

Assessment of energy consumption in organic tomato greenhouse production – a case study

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Abstract

Greenhouse production has increased over the last decades in the Mediterranean region. Greenhouses allow protecting crops from adverse climate conditions, creating microclimate conditions appropriate for obtaining high production with high quality all over the year. However, greenhouse production is generally associated with high environmental impacts due to the use of high amounts of resource inputs and the high quantity of waste generated. Sustainable greenhouse production is nowadays a goal and can be achieved by using appropriate technologies such as innovating crop practices and environmental control techniques allowing reducing agro-chemicals, water, and energy consumption. Organic farming is based on methods and practices that try to protect the environment (soil, water, air), which includes limitation on the use of synthetic pesticides and fertilizers and the use of on-site resources, such as livestock manure for fertilizer. Demand for food produced without using agro-chemicals has increased; usually these products are sold at high price and associated to a particular nutritional value, taste and health. It is generally associated with lower yield and better quality. Greenhouse organic farming is not widely applied as farmers believe that yields are strongly reduced. However, there is a market opportunity to organic farming as a result of higher product prices and consumers demand. In order to compare the overall efficiency of crop farming systems, it is vital to consider energy consumption and efficiency. In this work, a case study is analysed in terms of energy consumption and greenhouse gas emissions (GHG). The data were obtained directly from the grower and the main objective of this work was to characterize the organic greenhouse production system. The most important inputs were identified and compared with others obtained with conventional greenhouse production. Results showed that organic greenhouse uses less energy ha⁻¹ and t⁻¹ of produced tomatoes than the conventional greenhouses.

Keywords: energy efficiency, GHG emissions, sustainable production

INTRODUCTION

One of the EU target indicators for 2020 is “20% increase in energy efficiency”. Improving energy efficiency means to reduce the amount of energy required to provide a unit of product. It includes all measures that are suitable to reduce specific components of the energy input, improving energy utilisation and contributing directly to the reduction of greenhouse gas (GHG) emissions.

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