

Encouraging California Specialty Crop Growers to Adopt Environmentally Beneficial Management Practices for Efficient Irrigation and Nutrient Management

Lessons from A Producer Survey and Focus Groups

April 2013



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American Farmland Trust is a private, nonprofit conservation organization that works cooperatively with the agricultural community and other partners to protect farmland from development, help agricultural producers improve environmental quality and keep farmers and ranchers on the land. In California, AFT focuses on promoting more efficient urban development that reduces farmland conversion and on encouraging more widespread adoption of environmentally beneficial farm management practices. For more information, please see our web site at www.farmland.org/california.

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On the Cover: Julie Fallon, Soil and Water Resource Conservation Manager for the Cachuma Resource Conservation District, records flow meter readings to assure efficient irrigation water application in broccoli. Photo by Steve Shaffer.

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Encouraging California Specialty Crop Growers to Adopt Environmentally Beneficial Management Practices for Efficient Irrigation and Nutrient Management:

Lessons from A Producer Survey and Focus Groups

Executive Summary

Between November 2011 and June 2012, American Farmland Trust (AFT) conducted a survey and focus groups involving 78 specialty crop growers throughout California to better understand why they adopt or fail to adopt environmentally beneficial management practices (BMP) for irrigation and nutrient management. AFT seeks to promote these practices because they can result in more efficient use of scarce water resources, and reduce surface and ground water pollution and greenhouse gas emissions. We were interested in learning about the barriers growers encounter in considering the adoption of these practices and what kind of assistance would help them overcome these barriers and, thus, encourage more specialty crop growers to adopt the practices.

Our research found that the three most important grower motives for adopting new BMP are reducing production costs, improving crop yield and/or quality and improving competitiveness. Improving the environment is also important to them, but as a secondary motivation. To our surprise, regulatory requirements and the demands of buyers in the food value chain were cited less frequently as reasons for adopting BMP.

The three most important barriers to specialty crop grower adoption of BMP were the up-front costs – by a large margin – followed by risk of diminished crop yields and/or quality and, finally, lack of information about BMP or the unavailability of technical assistance. Up-front costs appear to be an especially significant obstacle because our research also found that the overwhelming majority of growers self-finance implementation of new BMP rather than seeking funding from commercial banks or government cost-share programs.

Specialty crop growers recommended that BMP adoption could be accelerated if they had better access to timely information from trusted sources concerning all aspects of irrigation and nutrient management. They are interested in the potential impacts of BMP on crop yield and quality, how easily BMP would fit into their existing operations, what equipment would be needed and at what cost, how much training would be needed for them and their field workers, what type of outside service might be required to implement BMP, how easy it would be to scale up BMP across their farming operation and what regulatory implications might be associated with adopting BMP.

To remain competitive, growers are willing to assume some financial risk associated with BMP adoption. A common risk management strategy among those who have experimented with new BMP is to apply the practices on a small scale in collaboration with technical assistance providers; then, once the grower is comfortable with the new

practice and its results, expanding it to whole fields and eventually across their operation. In general, growers are unfamiliar with, but interested in, strategies that combine technical assistance with risk reduction through indemnification for potential crop yield and/or quality loss. (AFT has been pioneering risk management through its “BMP Challenge” program. See <http://www.farmland.org/programs/environment/solutions/bmp-challenge.asp>)

As a financial incentive to BMP adoption, growers recommend tax incentives more often than cost-share programs. They would also like to have the market recognize and reward BMP adoption, for example, through ecosystem services credits or buyer contract preferences. Finally, growers also recommend greater collaboration from regulators to reduce reporting requirements while supporting BMP adoption.

Based on what we have learned, we believe that a significant expansion of irrigation and nutrient management BMP adoption will require a broad-gauged, coordinated effort to address all of the key challenges growers face in considering whether to adopt new practices. We recommend that the California Department of Food & Agriculture, the USDA Natural Resources Conservation Service, the California Association of Resource Conservation Districts, specialty crop grower associations such as Western Growers Association and the California Grape & Tree Fruit League, and other interested parties come together to discuss the findings of this report and begin to develop a comprehensive strategy for helping growers meet the challenges they must overcome to gain confidence in BMP adoption. Specific recommendations are made for financial assistance, information and technical assistance, market recognition of environmental benefits, and risk management.

As contemplated by the Specialty Crop Block Grant under which this report was prepared, AFT will follow up with recipients of this report after its release to determine the extent to which the recommendations contained herein are being acted upon.

Introduction

California agriculture supplies more than half of the fruits, vegetables, nuts and other specialty crops consumed in the United States and a good deal of the nation's exports of these crops. The state's Mediterranean climate, one of only five such growing regions in the world, is ideal for producing these healthy foods. And California growers have taken advantage of it, along with massive public and private investments in irrigation water supplies, to increase their annual production of specialty crops to \$20 billion on just 5.4 million acres of farmland (roughly 5 percent of California's land area).

This success has not come without costs. Among these are the environmental impacts of the California agriculture, in particular the impacts associated with the use of irrigation water and plant nutrients (fertilizers). As a result of the depletion of natural stream flows, ground and surface water pollution, and concern about greenhouse gases, government regulators and consumers are calling for greater accountability on the part of growers for reducing the environmental impact of agriculture.

A significant number of California growers have risen to the challenge by improving irrigation efficiency – getting more “crop per drop” – and applying nitrogen fertilizers more carefully and precisely so that less runs off into streams or finds its way into underground aquifers. But the adoption of such beneficial farm management practices is not as widespread as it could or should be if California agriculture is to continue to contribute to national food security while helping to maintain a healthy environment for all Californians.

California growers rightly pride themselves on their good stewardship of the environment. But they, too, recognize that further improvements in farm management practices are needed to assure that agriculture remains environmentally and economically sustainable. A notable example of this recognition is California Agricultural Vision, a blueprint for sustainability of the state's agricultural and food system designed by leaders of the agriculture community in collaboration with representatives of groups representing the environment, farm labor, nutrition and feeding, and other interests. (See <http://www.cdfa.ca.gov/agvision/>) Ag Vision identified twelve key challenges facing California agriculture and among them was the need for improved stewardship of land and water resources through wider adoption of environmentally beneficial farm management practices.

AFT's Sustainable Stewardship Initiative

Since its inception, American Farmland Trust has promoted environmentally beneficial farm management practices (BMP) as part of its mission to conserve agricultural resources. In 2009, AFT launched its Sustainable Stewardship Initiative in California to expand the use of BMP by the state's growers, as recommended by California Agricultural Vision. This initiative began with three inter-related strategies:

First, through field trials called the “BMP Challenge” AFT is demonstrating risk management tools (similar to crop insurance) to encourage the adoption of BMP that will reduce the environmental impact of agriculture while maintaining or improving profitability. <http://www.farmland.org/programs/environment/solutions/bmp-challenge.asp> The focus of these trials is on improving the efficiency of irrigation to stretch limited water supplies and reducing applications of plant nutrients that can be the source of ground and surface water pollution and of greenhouse gases.

Second, as a participant in the Stewardship Index for Specialty Crops (SISC), AFT is helping to design performance metrics by which to measure how well the BMP we seek to encourage are achieving actual environmental improvements when applied to California’s signature fruit, vegetable and nut crops. (See <http://www.stewardshipindex.org/>) Increasing irrigation efficiency and reducing nutrient applications are among the goals of this exercise.

