



## Developing the Best Management Practices Cost and Adoption Survey for Florida Specialty Crop Growers

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**Agricultural best management practices (BMPs) are essential to minimize agricultural pollution and more efficiently utilize water for irrigation. Water conservation and reduced nutrient and sediment pollutants are public benefits. Private benefits can include improved productivity and increased efficiency (i.e. lower cost) with respect to fuel, labor, fertilizer and other inputs. While a variety of BMPs are adopted, researchers and policymakers do not understand the full suite of costs and benefits to growers. Researchers know which BMPs are adopted but there are no data indicating on which crops these practices are being applied or to what intensity. This paper describes a first attempt at surveying agricultural producers as to their adoption of BMPs. The survey asks growers to list specific BMPs they have adopted and to provide estimates of the costs and benefits associated with those BMPs. The BMP survey is the first step to understanding the socioeconomic factors that affect adoption. Survey data will be combined with aggregated Florida Department of Agriculture and Consumer Services notice of intent data to examine the relationship between farm characteristics (such as, crop choice, farm size, and indicators of the extent to which BMP use affects production costs) and BMP adoption. This survey identifies the BMPs that are being adopted by different commodities and therefore identify the valuable services these commodity groups offer.**

Agricultural best management practices (BMPs) are essential to minimize irrigation water consumption and mitigate nutrient and soil runoff, which degrades surface and ground water quality. Water conservation, increased carbon sequestration and reduced nutrient and sediment pollutants are public benefits that growers provide by adopting BMPs (Wade et al., 2015). However, growers may reap private benefits from BMP adoption through improved crop yields and/or reduced input costs from less fuel, labor, and fertilizer (Baumgart-Getz et al., 2012).

Growers provide a public service by absorbing the cost of implementing BMPs, but researchers and policymakers do not understand the full suite of costs. Costs can include additional labor, additional expertise, equipment purchase or modifications to new equipment, and opportunity costs. While a BMP may help reduce inputs or increase yields, it may also increase labor costs or require the farm to install new technology, and hire additional personnel with the necessary technical expertise. The extent to which the cost of BMP adoption is offset by its on-farm benefits is unclear.

The Florida Department of Agriculture and Consumer Services (FDACS) collects data on BMP enrollment via its Notice of Intent (NOI) form (FDACS, 2015) and provides county-level data on practices producers adopt. For each BMP, growers indicated whether they had already adopted the practice (In Use), planned to adopt (Planned), did not plan to adopt (No), or believed the practice was not applicable to their situation (Not Applicable). For the 2006 Vegetable and Agronomic Crops Manual, just

under 70% of the respondents used or planned to use irrigation scheduling (63% already used and 5% planned to use), while 3% of the respondents do not plan to use irrigation scheduling (Fig. 1). Controlled-release fertilizer was used by only 23% of respondents, almost three times more than those who said they did not do the practice (7%). These values are dwarfed by the 68% that indicate that the practice is not applicable. Cover crops are in use by a large number of respondents, 75%. This is similar to the 88% in national statistics (CTIC, 2017). For the 2015 manual, we see that estimates for calibrating fertilizer equipment are similar to those for irrigation scheduling: 23% indicating it is not applicable and 76% in use.

The NOI forms do not indicated crops these producers grow. Researchers therefore know which BMPs are adopted, but do not know on which crops these practices are being applied or to what intensity. Connecting crop data with BMP adoption may help explain when and where BMPs are inappropriate or “not applicable.” For example, controlled release fertilizer may not be applicable for an organic grower. In addition, it would be valuable to have a better geographic connection between BMP adoption and the location of rivers, ponds, sloughs, and other sensitive waterbodies. Collecting specific data as to which BMP is being adopted on which crop will help program design and more effectively target where BMPs need to be adopted.

Below we describe a survey that, to our knowledge, is the first attempt to capture Florida BMP adoption and the associated cost to producers. The survey asks growers to list specific BMPs they have adopted and to provide estimates of the costs and benefits associated with those BMPs. The BMP Cost and Adoption Survey is the first step to understanding the socioeconomic factors that affect adoption. The data has the potential to identify

