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More Integrated Pest Management Please

How USDA Could Deliver Greater Environmental Benefits From Farm Bill Conservation Programs

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Executive Summary

People aren't the only ones who enjoy the fruits and vegetables that come from our nation's agricultural growers—pests do too. Farmers need a way to manage the weeds and insects that threaten their crops, but chemical-intensive pest management often pollutes the air, land, and water. Integrated pest management, or IPM, can provide effective crop protection while minimizing risks to health and the environment. These smarter, prevention-based pest control practices can avoid resistance problems that occur with traditional pesticides and may reduce overall costs by lowering chemical inputs, reducing liability and worker injuries, and improving public relations.

Unfortunately, the largest Farm Bill conservation program—the Environmental Quality Incentives Program, or EQIP—is failing to adequately help farmers adopt integrated pest management practices. EQIP is a nearly \$800 million federal program intended to help farmers protect soil, water, air, plants, and animals.¹ The program could more effectively achieve its conservation goals and meet the needs of farmers by increasing the quantity and quality of assistance to growers seeking to adopt environmentally sound pest management practices.

The need to reduce pesticide use and risk in agriculture is greater today than ever before. The U.S. Geological Survey announced in March of 2006 that more than 50 percent of streams surveyed in agricultural areas have pesticide levels that exceeded safe standards for aquatic life, and nearly 10 percent have pesticides at levels exceeding benchmarks for human health.² Regulators around the nation are looking for strategies to reduce pesticide releases to protect water quality, reduce smog, and protect workers and communities from drift. Meanwhile, market demand for sustainable and organic food is growing, and many of the nation's largest food buyers are increasingly requiring their growers to adopt environmentally sound pest management practices.

This study used interviews, literature review, and analysis of expenditure data from the Natural Resources Conservation Service (NRCS) to evaluate whether NRCS adequately uses EQIP to support Integrated Pest

Management. The study discovered that public funds are not used appropriately to reduce pesticide risks, even in states where pesticide impacts are significant or widespread. In particular, our assessment found:

Insufficient EQIP funding is allocated to support IPM, even in states with serious pesticide impacts.

From 2003 through 2005, an average of just 2.4 percent of EQIP funds nationally were granted to farmers to support safer pest management. While funding for pest management increased slightly during this period, it remained at a low level, receiving only 3 percent in 2005. In many states, including those in regions where pesticides are known to be degrading water quality or other resources, little or no funding is being allocated to promote IPM. According to the U.S. Geological Survey, pesticides are frequently at levels of concern in waterways throughout the Corn Belt in the upper Midwest and parts of the Lower Mississippi River Valley.³ Yet in seven states within these regions, NRCS spent less than 1 percent of EQIP funds on pest management.

EQIP funding allocations for unspecified “pest management” practices are not necessarily designed to yield environmental benefits. Our review found that only a few states offer sufficiently high and detailed incentive payments to support higher-performing, prevention-oriented IPM practices. NRCS’ pest management payment rates are often far below actual costs, particularly for fruit, nut, and vegetable commodities, diminishing incentives for producers to seek IPM assistance. In at least a few state EQIP programs, it appears that producers are receiving payments just to buy pesticides.

Low prioritization in the EQIP ranking process, lack of clear IPM standards and guidelines, a bias favoring structural/engineered projects, and lack of technical assistance capacity at NRCS all conspire to reduce IPM allocations. Growers seeking pest management payments under EQIP frequently do not get “points” for multiple benefits provided by IPM to air, water, soil, and habitat, making their proposals less competitive (structural, engineered practices like fencing and animal waste storage tend to be the best-funded). NRCS’ national pest management standard does not clearly promote IPM performance. Finally, NRCS has little in-house expertise to promote IPM at the project level and, with some notable exceptions, has generally failed to make up for its inadequate capacity through external partnerships or the agency’s Technical Service Provider program.

While the program as a whole is missing the opportunity to promote IPM, a few state EQIP programs have taken the initiative to launch innovative partnerships and substantially expand IPM allocations. In Connecticut, for example, NRCS’ partnerships are delivering high-quality technical assistance and training to growers in IPM and nutrient management. In a few states, this type of effort has also resulted in the allocation of EQIP payments to assist transition to certified organic production systems that rely on advanced IPM to control pests.