Third, AFT worked with the USDA Natural Resources Conservation Service to catalogue the types of BMP available for the leading California specialty crops and the specific environmental improvements they can achieve. We published these results in an on-line publication called *A Guide to Beneficial Management Practices for California Specialty Crops* available at <http://www.farmland.org/programs/states/CA/specialty-crops-beneficial-management-practices-guide.asp> It includes direct links to detailed descriptions of more than 100 BMP. This publication also identifies federal and other sources of funding available to growers who wish to adopt these practices on their farms.

Reasons for this Study

As it pursued these projects, AFT quickly came to realize that it needed a better understanding of the process by which specialty crop growers make decisions about whether or not to adopt new environmentally beneficial management practices. The BMP Challenge, for example, is based on the premise that the risk of a decline in crop yields and, hence, income is a major barrier to BMP adoption. Yet, nobody seemed to have actually asked California growers themselves whether this was true or if they faced other barriers that could discourage BMP adoption.

For these reasons, American Farmland Trust decided to study how specialty crop growers cope with adopting new irrigation and nutrient management practices, commonly referred to as Beneficial Management Practices (BMP). BMP are activities currently recognized to be the most practical and effective means of meeting an environmental objective while making the optimum use of resources. An example of a BMP is soil monitoring and testing to determine the precise application of water and fertilizer required to assure crop yield and quality while protecting water quality and supply.

Examples of BMP for Irrigation and Nutrient Management	
<i>Irrigation (Efficient Water Use)</i>	<i>Nutrients (Pollution Prevention)</i>
Drip and micro irrigation systems	Nutrient management planning
Irrigation scheduling	Soil testing
Soil moisture monitoring	Plant tissue testing
Crop evapotranspiration monitoring	Precise placement of fertilizer application
Tail water return systems	Precise timing of fertilizer application
Drainage water return systems	Timed release fertilizers
Alternate furrow irrigation	Fertigation
Conservation tillage	Soil amendments
Cover crops	Cover crops

The development, demonstration and deployment of BMP on California farms is a key strategy, not only for improving environmental performance, but also for maintaining and increasing the industry’s economic competitiveness. Specialty crops are grown by more than 50,000 California farmers on about 5.4 million acres using about 20 million acre-feet of water. These growers face increasingly higher costs for water, fertilizer, fuel and crop protection materials. And more stringent demands from regulators and consumers to protect air and water quality and biodiversity further contribute to economic pressures on growers. More growers need to adopt BMP to cope with these new demands, but appear reluctant to do so because of uncertainty about costs, implementation logistics and the risk to crop yields and quality.

Because of its commitment to helping farmers improve environmental quality – while remaining economically viable – AFT wanted to understand more about why some growers adopt BMP and others do not. We also wanted to gain insight into how to overcome the barriers that may be preventing wider adoption of these practices, so we could recommend steps that will lead to a more effective, efficient technical and financial support system for growers and better environmental protection. On the premise that the best source of this kind of information is the growers themselves, we decided to go straight to the horse’s mouth. What we learned should help growers, technical assistance providers and policy makers with a better understanding of how to achieve wider adoption of BMP that can improve environmental quality while maintaining the economic competitiveness of California agriculture.

Study Methodology

In October 2010, AFT was awarded a Specialty Crop Block Grant from the California Department of Food & Agriculture (CDFA) to investigate motivations and barriers to implementation of BMP for irrigation and nutrient management by specialty crop growers. Between autumn 2011 and summer 2012, AFT and its partners (primarily county Farm Bureaus and Resource Conservation Districts) conducted nine grower focus groups throughout California to better understand these motivations and barriers. The venues of the focus groups were: Bakersfield, Fresno (East and West sessions), Santa Maria (English & Spanish sessions), Santa Rosa, Stockton, Watsonville and Yuba City.

Participants were recruited by invitation to obtain a diversity of growers in terms of size of the operation, crop type and approach to farming. Focus groups were conducted by Steve Shaffer with assistance from local partner organizations.

Participants in the focus groups were also asked to take an anonymous survey (Appendix 1) so that quantitative data could be collected and analyzed. This survey, which asked growers to confine their responses to their primary specialty crop (by acreage) and on irrigation and nutrient management practices for that crop, was also administered at industry conferences and workshops. The survey asked growers to rank their top three responses to each question and to mark any other response that would apply. This enabled us to identify primary as well as secondary factors affecting growers' decision-making.

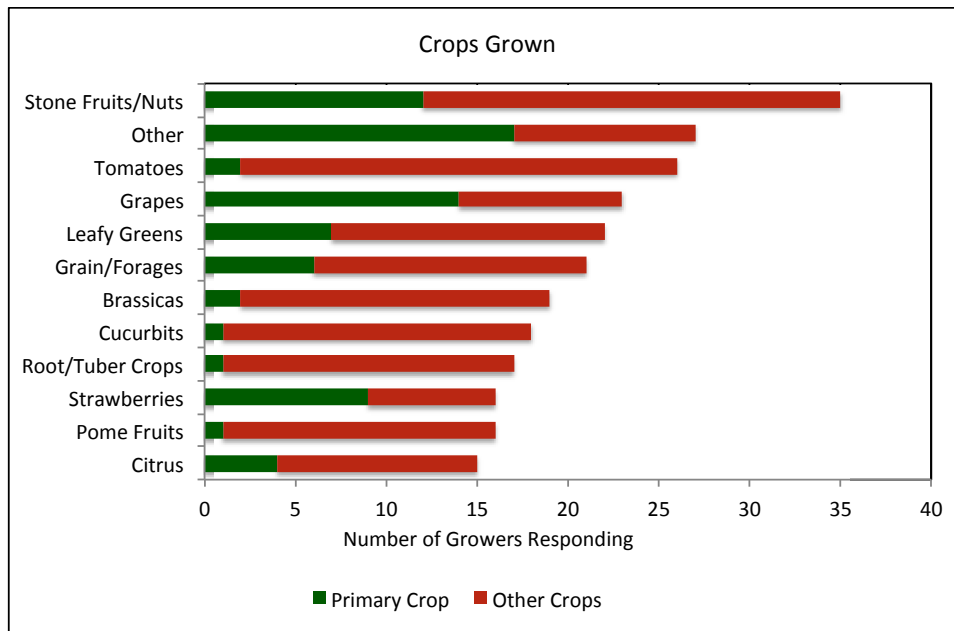
Study Results

A total of 58 growers participated in the nine focus groups and 78 completed the survey, which was also distributed at the Fertilizer Research and Education Program's 2010 annual conference. Participating growers represented a broad range of commodities, size of operation and approach to farming. Fifteen percent of them were Hispanic. This information was obtained from the focus groups rather than the survey.

Crops Grown

The survey asked growers to identify their primary crop as well as all other crops they produce. Approximately one third of those surveyed produce only one crop, but most growers produce multiple crops. In addition to the specific crops listed in Chart 1, "other" crops included artichoke, avocado, cane berries, herbs, kiwi, olives, peppers, persimmon, turf and various seed crops.

