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WORKING PAPER NO. 883

AN ANALYSIS OF THE HORTICULTURAL ECONOMY  
IN CALIFORNIA

by

Scott R. Templeton, Cheryl Brown, George E. Goldman,  
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DEPARTMENT OF AGRICULTURE AND  
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CALIFORNIA AGRICULTURAL EXPERIMENT STATION  
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## An Analysis of the Horticultural Economy in California

*Abstract*—Californians spent \$8.5 billion on environmental horticulture and generated \$10.1 billion of horticultural sales in 1995. These sales directly supported 129,000 jobs. These estimates cover both market and in-house activities. Horticultural landscapes covered almost 1.37 million acres in the state. Expenditures per acre, which range from \$927 for vegetation under electrical power lines to \$11,718 for arboreta and botanical gardens, tend to increase as the importance of plant variety and quality in the landscape for the associated consumption activity increases. California farmers had \$1.8 billion and \$20.3 billion in sales, respectively, from horticultural and agricultural crop production in 1995. Forecasts of nominal horticultural expenditures and sales in 1998 are \$9.8 billion and \$11.5 billion, respectively. Information on the estimated size of the industry and its breakdown by landscape type can help businesses to develop marketing strategies and new products. Policy makers can use results of this study to estimate water and chemical use by landscape type and justify more budgetary support for education, extension, research, and regulation that address important issues related to this growing industry.

*JEL Classification Codes:* Q10, Q24, R12, R14, R15

*Keywords:* economic impacts, environmental horticulture, horticulture and landscaping services, regional economics, spatial impacts, turfgrass industry,

Communicate questions or comments about the contents of this paper to  
Scott R. Templeton  
Department of Agricultural and Resource Economics  
207 Giannini Hall, MC# 3310  
University of California at Berkeley  
Berkeley, California 94720-3310  
510-642-3349 (w), temple@are.berkeley.edu

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## An Analysis of the Horticultural Economy in California

### Introduction

Horticulture involves the use of plants or planted landscapes to enhance indoor or outdoor environments for human activity. Private benefits include aesthetic pleasure, recreation, safer playing surfaces and roadsides, stress reduction, quicker convalescence, higher workplace productivity (Beard and Green, 1994), lower cooling expenses due to shade (McPherson and Rowntree, 1993), and gains in property values (Henry, 1993). As income and population increase, the demand for consumption activities dependent on horticulture increases and the industry becomes a source of growth in profits and jobs. As the industry grows, more areas are converted into landscapes that often contain non-native plants, are maintained through intensive use of water, mechanical, and chemical inputs, and require disposal of green waste. Although horticulture can create environmental benefits, some land conversions, non-native plants, intensive input use, and waste disposal can adversely affect environmental quality or human health (e.g., Balogh et al., 1992; Beard and Green, 1994; Kross et al., 1996; Templeton et al., 1998). As a result, the industry becomes more regulated (e.g., EPA, 1996). Thus, economic information about horticulture becomes important for determining the industry's contributions to the economy relative to other industries, assessing land use changes or regulatory impacts, and establishing priorities for public and private policy makers.

The purpose of this paper is to analyze the size, associated impacts, and expenditure intensity of the horticultural economy in California. Some previous research has focused on segments of the industry, such as urban forestry (Templeton and Goldman, 1996), wholesale nurseries (Schuch and Klein, 1996), or turfgrass (Cockerham and Gibeault, 1985). Other research (e.g., Pittenger et al., 1991) has focused on private sellers for which secondary market data are readily available but not on most of the institutions that provide in-house horticultural services. Some studies (e.g., Tootelian, 1993) also do not distinguish between wholesale and retail sales and, as a result, over-estimate economic impacts. None of the studies presents confidence intervals for estimates of industry size, none of the studies except Templeton and Goldman (1996)

utilize primary data or auxiliary information, and most are outdated.

In this paper, 'horticulture' is synonymous with 'environmental horticulture'. The term includes 'ornamental horticulture', 'landscaping', 'turfgrass management', 'floriculture', and 'arboriculture'. The term excludes the cultivation of fruits and vegetables for home consumption, which is part of agriculture. In the next section, data and estimation methods are discussed. Thirteen sections of the paper then highlight our estimates of total expenditures, sales, jobs, and area, if any, associated with design, installation, and maintenance of twelve landscape types and horticultural waste. The landscapes are private residential yards, interior environments, golf courses, public parks, vegetation along roadsides and other right-of-ways, school yards, cemetery grounds, vegetation under electric power lines, arboreta and botanical gardens, zoos, other landscapes in California, and landscapes outside of the state. A fourteenth section presents estimates of jobs directly associated with marketed goods and professional services. Economic impacts of sales are estimated with multipliers derived from three horticultural sectors in the IMPLAN model for California and discussed in the third from the last section. Area and expenses per acre are analyzed in the second from the last. Horticultural and agricultural crop production are compared in the penultimate section. Forecasts for the state's horticultural economy in 1998 and implications of our findings for future research and policy are discussed in the conclusion.

### **Estimation Methods and Data**

Estimators of total expenditures, jobs, or area associated with eight of the landscape types and estimators of the standard deviations of these population estimators incorporate the finite number of management units of the landscape type and the fact that sampling of these units occurred without replacement. These estimators are discussed in Cochran (1977) and in 'Endnotes'.<sup>1</sup> In almost all cases, estimates of expenditures for a particular landscape are also estimates of in-house or contractual sales to people within the state who provide horticultural goods or services. Primary data come from National Gardening Association's household survey (NGA, 1996) that was augmented with questions about yard size, benchmark surveys of California State University campuses (NACUBO, 1996), our updates of previous surveys of electric utilities