers, pesticides) offsite. The system should be designed to maintain adequate soil moisture for optimum plant growth without causing excessive surface runoff or erosion.

Microirrigation is sometimes referred to as 'trickle' or 'drip' irrigation. Microirrigation is a planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground. The purpose is to efficiently apply water directly to the soil in plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, or salt accumulation in the crop root zone.

Advantages[1]	Disadvantages
Characteristics shared by practices	
• Can minimize surface runoff and reduce soil erosion when the system is well-managed • May increase efficiency of water distribution with proper management • May reduce the size of or eliminate the need for additional practices such as a sediment basin or tailwater recovery system as compared to furrow or other surface irrigation systems	• Requires high maintenance
Sprinkler Irrigation	
• Requires less labor during irrigation sets as compared to furrow or other surface irrigation systems	• Requires more management • May require a water filtration system • Hand moved system may Increase labor between sets • May require improved pipelines to adequately pressurize the irrigation system
Microirrigation	
• Reduces soil crusting and compaction • May reduce need for cultivation of weeds, which can improve soil health • Allows chemigation and fertigation	• Requires high maintenance • Requires a water filtration system • May increase salt accumulation in root zone

[1]From Farm Water Quality Management Practice Sheets Irrigation System, Mircroirrigation #441, Irrigation System Sprinkler #442

In some audit standards these practices may help producers to demonstrate knowledge of the impacts of farming on the environment, including water quality impairments caused by sediments, nutrients, and pesticides. Irrigation practices in general may trigger concerns about water of unknown quality coming in contact with edible portions of the crop or with fecal contamination.

Scenarios

Buffer areas are established around fecal deposits in the field that might be splashed by sprinkler irrigation onto edible portions of the crop. Irrigations are held until fecal deposits are either flagged or contained, or removed.

Microirrigation is used during the crop production cycle to reduce the potential for irrigation water to contact the edible portions of the crop.

Where standing water occurs from flowing or overflowing water, buffers are established around the temporarily puddled area and in traffic areas. Where practical, drainage pathways are established to reduce the persistence of puddle water to reduce potential habitat or drinking areas for wildlife. These areas are monitored and signs of wildlife presence are noted.

Additional Resources

Balancing Food Safety and Sustainability: Opportunities for Co-management , 2012

Reducing Runoff from Irrigated Lands: Managing Existing Sprinkler Irrigation Systems, 2007

Irrigation Water Salinity and Crop Production, 2002

Drip Irrigation Salinity Management for Row Crops, 2011

The following are for-sale publications from the University of California

Fertigation with Microirrigation, 2006

Maintaining Microirrigation Systems, 2012

Micro-irrigation of Trees and Vines, 1996

Irrigation Pumping Plants, 2000

Sprinkle Irrigation of Row and Field Crops, 2011

Additional resources on co-management of food safety and sustainability may be found at on the UC Food Safety Website under the Pre- and Post-Harvest Produce link. You can also contact Mary Bianchi, UC Cooperative Extension Emeritus Farm Advisor in San Luis Obispo County at mlbianchi@ucanr.edu.