

U.S. Imports of Colored Bell Peppers and the Opportunity for Greenhouse Production of Peppers in Florida

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Abstract

U.S. consumption of high quality red, orange, or yellow bell peppers has been increasing over the past decade with this commodity's demand satisfied mainly by imports. These high quality colored peppers imported to the U.S. are grown in greenhouses, and they represent a significant share of the value of the total U.S. bell pepper domestic use. During 1993–2002, high quality colored peppers (greenhouse-grown) shipped to Miami averaged year-round wholesale fruit prices 3 times greater than colored field-grown fruits and 5 times greater than field-grown green fruits. With a small but expanding bell pepper greenhouse industry, new potential growers need estimates of costs and profitability that result from greenhouse production systems. We estimated production costs and returns to capital and management of greenhouse-grown peppers assuming the use of current technology applied in Florida. Total costs of production per m^2 (transaction expenses excluded) ranged from \$28.28–34.63 based on a range of possible marketable fruit yields of 7–19 $kg\cdot m^{-2}$, respectively. Currently, marketable fruit yields in Florida greenhouses range from 7–15 $kg\cdot m^{-2}$ and the average historical wholesale price for transactions of colored fruits at the Miami terminal market is \$26.45/5-kg box. Estimated returns for fruit yields of 7–19 $kg\cdot m^{-2}$ were \$-9.19–37.89/ m^2 . Returns to capital and management became positive with marketable fruit yields greater than 7.7 $kg\cdot m^{-2}$. Local production of greenhouse-grown peppers could represent a viable vegetable production alternative for Florida growers.

INTRODUCTION

U.S. consumption of high quality red, orange, or yellow bell peppers (*Capsicum annuum* L.) has been increasing over the past decade (U.S. Dept. of Agriculture, 2001). This commodity's demand is satisfied mainly by imports from countries that supply with colored peppers produced in greenhouses, such as The Netherlands, Canada, Israel, Spain, and partially from Mexico (Fig. 1). The high value of colored peppers produced in greenhouses augments the total value of all bell peppers (green and colored) imported to the U.S. (Fig. 2). In 2002, U.S. imports of greenhouse-grown bell peppers shipped from The Netherlands, Canada, Israel, and Spain represented 8.4% in volume (75,523 MT) but 21.5% in value (\$154 million) of the total U.S. bell pepper domestic use (U.S. Dept. of Agriculture, 2002).

Greenhouses provide a better environment that makes possible or improves crop yield and quality compared to outdoor production (Wittwer and Castilla, 1995). Spain, The Netherlands, Canada, Israel, and Mexico have large greenhouse areas dedicated to the production of colored pepper fruits (Fig. 3).

In Florida, U.S., pepper plants are grown outdoors in 7,700 ha for harvesting green fruits; however, a protected environment is required to obtain high quality colored fruits. A few growers have been using greenhouses to produce colored peppers (Jovicich et al., 2003b; Tyson et al., 2004) in a total area of about 20 ha, the largest among the greenhouse vegetables produced (Tyson et al., 2004). Greenhouse area may expand in the near future,

in part as a consequence of the greater demand for specialty vegetable crops, loss of methyl bromide, and an increase in urban sprawl and price of arable land. We investigated the potential for greenhouse production of colored bell peppers as a viable vegetable production alternative for Florida growers.

MATERIALS AND METHODS

Monthly average wholesale market prices (Miami terminal market, FL, U.S.) of imported greenhouse-grown peppers (red, orange, and yellow colored fruits) and of field-grown (colored or green fruits) peppers were calculated for the period 1993–2002. To estimate the profitability of a bell pepper greenhouse enterprise, a budget analysis was used to calculate the returns to capital and management (land charge not included). Production costs of greenhouse-grown peppers were estimated assuming the use of current technology applied in commercial greenhouse crops in Florida and in experimental crops at the University of Florida (Cantliffe, 1999; Jovicich et al., 2003b). Revenues were estimated from current fruit yields and historical fruit price data (Fig. 4). Production assumptions included a crop of nonpruned plants (Jovicich et al., 2003a), grown in soil-less media in a 0.78-ha high-roof polyethylene-covered greenhouse located in the North Central Florida region, where, on occasion, fuel was used for heating during winter and spring. The crop was transplanted in August and fruits harvested from November through May. A sensitivity analysis was calculated for a range of possible fruit yield and fruit prices, and break-even yield was calculated assuming historical wholesale fruit price data.

RESULTS AND DISCUSSION

During 1993–2002, colored peppers imported from The Netherlands, Canada, Israel, and Spain and shipped to Miami averaged year-round wholesale fruit prices of \$4.80/kg. During the late fall and spring, greenhouse-grown peppers attracted prices 3 times greater than colored field-grown fruits and 5 times greater than field-grown green fruits.

