

## ***The Perceived Benefits and Costs of Sustainability Practices in California Viticulture***

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### Issue

One of the most common goals of sustainable agriculture programs is the implementation of best management or "sustainability" practices. There are several sustainable viticulture partnerships in California featuring a range of education and outreach activities, self-assessment workbooks, and third-party certification. Prominent examples include the Central Coast Vineyard Team's Positive Points System, the Lodi Winegrape Commission's Sustainable Winegrowing Program, Napa Valley Grapegrowers and the Napa Sustainable Winegrowing Group, and the California Sustainable Winegrowing Alliance's Sustainable Winegrowing Program. The practices recommended by these programs vary in terms of their economic costs of implementation, economic benefits to viticulture enterprises, and environmental benefits to society. The study reported here evaluates the perceived costs and benefits of a wide range of sustainable viticulture practices based on surveys and interviews with California viticulture outreach professionals and growers. This research brief focuses on the economic and environmental aspects of sustainability; the social aspect of sustainability will be addressed in later analyses. The results offer empirical insight into an important question the viticulture industry has been grappling with since the emergence of sustainability programs and certification in the early 1990s: Are the environmental and economic benefits of adopting sustainable practices greater than the costs?

### Key Findings

Sustainable viticulture practices vary widely in their perceived benefits and costs, but the economic benefits are viewed as exceeding costs for the majority of practices measured. Grower interviews identified three main types of direct economic benefits of sustainable practices: reduced input costs, improvements to winegrape quality and vineyard health, and easier compliance with environmental regulations. Some sustainability practices have higher costs such as more intensive labor inputs and management costs. Sustainability will be enhanced when growers choose the economically beneficial practices that have the highest environmental benefits. Of those practices where economic benefits outweigh costs, the top 5 practices ranked in terms of environmental benefits are: 1) spot spraying for pest problems instead of treating entire vineyards; 2) pheromones to disrupt pest mating; 3) computer models for disease forecasting; 4) dust reduction with cover crops; and 5) ET-methods to determine when to irrigate. Important challenges to the adoption of sustainable practices arise when economic benefits are low but environmental benefits are high, and when growers have uncertainty about benefits. Practices that primarily have environmental benefits but impose economic costs require cooperation among growers to fully realize their value. Uncertainty leads to increased cost evaluations, but decreases evaluations of both economic and environmental benefits.

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## Policy and Management Implications

Sustainable practices with positive economic benefits to growers are amenable to traditional outreach and education strategies that inform growers about the economic benefits in a clear manner. Outreach programs should consider focusing grower education activities on those practices that have both economic and environmental benefits, because of their “win-win” nature. Practices with primarily environmental benefits require grower collaboration at the community level and connecting growers to other stakeholders who have an interest in environmental issues, such as government agencies and conservation programs. Reducing uncertainty should be a primary goal of all outreach programs, and requires partnering with research organizations that can demonstrate the effectiveness of especially new agricultural practices.