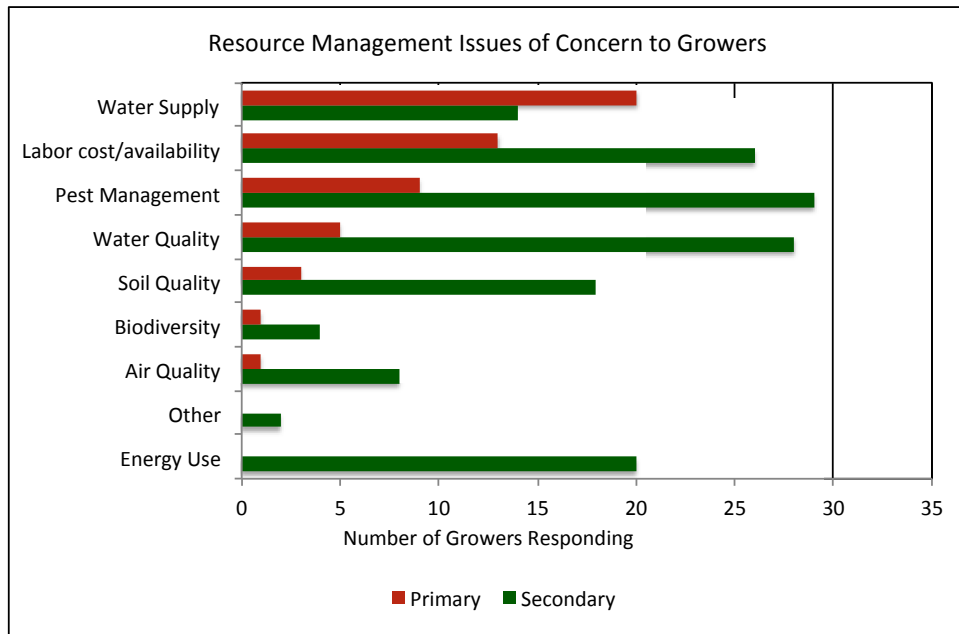
Chart 1



Resource Management Areas of Concern

Our BMP adoption discussion focused on irrigation and nutrient management, so we wanted to know how significant water quantity and quality issues are to growers compared with other resource management concerns. During the focus group sessions, growers described their concerns as cost (e.g. labor and input costs), crop yield and quality (e.g. soil quality, water supply and pest management), regulatory pressures (e.g. water quality, air quality) and long term environmental quality and agricultural productivity (e.g. soil quality, water quality, air quality, biodiversity). The results are shown in chart 2 and will be important in tailoring programs to better meet growers' future needs.

Chart 2



While it is not surprising that water supply is a concern to most growers in the San Joaquin Valley and on the Central Coast, even growers on the North Coast and in the Sacramento Valley are concerned about water supply. Growers in all regions are increasingly aware of water quality issues and associated impending regulations. Long-term soil quality was often mentioned as a high priority resource area of concern, reflecting growers' awareness that maintaining and improving soil properties is key to high crop yields and quality. The high cost of labor and the availability of qualified labor were also of great concern to growers across all regions. Pest management, including weeds and diseases as well as arthropods was often the primary crop management concern across all geographic areas. Out of the seven Latino growers who responded to the survey, four identified pest management as their primary resource management issue, while soil quality, water quality and water supply were each identified by one grower. Note that water quality was not mentioned as frequently as the primary concern of

growers, even with the emergence of new regulatory requirements. But it does rank high as a secondary concern.

The results of the survey also shed light on how resource management concerns vary by region. As previously mentioned, water supply reliability was the primary resource priority in all regions. Water quality was identified as the primary concern only by leafy green growers on the Central Coast, probably because recently implemented water quality regulations are going to impact them more significantly than growers of other crops, due to higher fertilizer requirements. Strawberry growers, as well as tree crop growers in the same region were more concerned with water supply. When primary and secondary resource concerns are aggregated, labor, pest management, water supply and water quality all rank high across all crops and regions.

Early and Late BMP Adoption

When designing BMP incentives and support strategies, it is important to understand when a grower is more likely to adopt new BMP relative to his/her peers. Targeted support needs to change depending on where a grower fits on the adoption continuum¹ (whether the grower is an early, middle or late BMP adopter), and where the grower is on the steps towards BMP adoption² (education, planning, implementation, on-going management), how he or she views different sources of information, different forms and sources of technical and financial assistance, and how a grower views collaboration. In other words a large, but well organized tool box needs to be at a growers fingertips.

For BMP adoption support strategies to be effective in meeting environmental goals, the concept of "disproportionality"³ needs to be recognized and understood. It describes the oft-occurring situation that the majority of water pollution is generated by a minority of landowners or managers. Disproportionality often leads to high adverse impacts when inappropriate behavior by the minority occurs in vulnerable areas. It is important to make the distinction here between bad actors and inappropriate behavior. Most inappropriate behavior is born out of ignorance, which with proper education can be remedied. While targeting the innovators and early adopters may provide internal community leadership to accelerate BMP adoption, targeting the late majority adopters, that is to say those most likely to exhibit inappropriate behavior, may provide greater and more timely results in achieving environmental goals.

Growers were asked when they thought they adopted new BMP compared with their peers. Of those who responded, 43 percent believed they adopted new practices earlier

¹ The adoption continuum, first proposed by Everett M. Rogers in *Diffusion of Innovations* (1983), describes a conceptual model of adoption of any new technology by a community consisting of a population distributed in a typical bell-shaped curve of innovators (2.5 %), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%).

² The BMP adoption process stages: Stage 1 - awareness of a problem or opportunity and a potential BMP response; Stage 2 - persuasion to implement the BMP, Stage 3 - decision to adopt the BMP; Stage 4 - implementation of the BMP; Stage 6 - managing and confirming the performance of the BMP.

³ Described by Professor Emeritus Pete Nowak at the University of Wisconsin, "disproportionality," is one of his four axioms when attempting to solve water quality problems.

than most other growers, while 28 percent thought they implemented a new BMP at about the same time as most. Only 7 percent of growers admitted that they tended to adopt new practices later than their peers. Interestingly, none of the Central Coast Latino growers said they adopted new BMP earlier than most others.

When asked if they were considering adopting a new irrigation or nutrient BMP in the near future, 86 percent of growers responded yes or maybe, while only 14 percent responded no. The “near future” was not specifically defined in the survey, but from the focus group discussions, we deduced that growers considered it to be within one or two seasons.

Most growers have adopted a new BMP within the last four years, with about 40 percent of respondents having done so within the last year. Several growers indicated that they had transitioned to micro-irrigation (drip or sprinkler) in the late 1990’s or early 2000’s, and now continue to improve the management of these systems. For example, some were now incorporating soil moisture monitoring to schedule irrigation more precisely.

One way to look at these results is to ask whether growers are "Unable" or "Unwilling" to adopt new BMP. These data seem to indicate that most growers would be classified as “Unable to Adopt” new irrigation and nutrient management BMP, due to a lack of information and little or no experience with the BMP, and/or an inability to finance implementation of the BMP. Few are “Unwilling to Adopt” new BMP, even when robust technical and financial assistance is available. This observation suggests that an effort to provide comprehensive technical and financial support to growers will be effective in accelerating BMP adoption.