Recommendations for Better Use of Integrated Pest Management

Our research points to nine priority actions that could enhance growers’ pest management practices and better achieve EQIP’s goals for improved soil, water, air, and habitat. Implementation of the following recommendations will require action by Congress, NRCS, USDA’s Cooperative State Research Extension and Education Service (CSREES), producers, and other stakeholders. With the reauthorization of the Farm Bill looming, congressional action to help NRCS increase its capacity in this area is both timely and critical.

1. Implement IPM initiatives in priority regions. In regions where pesticide use results in widespread environmental impacts or regulatory liability for producers, NRCS should launch initiatives to promote IPM through new partnerships, retooling EQIP and other conservation programs, and benchmarking program performance. In addition, NRCS should provide outreach to growers in these regions to ensure that they

know IPM assistance is available. Through these initiatives, and the adoption of the recommendations listed in this section, NRCS should strive to increase EQIP allocations for pest management to at least 10 percent of program spending on average—an increase of more than threefold over current spending levels.

2. Recognize the multiple benefits of IPM. NRCS should adequately rank IPM proposals in terms of their positive impact on multiple resources, including water, air, soil, habitat, and human safety.

3. Encourage increased environmental performance by establishing tiered payment rates for advanced IPM practices, including those for organic systems. Rates must be set sufficiently high to encourage participation from a diverse group of farmers (including specialty crop producers who face higher pest management costs) and scaled appropriately to the level of management intensity and expected environmental performance.

4. Improve the delivery of quality technical assistance by forging new partnerships to fill gaps in IPM expertise. Partnerships with other organizations—including NGOs and public and private entities—can help develop tools for outreach, upfront planning, ongoing training, and technical assistance to farmers. NRCS should establish a more formalized partnership with cooperative extension programs.

5. Increase reimbursement and performance expectations for technical service providers (TSPs), and provide TSPs with more training in integrated pest management. Higher reimbursement levels and more stringent qualification requirements—including a certification for experts in organic agriculture practices—will help increase the use of IPM.

6. Prioritize integrated stewardship practices. IPM practices will be most effective when integrated with other farming practices, including irrigation, nutrient management, crop rotation, tillage, and animal husbandry, among others. This can best be achieved by establishing EQIP project ranking criteria to prioritize multiple, synergistic land management practices or by providing set-aside funding for integrated land management practices that include pest management.

7. Elevate national leadership to promote IPM within NRCS and increase state and local staff training and expertise in NRCS offices.

8. Revise NRCS' national IPM standard to clearly promote pest prevention, pesticide use reduction, biological approaches, and use of least hazardous pesticides. By contrast, the existing standard focuses predominantly on “end-of-pipe” risk mitigation of pesticide use, missing important opportunities for greater risk reduction.

9. Develop metrics for evaluating and monitoring IPM performance under Farm Bill conservation programs. A scoring system for pest management plans and their components along a continuum—from chemically intensive treatment methods to prevention-based, non-chemical or biologically integrated practices—would enable NRCS to more objectively rank EQIP proposals and, by aggregating scores, report on IPM performance over time and throughout regions.

These recommendations are discussed in more detail beginning on page 19.

1. Missed Opportunities for Integrated Pest Management

Integrated Pest Management allows farmers to protect their crops from pests while also protecting beneficial insects, soil, water, wildlife, workers, and the community from intensive pesticide use. But despite widespread scientific literature showing that IPM practices provide effective pest control and improved environmental performance, EQIP—USDA’s best-funded program for promoting on-farm stewardship—has generally failed to promote IPM.

The Promise of Integrated Pest Management

There is a great deal of evidence that IPM works. Congress defined Integrated Pest Management in 1996 as “a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks” and directed all federal agencies to promote it. Six U.S. Department of Agriculture (USDA) agencies, numerous state and land-grant universities, and the EPA all actively support IPM. In 2002, the USDA launched the National Road Map for IPM, touting IPM as a critical strategy to “protect human health” and to “protect agricultural, urban and natural resource environments from pest and invasive species encroachment while minimizing unreasonable adverse effects on soil, water, air and beneficial organisms.”