## Methodology

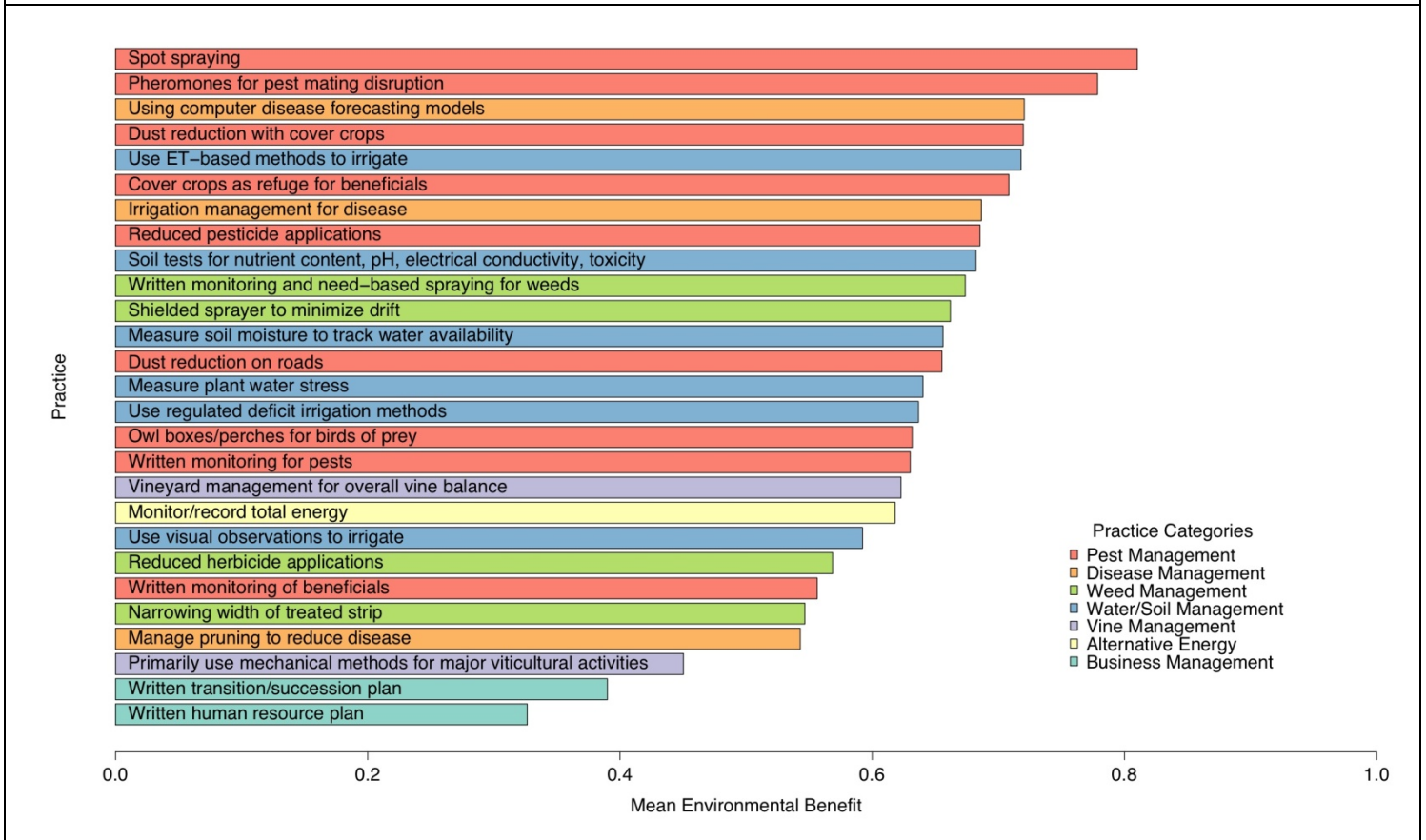
The data comes from three sources. First, we conducted a statewide survey of "outreach professionals" that targeted university researchers, Cooperative Extension agents, producer group staff, and vineyard management consultants. The outreach survey collected 123 respondents with an overall response rate of 43%. Outreach survey respondents ranked (on 7-point scales, converted in the analysis to range from zero to one) the effectiveness of 44 different practices in terms of their economic costs, economic benefits, and environmental benefits. Second, we accessed data from a 2008 survey of 101 winegrape growers participating in the California Sustainable Winegrowing Alliance's Sustainable Winegrowing Program (SWP). The SWP survey aimed to understand grower motivations and barriers to practice adoption, perceived impacts of the practices, and perceived effectiveness of the SWP. The full report is available online from the California Sustainable Winegrowing Alliance at: <http://www.sustainablewinegrowing.org/docs/NFWFSurveyReport.pdf>. Third, we conducted 16 in-person interviews of winegrape growers in Lodi, Napa Valley, and Central Coast winegrowing regions to ask their views about the costs and benefits of various practices.