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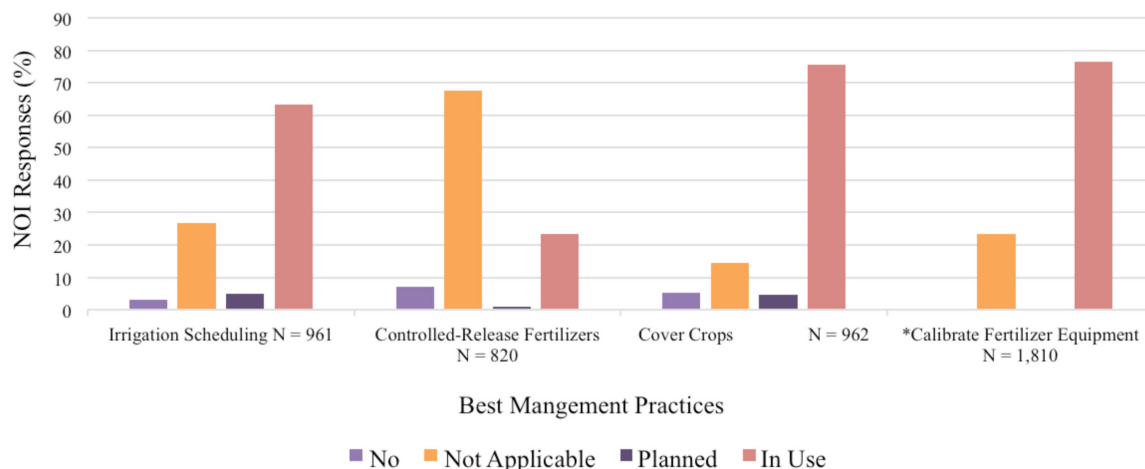


Fig. 1. Percentage of Notice of Intent responses for questions regarding irrigation scheduling, controlled release fertilizer, and cover crops use in the 2006 Vegetable and Agronomic Crop Manual and calibrating fertilizer equipment in the 2015 Vegetable and Agronomic Crop Manual. Source: Florida Department of Agriculture and Consumer Services, Feb. 2018. \*Indicates the question came from the 2015 Vegetable and Agronomic Crops manual. All other questions are from the 2006 Vegetable and Agronomic Crops manual. Categories not shown are economically not feasible and technically not feasible.

which commodity groups, farm sizes, or geographic locations have difficulties adopting specific practices and will provide a baseline for adoption and typical costs. These data can also be used to design more targeted surveys that will identify specific challenges or barriers to adoption.

### Survey Design and Methodology

The BMP Cost and Adoption Survey identifies the BMPs adopted by different commodity growers. It is a statewide survey of fruit and vegetable producers designed with input from University of Florida, IFAS (UF/IFAS) horticulture faculty, extension faculty, citrus and vegetable specialists, and growers. The survey was administered online by the Florida Survey Research Center in March 2018. UF/IFAS extension agents, grower associations, and producer magazines distributed the survey link and access code. The goal was to contact growers directly and to capture data from as many acres as possible. This method is appropriate given the diversity of Florida crops. Data collection continues both online and through in-person interviews.

The survey has three primary sections: costs and benefits of core BMPs, barriers to adoption, and farm demographics. The questions are intended to capture characteristics of the operation and field thought to affect adoption. Core BMPs include applying controlled release fertilizer, calibrating fertilizer equipment, planting cover crops, and using irrigation scheduling tools. These are a few of many BMPs thought to have significant effects on water quality. For respondents two most widely grown crops, the questionnaire asks how many acres the practices are being applied, when they were first implemented, the additional cost of implementing the practices, and the estimated yield effect from using the practices.

In addition to core BMPs researchers asked respondents to identify other BMPs they are adopting. Barriers to adopting all BMPs are captured with questions asking if they did not implement the practice because of lack of knowledge, lack of experience, the practices are too labor intensive, the practices are too expensive, they do not perceive a yield benefit from using the practice, they do not have time to learn a new practice, or the practices are too data intensive. Understanding the barriers to

adoption will help to identify growers' needs, highlight where more education is needed, indicate if cost-share programs are effective, and focus research efforts.

Questions on farm demographics include land tenure, farm size, and location. Land owners are more likely to adopt soil conservation practices like cover crops, conservation tillage, and conservation buffers because benefits from these practices accrue in the longer term (Soule et al., 2000; Soule, 2001, Davey and Furtan, 2008). Farm size is often positively correlated with conservation practice adoption (see, e.g., Lambert et al. (2007), Baumgart-Getz et al., (2012), Wade and Claassen (2017)) and can be a particularly good indicator for adoption of practices, like more efficient irrigation systems or new tillage equipment, that require a significant capital investment. Farm and field location can significantly influence what practices growers adopt. Geopolitical influences such as mandating BMP use in certain water management districts or regional cost-share programs can coupled with other socio economic characteristics can affect conservation practice adoption.

### Conclusion

The BMP Cost and Adoption Survey will capture how BMPs affect yields and production costs. This work is an important step to quantifying and documenting BMP costs and the socio-economic factors that affect adoption. Understanding grower challenges to adoption will help to fill research gaps and support conservation program design.

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