IPM can help the Natural Resources Conservation Service (NRCS) protect the soil, water, animals, plants, and air, and typically provides benefits to multiple resources. Crop and livestock producers can benefit from IPM practices to manage insects, nematodes, weeds, plant and animal diseases, vertebrate pests, and invasive species. In addition to providing cost-effective pest management, IPM’s smarter, prevention-based approach can reduce pesticide runoff and leaching to groundwater, improve air quality by reducing emissions of smog-forming gases, improve soil health, reduce risks to wildlife, improve worker safety, and prevent pesticide drift.

With market demand for sustainable food on the rise, many of the nation’s largest food buyers, including Sysco and Unilever, are increasingly requiring their growers to adopt environmentally sound pest management practices. Demand for organic foods, for which advanced IPM practices are a defining requirement, continues

to increase. In order to respond to these pressures and to overcome the perceived risk of lower yields, farmers need technical assistance and financial incentives. EQIP is well positioned to provide this support.

In addition to EQIP, the Conservation Security Program (CSP) can play a strong role in supporting environmentally friendly pest management. This analysis focuses on EQIP, however, for several reasons. With roughly 20 percent of CSP’s 2005 contract allocations going to reward farmers that are implementing IPM practices, compared with 3 percent under EQIP, CSP appears to be doing a relatively better job in funding IPM.⁴ Because EQIP is currently the largest Farm Bill conservation program on working lands, roughly five times the size of CSP, it stands out as a substantially greater opportunity for increasing public investment in IPM. In addition, unlike EQIP, which is available to growers everywhere, CSP is currently limited to farmers only in select watersheds. NRDC strongly supports increasing overall resources for CSP and making this program more widely available to growers. Meanwhile, EQIP will remain an important resource for helping growers adopt IPM. In addition to EQIP and CSP, the Agricultural Management Assistance program, operating in 13 states, provides very limited support for IPM, totaling \$331,806 in 2005.

Insufficient Resources Are Allocated to IPM

The Natural Resources Conservation Service is missing an important opportunity to address priority resources concerns through IPM. Both Congress and NRCS have squarely identified EQIP as a place to promote integrated pest management. The 2002 Farm Bill authorizes NRCS to accord “great significance” to a practice that relates to pest management and pesticide use when determining the amount and rate of incentive payments under EQIP, and Congress explicitly included IPM as a Land Management Practice that can be funded under EQIP.^{5,6}

In its implementing regulations, NRCS states that it has “identified national measures that can help EQIP achieve its national priorities and statutory requirements more efficiently. These measures include identifying and implementing conservation practices that employ appropriate tools to more comprehensively serve EQIP purposes, such as ... Integrated Pest Management Plans.”⁷ NRCS’ Pest Management Standard requires the use of IPM where it is available.⁸

Despite clear authority and encouragement to promote IPM under EQIP as a key strategy for reducing non-point-source pollution and improving water quality, NRCS has generally not made this a priority. From 2003 through 2005, just 2.4 percent of EQIP funds were used for funding pest management activities under EQIP’s updated Pest Management Practice Standard (code 595).⁹ Other EQIP-supported practices, which are not reported under practice code 595, such as cover cropping, crop rotation, and field buffers, may also contribute to pest management and resource conservation goals. However, these practices may be implemented for reasons other than pest management, making practice code 595 the best indicator of investment in IPM under EQIP.

Table 1. Percentage of EQIP Funds Allocated to Pest Management Practice Standard 595, 2003–2005¹⁰

	2003	2004	2005
Total EQIP funds (less technical assistance)	\$448,772,787	\$717,804,086	\$786,024,261
Total allocation for 595 standard	\$ 8,722,787	\$ 16,257,977	\$ 23,036,994
Total % for 595 practice standard	1.94%	2.26%	3%

Success in Ohio: EQIP Program Achieves Reduced Atrazine Levels in Municipal Drinking Water Supply

Contributed by Suzy Friedman, Environmental Defense

The Hoover Reservoir, a major drinking water source for the city of Columbus, Ohio, has suffered from high levels of atrazine since the 1980s, periodically exceeding the health limit of 3 parts per billion (ppb). Farmers apply atrazine, an herbicide, to their fields at planting time (usually May) to kill thistle and other weeds that sprout between rows. While helpful in killing weeds, spring rains also carry the chemical into water bodies such as the Hoover Reservoir. About 75 percent of American corn farmers over the past 50 years have followed the practice of spraying atrazine, applying about 70 million pounds every year to save the time and labor of tilling to remove weeds.