## Results

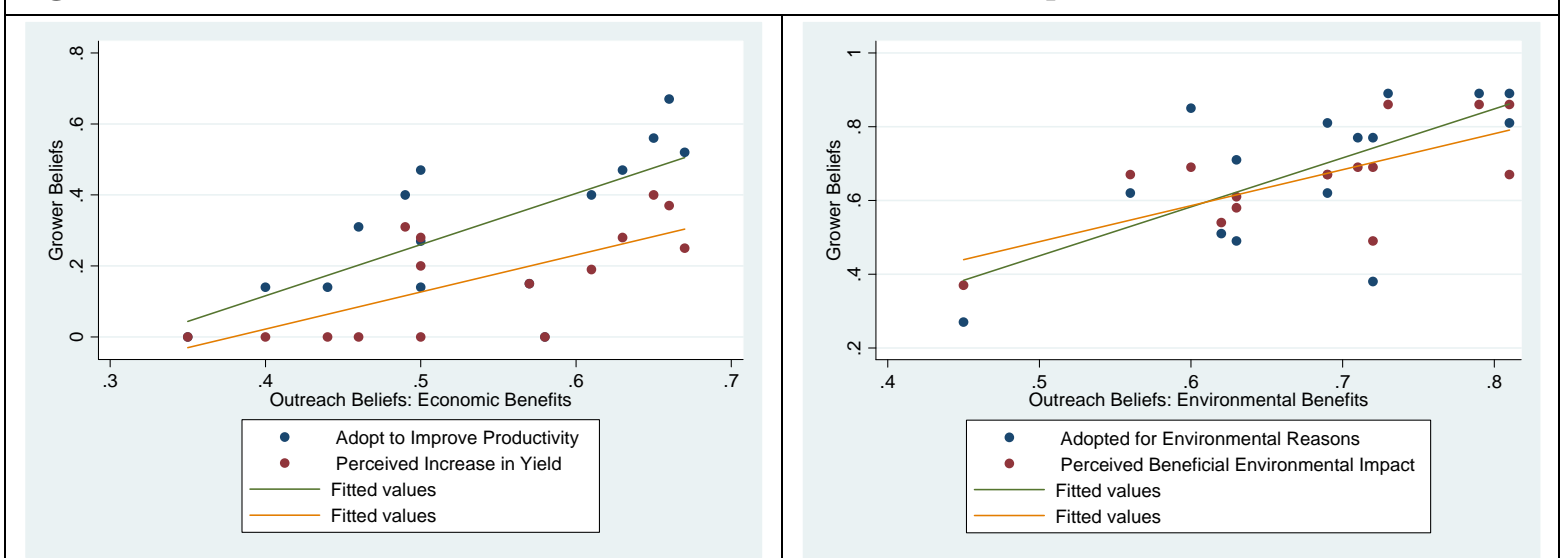
Figure 1 shows the practices where perceived economic benefits outweigh the costs, ranked in terms of their environmental benefits. The practices at the top are likely to be adopted by growers because they provide economic benefits, and give the biggest "bang for the buck" in terms of environmental benefits. For 15 practices evaluated in both surveys, Figure 2 shows the average perceived benefits from the outreach survey on the horizontal axis and the proportion of SWP growers who adopted practices for different reasons or perceived a particular result on the vertical axis. Practices with higher perceived economic benefits also have higher proportions of SWP growers who adopted the practice to increase productivity and have seen increased yields. Practices with higher perceived environmental benefits also have higher proportions of SWP growers who adopted the practice for environmental reasons and perceived a beneficial environmental impact. Figure 3 shows how the perceived costs of a practice tend to increase as the level of uncertainty increases, while the perceived benefits (both economic and environmental) tend to decrease. Uncertainty is measured as the proportion of outreach respondents answering "don't know" when asked to evaluate a practice. Uncertainty is a barrier to practice adoption because the perceived cost/benefit ratio will decrease for practices where growers are uncertain about their effectiveness. Figure 3 also shows that energy and management planning have some of the highest levels of uncertainty, while pest, disease, and weed management practices are typically lower in uncertainty. This result reflects the fact that many sustainability programs evolved from older programs focused on reducing the costs and environmental impacts of pest, disease, and weed management practices.

