

Adaptive management framework for evaluating and adjusting microclimate parameters in tropical greenhouse crop production systems

ABSTRACT

High operational costs of greenhouse production in hot and humid climate condition due to the initial investments on structure, equipment, and energy necessitate practicing advanced techniques for more efficient use of available resources. This chapter describes design and concepts of an adaptive management framework for evaluating and adjusting optimality degrees and comfort ratios of micro climate parameters, as well as predicting the expected yield in greenhouse cultivation of tomato. A systematic approach is presented for automatic data collection and processing with the objective to produce knowledge based information in achieving optimum micro climate for high-quality and high yield tomato. Applications of relevant computer models are demonstrated through case study examples for use in an iterative way to simulate and compare different scenarios. The presented framework can contribute to future studies for providing best management decisions such as site selection, optimum growing season, scheduling efficiencies, energy management with different climate control systems, and risk assessments associated with each task.

Keyword: Greenhouse; Climate control; Microclimate evaluation; Tomato; Ventilation; Evaporative cooling