Resolving this health challenge became a priority, and OH NRCS partnered with the Upper Big Walnut Water Quality Partnership (an all volunteer group of local farmers) and the Delaware County Soil and Water Conservation District to leverage EQIP to address the threat. They wanted to find a way that would allow farmers to continue no-till farming, which has significant benefits for soil health and can help reduce non-point-source runoff, and avoid using the same levels of atrazine. Launched in 1999, the special EQIP project financially rewarded participating farmers for reducing atrazine application on fields enrolled in the program. The special EQIP project provided financial and technical assistance to farmers to implement pest management, nutrient management, and conservation tillage practices, to help them reduce atrazine use while maintaining or improving soil and water quality through conservation tillage.

By 2005, farmers had enrolled 30,889 acres in the program, with an EQIP obligation of \$1.2 million by OH NRCS. In 2003, OH NRCS expanded the program, opening it up to farmers in parts of the Scioto, Oletangy, and Alum Creek watersheds. Average measured levels of atrazine in the reservoir dropped substantially as a result of the project, and Columbus has saved \$3.1 million in water treatment costs for activated carbon. Before the project, average atrazine levels in the reservoir spiked in July at more than 4 ppb, and after the project the average in July was about 2 ppb, below the health limit. Average atrazine levels were lower in every month after the project than before, with the exception of April, when the averages were the same—less than 0.5 ppb. With NRCS investing \$1.2 million and Columbus saving \$3.1 million, the return comes to \$2.58 for every dollar invested in farmer conservation efforts through the project.

Table 2. Percentage of Funds Allocated to Pest Management Practice Standard 595, 2003–2005, by State¹¹

	EQIP total allocation 2003–5 ¹²	Total 595 allocation	%
Alabama	\$35,202,097	\$2,264,307	6.43%
Alaska	\$13,129,808	\$843,292	6.42%
Arizona	\$41,834,417	\$84,850	0.20%
Arkansas	\$47,156,976	\$0	0.00%
California	\$123,437,174	\$2,154,850	1.75%
Colorado	\$74,189,165	\$680,899	0.92%
Connecticut	\$14,048,204	\$679,279	4.84%
Delaware	\$11,786,108	\$1,321,601	11.21%
Florida	\$46,983,287	\$2,825,872	6.01%
Georgia	\$37,613,640	\$6,000	0.02%
Hawaii	\$14,691,772	\$1,074,191	7.31%
Idaho	\$40,705,614	\$530,143	1.30%
Illinois	\$29,308,422	\$0	0.00%
Indiana	\$27,687,856	\$1,404,092	5.07%
Iowa	\$53,615,835	\$1,678,340	3.13%
Kansas	\$58,478,677	\$2,556,402	4.37%
Kentucky	\$24,670,201	\$0	0.00%
Louisiana	\$35,382,809	\$332,319	0.94%

	EQIP total allocation 2003–5¹²	Total 595 allocation	%
Maine	\$20,041,877	\$246,536	1.23%
Maryland	\$15,698,787	\$309,173	1.97%
Massachusetts	\$9,075,481	\$1,819,086	20.04%
Michigan	\$38,978,771	\$2,152,862	5.52%
Minnesota	\$64,495,347	\$1,295,695	2.01%
Mississippi	\$38,482,714	\$1,035,521	2.69%
Missouri	\$50,198,661	\$3,156,874	6.29%
Montana	\$59,847,388	\$2,786,346	4.66%
Nebraska	\$62,309,226	\$191,308	0.31%
Nevada	\$17,375,287	\$917,570	5.28%
New Hampshire	\$8,240,855	\$24,006	0.29%
New Jersey	\$10,306,013	\$314,303	3.05%
New Mexico	\$57,364,398	\$29,020	0.05%
New York	\$27,835,807	\$5,652,254	20.31%
North Carolina	\$37,942,559	\$1,745,261	4.60%
North Dakota	\$45,173,191	\$428,097	0.95%
Ohio	\$33,229,681	\$1,091,150	3.28%
Oklahoma	\$54,098,021	\$1,575,993	2.91%
Oregon	\$44,830,052	\$1,261,706	2.81%
Pennsylvania	\$28,756,548	\$14,960	0.05%
Puerto Rico	\$6,681,474	\$0	0.00%
Rhode Island	\$2,869,360	\$32,760	1.14%
South Carolina	\$21,692,164	\$124,708	0.57%
South Dakota	\$44,875,193	\$86,978	0.19%
Tennessee	\$25,395,342	\$0	0.00%
Texas	\$165,154,765	\$1,816,782	1.10%
Utah	\$48,328,249	\$180,373	0.37%
Vermont	\$14,220,263	\$147,262	1.04%
Virginia	\$26,639,049	\$174,348	0.65%
Washington	\$41,861,646	\$426,235	1.02%
West Virginia	\$16,810,824	\$0	0.00%
Wisconsin	\$43,645,591	\$377,480	0.86%
Wyoming	\$34,045,822	\$110,540	0.32%
Total	\$1,952,601,134	\$48,017,758	2.46%