# Research Brief

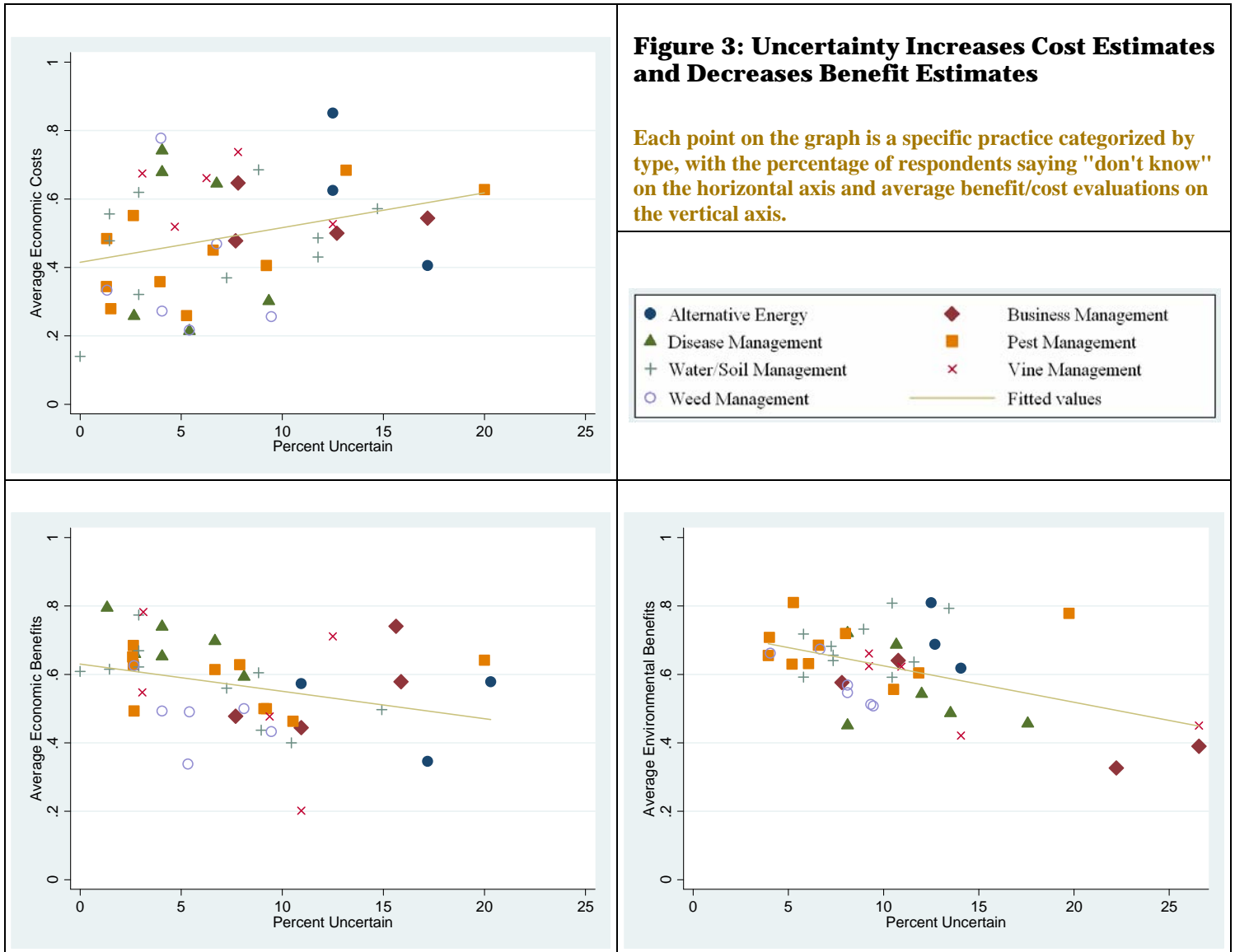
**Figure 1: Practices with Positive Economic Benefits Ranked by Magnitude of Environmental Benefits**



**Figure 2: Correlation Between Outreach Professional and Grower Opinions**



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### New Research Directions

The practices with the highest levels of uncertainty are appropriate targets for more detailed agricultural and environmental research to assess effectiveness. Information about environmental and agricultural effectiveness should be accompanied with information about the costs of implementation. While many growers noted the importance of regional context for influencing the costs and benefits of practices, our survey did not clearly show regional differences and thus more research is needed on the importance of geography. Broader surveys of practice adoption and participation in sustainability programs are needed to evaluate effectiveness of outreach as well as variables affecting grower behavior in California viticulture as a whole. Studies isolating and comparing specific viticulture regions are poised to identify the unique place-based factors influencing practice adoption and to provide insight highly relevant to regional sustainable viticulture programs. These questions will be addressed in the future activities of this research project, which is funded by a grant from the National Science Foundation awarded to Principal Investigator Mark Lubell.