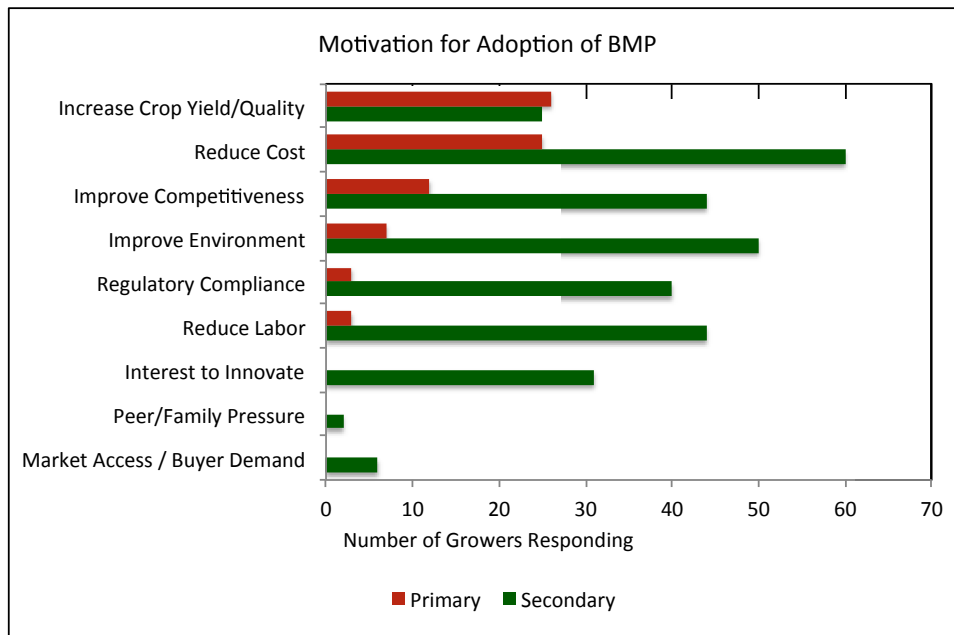
Motivations for Adoption of BMP

Growers were asked to identify the reasons that motivated them to adopt new irrigation or nutrient management BMP. They were asked to rank up to three motivating factors. As shown in Chart 3, improving crop yield or quality was most frequently cited primary motivating factor, followed closely by reducing costs. Improving competitiveness also ranked highly, probably because it implicates production costs as well as crop yield and quality. It is also interesting to note that improving the environment was listed more than twice as frequently as either reducing labor or regulatory compliance as a primary motivating factor. When primary and secondary motivations were aggregated, reducing production costs was the most often cited, followed by improving the environment. Among Latino growers the primary motivation for adopting a new BMP was to improve crop yield/quality, while improving the environment and reducing costs were the most frequently mentioned secondary motivational factors.

Despite the general concern in the agricultural community about regulations, regulatory compliance was not often cited as a primary motivation for adopting BMP, but was frequently cited as a secondary motive. Most grower participants in focus groups on the Central Coast and in the Central Valley expressed their awareness that new water quality regulations were coming and that they are starting to look more closely at what they will

have to do to comply. While some are acting now, most are waiting to see how new regulations will affect their operations on a practical level. Most acknowledged that they have a responsibility to protect water quality, but expressed their deep concern about how new regulations will impact their costs and whether they will really result in environmental improvement. Their hope was that consumers would reward improved environmental performance with better commodity prices in the marketplace.

Chart 3



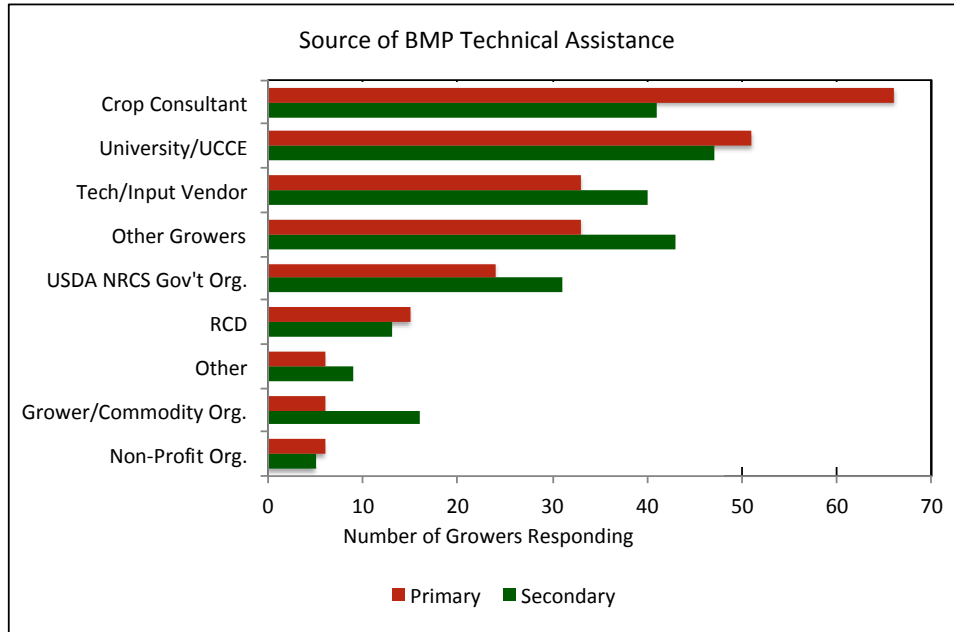
Sources of Technical Assistance

When considering adoption of a new BMP, growers usually consult multiple sources for their technical information and assistance. They seek this information because, while they are quite familiar with their existing practices, they have not had experience with new ones. In the focus groups, virtually all growers indicated that after they consult multiple sources of information, they perform their own feasibility analysis for their own specific circumstances. In so doing, they rely not only on hard data, but also on a feel for the specific crops under specific growing conditions.

As illustrated in Chart 4, private crop consultants are the source of technical information to which most growers turn first, while the University of California and its Cooperative Extension (county Farm Advisors, Specialists, and UCCE web sites) is the source used most frequently. Extension is highly valued by growers, but most believe it is significantly understaffed and underfunded. Growers also frequently seek advice from private technology vendors and other growers. Some growers commented that long-standing relationships with vendors are quite valuable. When new products become available, vendors seek out the early adopters who are also good managers to “kick the tires” of new products. While most growers are willing to share information with and

learn from other growers, some indicated that they are in competition with each other and keep innovation information closely guarded to maintain a competitive advantage.

Chart 4



Some growers were quite proud of the fact that they innovate independently, having adopted precision irrigation and nutrient management technologies ten or more years ago, and continue to improve upon them. As one Central Coast grower said, “Too much support for keeping an even playing field can reduce weeding out the weaker players.” This support limits the opportunities for the stronger growers to expand. This grower was also confident that however the water quality regulations are implemented, he was better positioned to respond effectively than other growers.

While some growers were confident in their ability to compete in the marketplace, most other growers saw the value of some level of collaboration. Many articulated a different level of self-reliance, seeing the value of local collaboration within their watershed, wanting to see, “More money such as block grants should be available to local Watershed Coalitions. This will help with technical assistance capacity and allow the coalitions to hire people to help.” Another grower in the Sacramento Valley took a longer view, wanting the industry to survive for future generations, “Working together is important. I don’t agree that only the strong should survive and push out the weak. It should not be all about the money but include stewardship and helping usher in a new generation of farmers.”

The USDA-NRCS and many Resource Conservation Districts (RCDs) also received high marks for providing technical assistance. But some growers mentioned the issue of having to deal with a cumbersome bureaucracy and were also concerned about the confidentiality of the information they would have to provide government. Surprisingly,

approximately 30 percent of growers were not aware of USDA-NRCS or RCDs and their function of providing technical assistance. A testament to the efforts of Cachuma RCD and the local NRCS office, Latino growers on the Central Coast cited them most frequently as their primary source of technical assistance.