Funding Allocated for Structural, Engineered Practices Exceeds Funding for Land Management Practices

The relatively low EQIP funding levels for pest management reflect a larger bias toward structural, engineered practices such as animal waste facilities, fencing, piping, and pond construction, as opposed to more intensive land management practices like nutrient management and IPM. Of the top 10 practices funded by EQIP over 2003–2005, the large majority went toward structural practices (see chart below). Overall, IPM ranked 12th, at less than 2.5 percent. The emphasis on structural practices is partly a result of Congress’s mandate that 60 percent of EQIP resources support livestock operations—a limitation that should be struck when Congress reauthorizes the Farm Bill. However, low support for pest management cannot be completely explained by this legislative mandate since practices such as IPM, and nutrient management in particular, may be allocated to livestock operators. For example, the entire \$1.7 million set aside by Montana for pest management will go toward invasive weed control on grazing lands.¹³

Table 3. Top 15 Practices Funded by EQIP, 2003–2005¹⁴

		\$	%
1	Waste Storage Facility	237,170,985	12.15%
2	Fence	143,951,269	7.37%
3	Irrigation System Sprinkler	139,129,769	7.13%
4	Brush Management	86,277,207	4.42%
5	Pipeline	79,592,281	4.08%
6	Nutrient Management	70,978,495	3.64%
7	Pipeline High-pressure, Underground, Plastic	70,429,050	3.61%
8	Pasture & Hayland Planting	67,816,119	3.47%
9	Residue Management, No-Till & Strip Till	60,196,539	3.08%
10	Trough or Tank	54,297,506	2.78%
11	Heavy-Use Area Protection	53,212,440	2.73%
12	Pest Management	48,017,758	2.46%
13	Prescribed Grazing	46,776,564	2.40%
14	Grade Stabilization Structure	39,973,521	2.05%
15	Well	34,544,415	1.77%

EQIP Is Not Being Used to Promote IPM in States That May Need It Most

According to the U.S. Geological Survey’s assessment of pesticides in our nation’s waterways, released in 2006, pesticides exceeded levels of concern for aquatic ecosystem health in 57 percent of its agriculturally dominated stream sampling sites.¹⁵ USGS reports that the highest and most frequent pesticide detections were measured or are predicted to be in the waterways throughout the Corn Belt in the upper Midwest (including Illinois, Indiana, Iowa, Nebraska, Ohio, and parts of adjoining states) and parts of the Lower Mississippi River Valley.¹⁶ Many of the state EQIP programs with the lowest spending on pest management are located in these regions. For example, from 2003 through 2005, seven state EQIP programs in these regions spent less than 1 percent on pest management through EQIP, including those in Arkansas, Illinois, Kentucky, Louisiana, Nebraska, Tennessee, and Wisconsin. EQIP programs in Illinois, Kentucky, and Tennessee allocated no

funding at all for IPM during this period.¹⁷ As Table 4 indicates, the Conservation Security Program was also underutilized in supporting pest management in these states. Outside of these regions, USGS reports that pesticide benchmarks for aquatic habitat were exceeded at multiple monitoring sites in California, Texas, and Washington—all states that allocated only 1 percent to 2 percent of EQIP resources on pest management from 2003 through 2005.