For a fall bell pepper crop in North Central Florida with a fruit yield of $13 \text{ kg}\cdot\text{m}^{-2}$ (Fig. 4), the returns to capital and management in a greenhouse of 0.78 ha were estimated at $\$18.21/\text{m}^2$ in an Aug.-May crop (Table 1). The estimated total costs of production per m^2 (transaction expenses excluded) ranged from $\$28.28$ to $\$34.63$ based on a range of possible marketable fruit yields of 7 to $19 \text{ kg}\cdot\text{m}^{-2}$, respectively. Currently, marketable fruit yields in Florida range from 7 to $15 \text{ kg}\cdot\text{m}^{-2}$ and average historical wholesale price for transactions of colored fruits at the Miami terminal market is $\$26.45/5\text{-kg}$ box for the harvesting time period (Fig. 4). For this historical price and for a range of fruit yields of 7 to $19 \text{ kg}\cdot\text{m}^{-2}$, the range of estimated returns was $\$-9.19$ to $37.89/\text{m}^2$. Returns to capital and investment became positive with marketable fruit yields greater than $7.7 \text{ kg}\cdot\text{m}^{-2}$. Fruit yields greater than $8 \text{ kg}\cdot\text{m}^{-2}$ can be obtained in Florida in a 6 to 7-month harvest period in greenhouse-grown pepper crops.

Although initial capital investment per unit area is high in greenhouse enterprises that produce vegetables, high-value crops such as colored bell peppers could represent a viable vegetable production alternative for Florida growers. Florida benefits from its mild winter climate where fuel for heating in greenhouses is occasionally required. With current market prices for colored peppers, low-cost greenhouse structures with high roof for increased passive ventilation and low labor demanding growing systems can make greenhouse production economically viable. The cost of the greenhouse investment will vary considerably with the level of technology used. A cash flow analysis for a series of years, which would include interest on the capital investment, could supplement the budget analysis.

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Tables

Table 1. Summarized budget analysis of a greenhouse-grown bell pepper crop in 0.78 ha in Florida.

	(\$/m ²)
Gross revenue (13 kg·m ⁻²)	58.98
<i>Variable costs</i>	
Preharvest costs	11.50
Harvest costs	2.12
Packing & marketing costs	5.90
Transaction cost	8.85
Total variable costs	28.37
<i>Fixed costs</i>	
Total fixed costs	12.40
Total cost	40.76
Return to capital and management	18.21

Figures

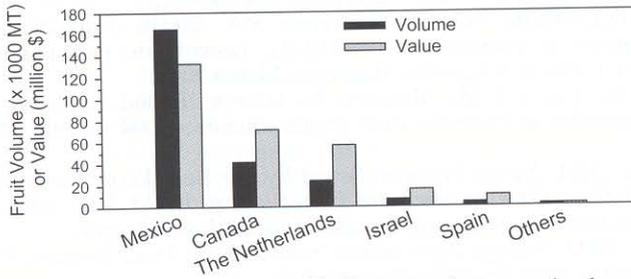


Fig. 1. Total volume and value of bell peppers (green and colored) imported to the U.S. from selected countries in 2002. Source: U.S. Dept. of Agriculture.

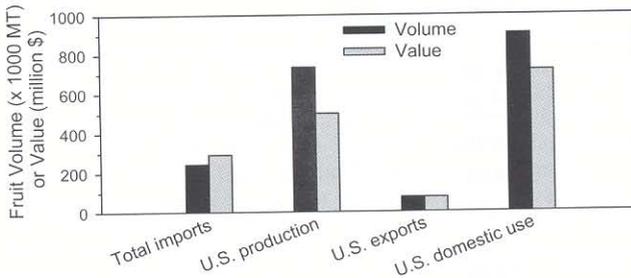


Fig. 2. Volume and value of U.S. imports, production, exports, and domestic use of bell pepper in 2002. Source: U.S. Dept. of Agriculture.

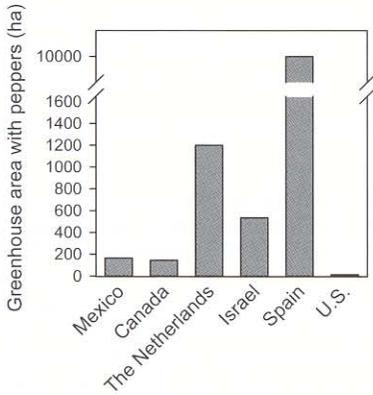


Fig. 3. Greenhouse area with bell peppers in selected countries that export fruits to the U.S. (data from years 2000-2002) and in the in the U.S (data from 1997 census).

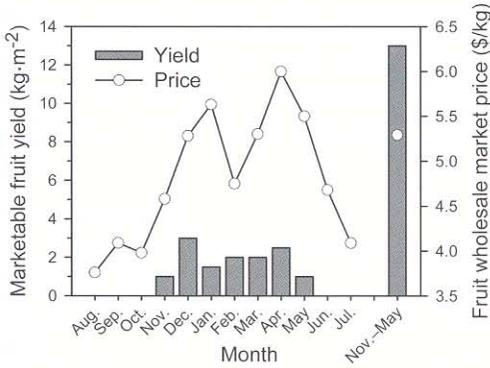


Fig. 4. Monthly marketable bell pepper fruit yields (estimated total yield: 13 kg·m⁻²) and average wholesale market prices (1993-2002) for colored greenhouse-grown fruits in a typical fall to spring greenhouse crop in Florida.