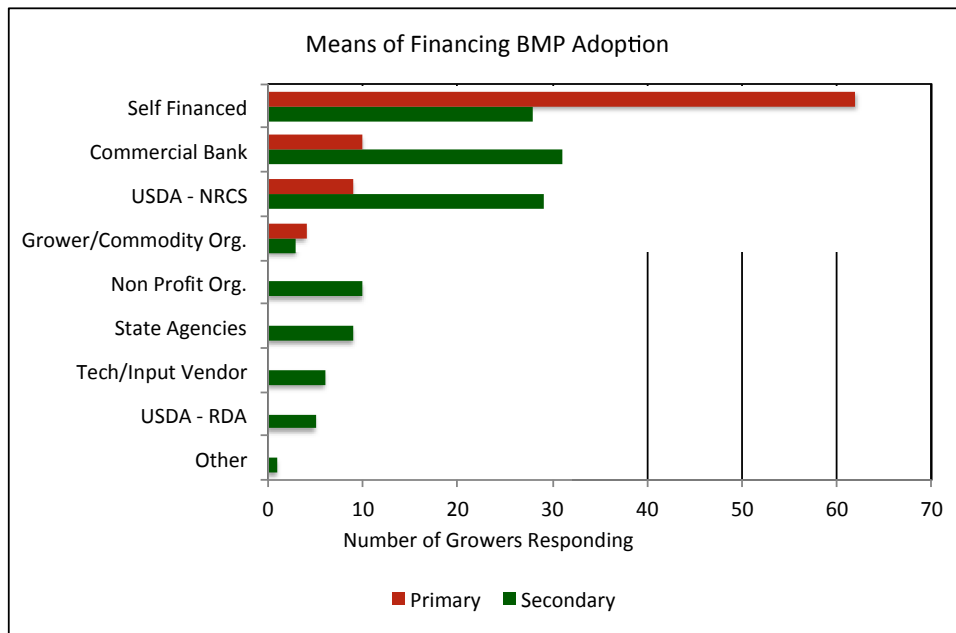
Financing of BMP

An overwhelming percentage of the growers we surveyed self-finance implementation of new BMP. This is among the most surprising findings of our research and because, as we shall see, the cost of new BMP is the leading obstacle to adoption, has important implications for encouraging wider adoption of these practices. Commercial banks and NRCS were distant second choices among financing options, as shown in Chart 5. Latino growers, however, had a somewhat stronger preference for NRCS funding of BMP adoption.

In the focus groups, growers indicated that they expect a very quick return on their investment in BMP, typically within one or two growing cycles. Many suggested that tax credits to offset the cost of BMP adoption would provide an additional incentive for implementation. They have a slight preference for low- or no-cost financing of BMP projects over government cost sharing payments.

Another surprise was that about 30 percent of growers were not aware of NRCS programs such as the Environmental Quality Incentives Program (EQIP), which has invested billions of dollars, primarily in BMP that improve water quality. Of the growers who do participate in USDA financial assistance programs, nearly half had mixed things to say about their experiences. Even more growers, approximately 60 percent, were not familiar with Resource Conservation Districts, how they are organized and what technical information and assistance they provide.

Chart 5



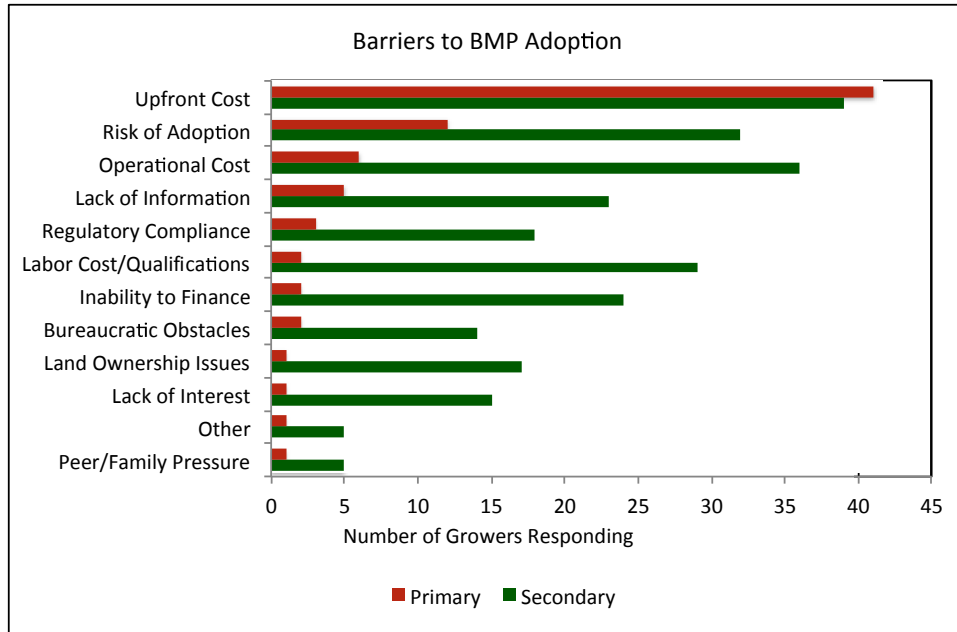
Barriers to BMP Adoption

Capital Cost of Adoption

One of the most important things we asked growers was what barriers or obstacles make them reluctant to adopt new BMP. As Chart 6 shows, the capital costs associated with adopting new irrigation or nutrient BMP were by far considered to be the primary barrier to adoption by growers in every region.

Most growers also said they were hesitant to assume new debt, which is confirmed by the large numbers who self-finance new BMP projects. One grower summed it up this way, “Our margins are small and whatever practice we implement needs to pay out.” The old axiom that “time is money” holds true as growers described this barrier in greater detail. They often said that they don’t have the time to do the initial work of educating themselves about a new BMP. One of the reasons they cite is the time now required to meet the reporting requirements of regulators and supply chain buyers.

Chart 6



Other Cost Factors

Other costs such as labor and the inability to finance projects were much less frequently identified as barriers, except by Latino growers for whom they appear to be more significant. One grower described a typical management issue: “Deprogramming or re-programming our work force can be a barrier. When we’ve had problems, it was often with irrigation management. We train workers but they may not fully understand changes, for example changing from pipe to drip.” Another grower said that he had to

hire another full-time employee to help with implementation and continued use of a new irrigation management BMP.

Risk of Adoption

The second most frequently identified barrier to BMP adoption was the risk of a loss of crop yield and, hence, income. When this issue was discussed in the focus groups, it became apparent that the element of risk had many facets. One typical response was, “I operate at a tight margin. My biggest risk is losing efficiency. If I try something and it loses yield, it could break a season.” But the concept of risk also extended to impacts on crop quality, the economics of production and the inability to incorporate the BMP across the farming operation, i.e. in a variety of growing conditions, crop rotations, etc. As one grower put it, “Our biggest focus is on the crop. Quality is very important. We need to do tests and trials on any new BMP first.”

For tree and vine crops, the adverse effects of a new BMP may not show up immediately. An almond grower on the West side of the San Joaquin Valley observed that, “Permanent crops are different. They could be affected two to three years out. I have tried different things like deficit irrigation and it hurt me in the past. Extension first endorsed the practice, then came back later and said not to use it.” Such insights demonstrate a need for a multi-pronged approach to mitigate risk. This is discussed in the next section.

Growers view risk from a variety of different perspectives. The following grower observations illustrate this: A Sonoma diversified vegetable grower told us, “I bear the full risk of adoption, so I need robust information. I participate in test programs, but a risk safety net would help.” A Central Coast strawberry grower said, “Our biggest focus is risk to the quality and quantity of production. When looking at a new practice we always do trials.” A San Joaquin Valley grower added, “You have to trial things extensively. In implementation, it takes gradual scaling up.” A Kern County grower said, “If little cost, but information intensive – risk [coming from a lack of information] becomes a bigger factor.” Second only to the barrier of upfront cost for growers who financed their projects themselves or through a commercial lender, was risk, while those that worked with USDA-NRCS programs did not view risk as a barrier. As one Sacramento Valley walnut grower summarized working with NRCS, “Having a conservation plan is important. I would suggest everyone get one. You can always change it. You have to have it if you are going to participate in these programs. It didn’t cost me anything to do it but time. Setting up the plan was not that hard. Growers will probably realize they’re doing more correctly than they realized.”