A full literature review to identify all the states where pesticide issues are a high priority is beyond the scope of this paper. In identifying such states, NRCS should consider a broad array of pesticide-related impacts (e.g., air quality, drift, community and worker health, beneficial insects, and pest resistance) and the potential to support producers facing increasing regulatory activity. Certainly, there may be regions where little or no pesticides are used, or where other conservation priorities are simply greater.

Table 4. IPM Allocations in Select States of the Upper Midwest and Mississippi River Valley in 2005

	IPM allocation under EQIP¹⁸	% of total state EQIP funds	IPM allocation under CSP¹⁹	% of total state CSP funds²⁰
Arkansas	\$ 0	0%	\$ 0	0%
Illinois	\$ 0	0%	\$328,158	6.1%
Kentucky	\$ 0	0%	\$ 11,008	2.9%
Louisiana	\$111,064	0.8%	\$ 46,262	12.8%
Nebraska	\$ 72,036	0.3%	\$620,658	11.6%
Tennessee	\$ 0	0%	\$ 21,061	45.0%
Wisconsin	\$283,939	1.7%	\$363,958	18.9%

NRCS’ Pest Management Standard Is Not Being Fully Implemented

State conservationists, who are charged with implementing EQIP in each state, are obligated by NRCS’ national Pest Management Standard (practice code 595) to ensure that pest management technical assistance and support are applied to protecting natural resources. The standard requires that “each conservation plan has a pest management component, if needed” and that “clients should review and update their pest management plans periodically in order to incorporate new IPM technology, respond to cropping system and pest complex changes, and avoid the development of pest resistance.”²¹ The standard further requires state conservationists to be responsible for, among other things:

“a) Targeting pest management technical assistance to specific resource concerns and locations within their respective States/Areas (e.g., watersheds with pesticide-impaired sources of drinking water, pesticide Total Maximum Daily Load requirements, or highly vulnerable areas that may contribute to future pest management-related contamination); b) Supplementing pest management guidance and requirements, as necessary, making it applicable to local conditions and providing a review copy to respective Regional Conservationists; c) Ensuring that appropriate training is provided to all NRCS personnel who provide pest management guidance to the public, and establishing a process to provide continuing education to maintain employee competency and certification.”²²

Fully implementing NRCS’ Pest Management Standard would go a long way in helping NRCS achieve its natural resource goals, especially in states where pest management practices have resulted in significant environmental impacts.

2. Optimizing EQIP to Promote IPM

EQIP's ranking system significantly influences the kinds of practices funded by the program. Producers' applications are reviewed on a competitive basis and scored based on the anticipated potential of the proposed practices to enhance priority resource concerns. While states must take into account federal priorities, state and local committees are responsible for setting additional resource priorities and for deciding which practices affect which resource concerns.

Because demand for EQIP assistance typically far exceeds available resources, funding is unlikely to flow to practices and resource concerns that are not given high priority by the program's ranking criteria. Low levels of EQIP funding for pest management in states that have significant pesticide impacts indicate that the resource prioritization and ranking system is frequently failing to prioritize IPM where it is needed most.

Funding for IPM Increases in States Where It Is Recognized to Provide Multiple Benefits

In analyzing a number of ranking systems employed by state EQIP programs, we found that the states with the highest percent of funding allocations for IPM (Massachusetts, New York, Delaware) have established ranking systems that recognize IPM as a practice that achieves multiple environmental benefits. For example, in New York, pest management projects are scored to benefit air quality, animals and habitat concern, plant health, and water quality.²³ In Connecticut, NRCS' pest management practice addresses five priority resource concerns: ground-water quality, surface water quality, agricultural

Table 5. Percentage of 2005 EQIP Funds Allocated to Pest Management Among Top 10 States

State	2005
Massachusetts	21%
New York	18%
Delaware	11%
Michigan	11%
Hawaii	11%
Connecticut	10%
Montana	9%
Alabama	9%
Missouri	7%
Florida	6%

How Michigan NRCS Increased IPM Awards Under EQIP

Michigan is a good example of how a change in the EQIP prioritization and ranking process contributed to a higher pest management allocation. Funding for IPM increased from 1.27 percent of total EQIP allocations to farmers in 2003 to 11 percent in 2005. In 2003, grower groups, IPM extension staff, and NGOs participated in the NRCS advisory process, including the EQIP subgroup of the State Technical Committee, and helped NRCS recalibrate its ranking process to better reflect the resource benefits provided by IPM. In addition to riparian corridor management and groundwater resource protection, Michigan now considers IPM as a mitigation strategy for addressing air quality protection and promoting integrated conservation cropping systems.²⁴

