The Rapid Response to Rising Temperatures in Fresh-Market Tomato Production for Small Farmers

The rising temperatures and drought conditions have caused significant challenges in summer tomato production worldwide. This project aims to develop and implement a climate-resilient fresh tomato production system tailored for small farms. Rising temperatures have severely impacted tomato production across the U.S. and globally, resulting in halted fruit set, poor development, and reduced quality. The exceptionally hot summer of 2024, with temperatures consistently ranging from 32-37°C (upper 90s°F) from mid-June through August, has caused irreversible damage to tomato growers in Middle Tennessee and other regions using both high tunnel and open-field systems. These conditions have disrupted the supply of locally grown fresh tomatoes and increased the risk of losing regular customers, directly affecting the economic stability of rural areas. This project will collaborate with farms that have experienced severe crop losses due to extreme summer heat and prolonged drought. It has two primary objectives: Objective 1 is to develop a climate-resilient fresh tomato production system for small farms, which includes selecting tomato varieties suitable for high tunnel and open-field cultivation, using grafted tomato plants, and applying various types of plastic mulch to regulate the soil microclimate. Smart agriculture tools will be employed to monitor and record plant health, as well as ambient and soil conditions in real time. Demonstration plots will be established on three farms to assess the system's overall effectiveness. Objective 2 is to leverage the extension system to prepare a large number of tomato farms for the impacts of climate change. The ultimate goal is to establish a fresh-market tomato production system that can withstand climate change, ensuring a stable supply of fresh vegetables to both local and broader communities. This project is funded by NIFA award proposal: 2024-12416

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