At all the focus group discussions growers elaborated on another theme common to the wide spread adoption of new technologies, such as irrigation and nutrient BMP. That is the commercialization “valley of death” or the barriers to scaling up that which is well demonstrated on a small research and demonstration scale to full commercial scale. This phenomenon can take place across a sector, or within an individual grower’s operation. As highlighted in previous grower comments, many growers appreciate the value of partnering with Farm Advisors and other technical professionals in conducting small-

scale field trials on-farm where farmers can become familiar with new technologies (BMP). The barrier then becomes the ability to overcome the risk of scaling up the BMP from the field trial to a commercial scale.

Many growers who have adopted BMP have managed the risk through a gradual process of scaling-up. They will participate with farm advisors in field trials of a BMP, then try the BMP on a portion of one of their own fields and, assuming that works well, finally apply it to the entire field. Once a BMP has been demonstrated to work well in that field over a variety of growing conditions, a grower is more likely to consider applying it to other fields. There was general agreement that each field is different, requiring intimate knowledge. As one Central Coast grower summed it up, “Trials are critical. I’m not going to try things on a large scale until I’m pretty sure it’s a sound investment. I’ll try larger and larger trials before I take a leap. I want really low risk before I try it on a larger scale. I need to know the ground, know the product/application and know the crop. I put it all together and then I might get to that 100% confidence level.”

The grower-cooperator may be comfortable in scaling up the BMP in the field where the trials took place, but may perceive the risk as too great when applying the BMP to the same crop in other fields with somewhat different growing conditions. The same phenomenon exists when scaling up a BMP from a hand full of early adopters to a majority of growers, or from one crop to another. A variety of tools is needed to support the scaling up process encountered by growers once they have made the decision to adopt a new BMP.

Lack of Information

Risk often manifests itself through the lack of information that growers trust and, hence, their confidence in the performance of a new BMP. This was the third most cited primary barrier to BMP adoption. In every focus group growers expressed the desire for easier access to more and better information. A Kern County grower put it, “I feel we’re getting to point where industry has surpassed the science. Industry is begging for more science.” One grower response to the lack of information and the risk it entails is to try new BMP on a small scale. Another grower summed it up this way, “Each new BMP must be implemented and fine tuned field by field, well by well, rootstock by rootstock.”

Bureaucratic and Regulatory Concerns

Difficulty or the inability to obtain a needed permit, conflict with other existing regulations, conflict with buyer imposed requirements, and time required to meet regulatory requirements all were mentioned as barriers to adopting new BMP. This often became a venting session on the part of growers, many of whom appreciated the need for sensible regulations, as they expressed frustration with conflicting requirements, changing requirements, and the time taken away from more productive activities.

About a quarter of the growers we surveyed expressed concern over the access of regulatory agencies to their private business information, and even more were concerned

with the amount of time needed for regulatory reporting. Some growers do not want government involved in their farming operation at all. In fact, several expressed concern that government assistance supported the weaker, less efficient producers to the detriment of the more competitive growers. Others were unhappy with the process they had to endure to have BMP projects approved, but found the benefits were worth the effort. Still others found the process frustrating to the point of abandoning the effort. Criticisms included not meeting eligibility requirements, rigidity in the project design requirements, completing the process only to be denied funding and having to reapply only to be rejected again. The following section on adoption assistance discusses suggested improvements.

In every focus group, growers expressed a fear that the voluntary adoption of BMP by some could lead to it becoming a universal requirement through either government regulation or supply chain buyer standards. Growers on the North and Central Coasts were especially concerned about conflicts between food safety and water quality regulations that call for different and incompatible practices, i.e., field edge vegetative buffers to filter runoff v. leaving field edges completely bare to discourage rodent infestation.

From the focus group discussions, it was clear that most growers are willing to adopt new irrigation and nutrient BMP if, in their own minds, they were able. However, they were not willing to adopt BMP if mandated by regulators whose decisions the growers believe are not well founded. Growers largely recognized the need for regulations, and that at this point environmental regulatory compliance was not driving BMP adoption decisions on their farms. They acknowledged their responsibility to protect natural resources for their own benefit and for the benefit of society and the environment. To reiterate the comments of a grower on the Central Coast, “Farmers are now the ‘bad guys,’ but it wasn’t always that way. We’re blamed for water quality and supply issues, air quality issues. But you can’t argue you are doing the right thing unless you are doing the right thing. So we need to get beyond what has been done, need to be proactive, innovative, progressive. We need to be able to prove you are using resources wisely, not impacting water quality in excessively negative ways. We can do that smartly, need to be able to show you are doing everything you can. It will protect viability of farming in the long term.” Some did acknowledge that regulations (and buyer demands) may become a stronger driver in the future. They recognize their responsibility to protect the environment, but fear that the economic costs will be too great and that they may not be able to meet regulatory requirements, no matter the cost. But virtually all felt that if scientifically and economically defensible regulations are put in place, they can and are willing to meet them. The growers participating in every focus group commented that if regulators would take the time to understand farming, to partner with them to improve the environment, not just monitor and report pollution levels, that real progress can be made. These comments were made both in the context of food safety regulations and water quality regulations. Growers especially on the North Coast and on the Central Coast were quite concerned with the conflicts imposed upon them in trying to meet both sets of standards.

As growers recognize that they are rightfully accountable for protecting and improving the environmental resources upon which they and their neighbors depend, that rather than being targeted as the “bad actors” they would prefer to be acknowledged for the work they do and the improvements they’ve made, recognizing the need to document their efforts and continue to show improvement. One grower in the Sacramento Valley put it this way, “In order to adopt the BMP it would be good to have support with regard to public acceptance, recognition, etc. If you can have a document in the marketplace outlining what you’re doing and the public accepts this, then that helps a lot.”

Based on grower comments, we believe that regulators and supply chain buyers can better support BMP adoption if they:

- Work to harmonize conflicting regulations using a “net environmental benefit” framework
- Recognize the inherent differences in regulating non-point sources of pollution and the need for new research and demonstration efforts to deal with inherent uncertainty.
- Establish regulations based on the best science available, and provide for a defined useful life of the regulation so that investment in the BMP can be fully recovered.
- Provide for a reasonable time and flexibility in meeting new regulations so that the grower learning curve can be accommodated and the appropriate BMP can be tailored and implemented according to the specific farming conditions.
- Minimize monitoring and reporting requirements so that more time is available to innovate – to research and implement new BMP.
- Work to efficiently verify BMP performance to reduce reporting requirements while assuring environmental improvement.
- Collaborate with research, extension, technology providers (vendors) and technical assistance providers to better support grower efforts to adopt new BMP.
- Tailor financial support programs so that implementing partners are not unduly burdened with unreasonable performance and liability requirements.
- Establish an accountability program for environmental regulators to assure consistent and uniform application of regulatory authority by individual regulators that includes training and transparency protocols.

Rented Land

Only one grower indicated that not owning the land he farmed was the primary barrier to irrigation and nutrient management BMP adoption. However, land ownership issues were identified as a secondary barrier on a par with bureaucratic and regulatory obstacles. A significant number of growers, including many Hispanics, noted that they were tenant farmers who would not make an investment in BMP on their rented land or could not get the landowner to participate with them on a project. Some indicated that if they had longer leases or support from their landlord, they would be more inclined to adopt irrigation and nutrient BMP that require significant capital expenditures.