While other factors, such as strong outreach and independent technical assistance, were the important factors contributing to increasing the number of applications and overall financial support for IPM in Michigan, the modification in the ranking and criteria process played an important role in ensuring higher approval rates for farmers who want to practice IPM. Participants report that higher ranking and prioritization in turn creates more interest on the part of farmers to apply and creates incentive for NRCS staff and others to encourage growers to adopt IPM as a way to improve their chances of getting funded.

land use, riparian and wetland protection, and biodiversity.²⁵ In Massachusetts, different IPM practices address different concerns. The minimum IPM practice addresses soil, water, plant, and animal quality, while more specific advanced IPM practices are also considered to address air quality.²⁶ In these states, applications that include IPM achieve relatively high scores and are therefore more likely to be approved for funding.

Funding for IPM Decreases in States Where It Is Not Recognized to Benefit Multiple or Prioritized Natural Resources

Conversely, if pest management is accorded a very low priority for addressing established resource concerns, as is the case in Illinois and Pennsylvania, little or no funding will be allocated.²⁷ For example, although Illinois is noted in the USGS survey as having very high atrazine levels in its waterways, its ranking system does not award any points for integrated pest management practices.²⁸ In this case, as is the case with Pennsylvania, none of the resource concerns, even water quality, are considered to be addressed by pest management. In Illinois' current system, 3 points out of a possible 30 for water quality are awarded for actions to address pests, yet the only practice recognized there is irrigated water management.²⁹

In California, EQIP ranking criteria consider the benefit of pest management practices only to water quality, even though many IPM practices improve air quality and reduce pesticide drift. Volatile organic compounds in agricultural pesticides are a top-10 source of smog-forming pollutants in California's San Joaquin Valley, which is now in extreme nonattainment under the Clean Air Act.³⁰ Over the past three years, California has spent just under 2 percent of its EQIP funds to support environmentally friendly pest management practices. If NRCS classified the practice as having an impact on more than just water quality, it is likely that farmer applications and funding for IPM would increase.

"Set-asides" Can Result in Significant Funding for Environmentally Friendly Pest Management Practices

Another way for states to give higher ranking and priority for implementation of pest management is to create set-aside funding allocations at the state level. Nevada set aside \$300,000 at the state level for pest management practices in 2006.³¹ In Wisconsin, grower groups and IPM university specialists appealed to the State Technical Committee and were able to get a commitment for a statewide funding allocation for IPM in apple orchards, totaling \$100,000 in 2005. While not a lot of money, this was a significant outcome given that local decision makers were unfamiliar with the benefits IPM and were not awarding high points for IPM as a strategy for meeting local resource conservation priorities.

In Delaware, NRCS set aside 20 percent of its EQIP resources, or \$1,190,000 in 2006, for applications that fall within the broader category of integrated crop management systems (ICMS).³² This includes practices such as cover cropping, filter strip, nutrient management, pest management, and residue management. IPM is typically more effective when implemented with these other land management practices. For this reason, the more comprehensive IPM programs include nutrient management and integrated crop management. Within this general category, more advanced IPM (considered Tier II) is awarded additional points. In order to score high within the ICMS category, there is a built-in incentive for farmers to implement each of the practices included in the category, including IPM. Delaware's approach for setting aside funds specifically for integrated crop management is an innovative model to encourage more advanced, effective, integrated land management practices.

3. Ensuring Greater Environmental Benefits

NRCS has few tools available for measuring environmental performance in the field and must generally depend on the predicted performance of the practices it funds to evaluate EQIP's benefit to the environment. Until Congress gives NRCS capacity to monitor actual environmental performance (as many stakeholders have called for), it is particularly important for the agency to fund those pest management practices that offer the greatest expectation of delivering environmental performance.