Types of Assistance Available to Growers for BMP Adoption

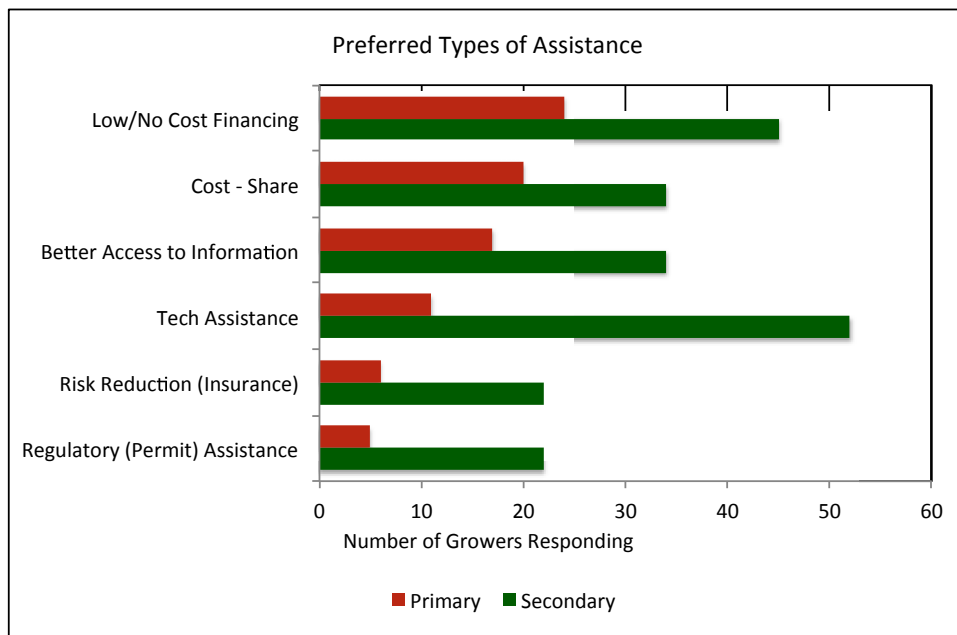
Assistance in various forms can help growers overcome the barriers to BMP adoption. Among these are financial assistance, technical assistance and risk management tools.

Growers had mixed opinions about government financing programs. Many were not aware of their availability. Some were patient in dealing with the bureaucratic process of getting assistance, while others were less so. Among those who knew about them and had received assistance, both cost-share programs such as EQIP and low- and no-cost loans were popular. The combination of technical and financial assistance provided by programs such as EQIP was valued by most growers who had direct experience with these programs.

Technical information and assistance also proved popular among growers. Many growers felt that adopting a new BMP based on good information, with on-going technical assistance, is an effective way to reduce the risk of adoption and conversely, assure a quick return on their investment.

Growers were interested in, but somewhat skeptical of a crop insurance approach to mitigating the risk of lower crop yields or quality. Many were unfamiliar with crop insurance, except for weather-related impacts, and view it as a form of government subsidy. When it was discussed in greater depth, however, many could see the potential value of a yield/income assurance program – such as that provided by AFT’s BMP Challenge – for a limited period of time (one to three years) to enable them to gain experience with BMP at a commercial scale.

Chart 7



While Latino growers did not identify risk of adoption as a primary barrier to trying a new BMP, they did most frequently identify risk reduction insurance as a preferred adoption assistance strategy. Secondary forms of assistance preferred by Latino growers included low- and no-cost financing and technical assistance. This result may indicate that these growers value the technical assistance provided by NRCS and RCDs over the cost-sharing offered under their programs.

Financial Assistance

The form of assistance for BMP adoption most favored by growers was financial assistance. Grower recommendations included:

- Greater access to low or no cost financing.
- Not specifically asked in the survey, but mentioned quite often by focus group participants was providing tax credits for adopting new BMP.
- Expansion of cost-sharing of up-front expenses such as that provided under EQIP, AWIP and other NRCS programs. Increased funding and expansion of eligibility criteria were suggested.
- An issue mentioned by RCD staff and other local partners that are providing support for BMP adoption to growers was some of the onerous requirements of California state cost share programs for water quality improvement that either limit grower participation or confer undue financial liability to the RCDs or other partners if funded projects do not perform as anticipated.

Information

Growers want more information. They want easier access to it. They want it to be more timely. They want it tailored to their own farming operation. They want to be able to trust it. Many, but not all, are willing to share information. In fact, one grower observed that, “Proprietary information screws the little guy. We need more public information.” Most growers now rely on the Internet for information and want to see better coordination of web-based information. Sources of information maintain websites, but often those sites are poorly organized, not up to date, and rarely cross-linked to other information sources. Growers want but cannot usually find easy access to Web-based information. Integrating and maintaining up-to-date web-based information on a crop and region specific basis would be invaluable. Build upon existing sources of technical assistance including from universities and cooperative extension, government agencies including Resource Conservation Districts, the private sector including vendors and crop consultants, and other growers and commodity organizations.

Grower comments can be summarized as follows:

- Most growers want to expand the capacity of Cooperative Extension. They want to see more Farm Advisors in their specific region with more specific expertise doing more extension work. Many participate in field trials with Farm Advisors and view them as beneficial.

- Most growers valued their crop consultants, but expressed some concern if they are affiliated with vendors of specific products. Many saw an increasing role for independent crop consultants such as Certified Crop Advisors, especially as new environmental regulations and reporting requirements emerge.
- Growers familiar with NRCS programs wanted to see expansion of NRCS technical assistance. While most growers who had participated in NRCS programs such as EQIP (Environmental Quality Incentive Program) expressed frustration with one or more elements of the sign-up process, most wanted to see it and other NRCS conservation programs expanded. They appreciated the working relationship that NRCS maintains with landowners.
- Growers in areas with active Resource Conservation Districts valued the role and function of RCDs to foster collaboration among landowners, provide technical assistance, and coordinate efforts with NRCS and other government agencies. To strengthen and expand RCD functions, some growers recommended that efforts should be made to build on successful RCDs. This could be done by building collaborations among RCDs on a regional basis. Another suggestion was to provide resources so that active RCDs can mentor capacity building for less active RCDs.
- Commodity organizations such as the Almond Board of California and the California Association of Winegrape Growers were mentioned as good sources of information and technical assistance by several growers. They valued the research funded by these organizations. They also valued the technical assistance they provide through their grower self-assessment workbooks, and sponsored field days.
- Most growers do collaborate. Along those lines, many growers recommended that new methods be developed to extend reliable information to growers and for sharing that information. Growers cited examples such as mobile irrigation labs, grower self-assessment workbooks, field days as proven mechanisms to share information and to build lines of collaboration. Many growers suggested that such tools could be made more routinely available and better coordinated.

Risk Reduction

Growers want to reduce risk of lower crop yields or quality associated with the adoption of new BMP. After cost, risk was the most significant barrier to BMP adoption they identified. While their primary strategy to reduce risk is to acquire information, another strategy they found attractive was to provide a financial “safety net” in the form of indemnification against income loss due to reduced crop yield and/or quality or increased production costs when adopting a new BMP. Such an approach was considered more attractive when combined with technical assistance.

Market Recognition

A few growers did mention that there was the potential of market recognition for BMP adoption. Such recognition could take several forms. Comments included:

- By documenting the use of BMP and measuring and reporting their performance, growers could benefit by:
 - Monetary compensation in the market place from the buyer or consumer using a certification and labeling program
 - Improving the economic performance (efficiency) of their farming operation
 - Consumer recognition that growers are doing the right thing
 - Ease of meeting regulatory requirements and buyer demands
- Develop Ecosystem Services Markets to increase economic attractiveness
- Develop and implement methods to quantify environmental benefits that result from adoption of a BMP
- Monetize those benefits through pollutant trading programs, emission reduction markets, and other mechanisms.
- Keep reporting, monitoring and other transaction costs to a minimum.

Conclusions and Recommendations

Conclusions

California specialty crop growers are interested in improving environmental quality. They are willing to entertain the adoption of new beneficial management practices to make more efficient use of water and reduce water pollution. But the primary motivation of most growers is understandably their bottom line as influenced by production costs, and by crop yield and quality. If BMP are to become more widely adopted, several concerns related to economic return must be addressed.

Increased production costs offer two challenges. The first is whether growers can afford to make the investment, given that most of them now self-finance new BMP and that growers themselves consider the capital costs of implementing new irrigation and nutrient management practices to be the highest barrier to BMP adoption. Complicating this issue is the reluctance of some growers to assume any additional debt or to accept government funding for BMP because of privacy, paperwork and regulatory concerns. The second challenge is whether growers can earn a positive return on their investment in BMP within a relatively short period of time, as they themselves insist. Inasmuch as irrigation and nutrient management BMP offer the potential to reduce the costs of both water and fertilizer, they offer growers hope that they can, indeed, recoup their investment in new practices. A positive return is also more likely if the marketplace recognizes and rewards the environmental benefits resulting from the adoption of BMP by growers.

However, even if these challenges are met, there remains the question of how the implementation of BMP will affect crop yield and quality, which can also affect their economic return. If growers are to embrace new BMP, they must be assured that the risk that crop yield and quality will not be negatively affected is minimal, or at least manageable. There are several ways such risk can be minimized. Since these approaches are not mutually exclusive, they can and should all be pursued where appropriate. The first way to minimize risk is to increase growers' confidence in their knowledge about how to implement the practice so as to assure that crop yield and quality are unaffected or improved. This can be achieved through technical information and assistance

provided by a variety of expert sources. But growers must first be aware that these sources exist – many are not – and they must have confidence in the source of information itself.

Another knowledge-based way to minimize risk is by conducting small-scale field trials and, if they prove successful, by scaling up their implementation. Exposure to the experience of other producers who have achieved positive outcomes by adopting a new practice can also reassure growers that risks are minimal, provided there are enough cases to demonstrate that a practice will work under a variety of conditions.

Finally, the risk of BMP adoption can be minimized by programs such as AFT's BMP Challenge, which offer indemnification for any economic loss attributable to proper adoption of the practices. This approach should not be considered a means of permanent support, but rather as a temporary safety net to enable growers to experiment with new BMP until they gain confidence in their management skills and how BMP affects their crops.

Recommendations

Based on what we have learned from specialty crop growers through our survey and focus groups, we believe that a significant expansion of irrigation and nutrient management BMP adoption will require a broad-gauged, coordinated effort to address all of the key challenges growers face in considering whether to adopt new practices. We recommend that the California Department of Food & Agriculture, the USDA Natural Resources Conservation Service, the California Association of Resource Conservation Districts, specialty crop grower associations such as Western Growers Association and the California Grape & Tree Fruit League, and other interested parties come together to discuss the findings of this report and begin to develop a comprehensive strategy for helping growers meet the challenges they must overcome to gain confidence in BMP adoption. Among the elements of such a strategy that deserve consideration are:

Financial Assistance

Maintain and, if possible, increase current funding levels for the Environmental Quality Incentives program (EQIP) and other BMP cost-share programs in the next federal Farm Bill, while streamlining the application process and making the programs accessible to a wider range of growers.

Consider federal and state income tax credits for qualified private investments in BMP.

Information & Technical Assistance

Better coordinate the services of information and technical assistance providers to provide a comprehensive suite of tools for BMP adoption and implementation

Assess and improve the effectiveness of information and technical assistance delivery to growers based on where they fall along the adoption continuum and where they are in the actual process of adopting BMP.

Increase information and technical assistance capacity by maintaining funding levels in the federal Farm Bill, expanding Certified Crop Advisor certification, the CDFA Fertilizer Research and Education Program and University of California Cooperative Extension

Market Recognition

The CDFA Environmental Farming Act Science Advisory Panel could include the adoption of irrigation and nutrient management BMP among the strategies eligible for incentives for on-farm ecosystem services.

The Stewardship Index for Specialty Crops or some other collaborative body could convene growers, buyers and consumers to identify and implement market mechanisms that reward growers for early BMP adoption.

Risk Management

Develop a pilot program for specialty crops similar to the BMP Challenge that combines support for technical assistance with indemnification for loss of crop yield or quality. Such a program should include a risk assessment to determine future premium rates and a means of quantitatively measuring the environmental benefits of BMP adoption.

Government & Regulation

Begin a dialogue among water quality regulators, agricultural producers, information and technical service providers and policy experts to identify ways that an improved regulatory system could encourage and support irrigation and nutrient BMP adoption.

“Selling” BMP to Growers

The proponents of environmentally beneficial management practices must recognize that, when all is said and done, they are there to sell something to the grower. They must effectively demonstrate that what they are selling will benefit the grower – that it is worth the money, fits into the existing farming operation and is simple to use. Much of the challenge of “selling” the BMP product is effectively communicating with the grower. To do so, a concerted, coordinated strategy by the BMP adoption support community is needed. These “sellers” should work together to tailor the “sales pitch” to effectively communicate with individual growers. The ultimate goal is to exceed their expectations. For if we do, they will exceed ours.

Appendix 1 – The Grower Survey

Survey to Assess Growers' Needs When Adopting New Management Practices

Introduction

American Farmland Trust is conducting a survey of growers to better understand how to improve support to growers who want or need to adopt Beneficial Management Practices (BMP). The focus is on irrigation water and nutrient management. Results of the survey will be reported with recommendations that identify the methods that will work best for growers. This survey is funded through a 2010 Specialty Crop Block Grant from the California Department of Food and Agriculture.

Your responses to this survey will be kept strictly confidential.

Focus Group Location: _____

What do you grow? Check all that apply. Mark the top three by acreage, 1, 2, 3.

Stone fruits and nuts	Citrus
Grapes	Leafy greens
Tomatoes	Cucurbits
Brassicas	Strawberries
Grain and forages	Pome fruits
Root and tuber crops	Other crops (specify) _____

Based on your primary crop, when did you last implement a new irrigation or nutrient management practice?

Last year	2 to 4 years ago	5 or more years ago
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If so, what was the practice? _____

Are you considering adopting a new irrigation and/or nutrient management practice in the near future?

Yes	No	Maybe
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What are the reasons that motivate you to adopt new irrigation or nutrient management practices? Check all that apply. Mark the top three by their importance to you, 1, 2, 3.

Reduce cost	Improve competitiveness
Reduce labor	Improve the environment
Regulatory compliance	Interest to innovate
Increase crop yield/quality	Peer or family pressure
Market access (e.g. buyer demand)	Other (specify) _____

Technical assistance _____ Regulatory (permit) assistance _____
Other _____

For the next 1 – 3 years, which are the resources management issues are of greatest concern to you? Please list the top 3 in order of importance to you.

Water supply
Water quality
Air quality
Biodiversity
Soil quality
Energy use
Pest management
Labor cost/availability
Other _____

Relative to other growers, when are you more likely to adopt a new BMP?

Earlier than most
About the same time as most
Later than most
Depends

Any additional comments you'd like to make? Please provide them below.

Optional:

May we contact you to learn more about your views? Yes No

Contact information:

Name _____
Mailing address _____
Telephone _____
Email address _____

Your responses to this survey will be kept strictly confidential.

Thank you for your participation.