For example, practices that eliminate the need for pesticides or prevent pest problems from occurring (such as crop rotation, promotion of beneficial insects, and use of mating disruption products) are likely to have far greater environmental benefits than practices that simply try to mitigate the risks of using conventional pesticides (e.g., safety equipment, mixing stations, buffer strips). Unless NRCS specifically promotes the higher-performing practices and provides meaningful financial incentives, there is little assurance that growers will implement these, particularly if they cost more. By funding specific pest management practices that are known to reduce pesticide use and risk, NRCS will get more benefit with each dollar invested.

The federal General Accountability Office (GAO) came to the same conclusion in 2001. In its review of IPM implementation, the agency found that USDA was failing to achieve significant benefit from IPM since it did not adequately distinguish between those practices that reduced pesticide use and those that did not. Overall, the report noted that the agency was only sparsely promoting more advanced cultural and biological practices, such as the use of pheromone products, promotion of beneficial insects, and habitat and cultural practices, that would produce greater environmental benefit.³³ Unfortunately, the NRCS Pest Management Standard that guides EQIP's approach to pest management does little to address the concerns identified in the GAO report.

NRCS' National Pest Management Standard Does Not Emphasize Prevention and Pesticide Use Reduction

NRCS' national Pest Management Standard (practice code 595) is not sufficiently clear in prioritizing pest management techniques that have the greatest potential to reduce unnecessary pesticide use and risk.³⁴

Instead, the standard focuses on pesticide safety and “end-of-pipe” mitigation strategies that do not consider the benefits of reducing chemical use or finding lower-risk pesticides.³⁵ Because states are given considerable latitude for developing and implementing their own pest management policies and eligible practices under EQIP, there is great variation around the country in the way NRCS promotes pest management. Some states have very minimal policies and standards that are supported by a single generic category for all pest management practices, while others provide incentives and competitive payment rates for specific biologically based practices that are more likely to have broader environmental benefits.

Many State EQIP Programs Do Not Promote Higher-Performing IPM Practices

Many state EQIP programs still have a long way to go to develop differentiated practice standards and instead pay for generic “pest management” practices that may not provide significant environmental benefits. Of the top 10 states providing the greatest support for pest management in the last three years, Missouri, Montana, Indiana, Nevada, and Alabama stand out as examples where more funding may not be yielding significant environmental benefits. In Missouri and Indiana, NRCS has allocated more than 5 percent of EQIP funding to pest management, but has designated only an undefined “pest management” category eligible for funding at \$5 acre. Under its standards, there is neither a requirement nor adequate financial incentive for the grower to use reduced-risk pesticides or more-advanced biologically based IPM practices.³⁶ Nevada spent 5 percent of its EQIP funds on pest management in 2003–05, yet a closer examination of its specific contract reimbursement data/rates reveals that 100 percent of that pest management funding contracted in 2005 was designated to go toward chemical treatment.³⁷ Similarly, Montana spent 9 percent of its EQIP funds on pest management in 2005, yet a full 93 percent of funds allocated in that year (roughly \$525,160) is allocated for herbicide application.³⁸ Alabama, which spent 9 percent of its EQIP funds on pest management, also has a very general policy with no additional mandated requirements above the national Pest Management Standard.

IPM payments are often set too low to encourage high-performing practices and specialty crop grower participation.

The 2002 Farm Bill specifically recognizes the need for higher payment rates to encourage pest management, stating: “in determining the amount and rate of incentive payments, the Secretary may accord great significance to a practice that relates to pest management and pesticide use.”³⁹ Yet many state EQIP programs have room to improve in meeting this need. Most states do not differentiate between higher-value vegetable crops and field crops; nor do they offer payment rates that are sufficiently high to support biologically based IPM techniques or attract the participation of specialty crop growers. For example, we found that the typical cost-share rate paid by state programs for a generic pest management practice was \$5 to \$10, not nearly enough to pay for high-performing IPM practices such as pheromone use, insect traps, and consulting.

Specialty crop growers are particularly disadvantaged by low payment rates because their pest management costs are typically significantly higher than those for field crops. Table 6 illustrates this difference in select California commodities.

Field Crops	Cost/acre
Alfalfa Hay	\$40
Field Corn	\$5
Wheat, Irrigated	\$7
Specialty Crops	Cost/acre
Baby Lima Beans	\$190
Cherry Tomatoes	\$290
Pear, Green Bartlett	\$1,087
Walnuts	\$181

In Several States, EQIP Promotes Environmental Performance by Supporting Specific Pest Management Practices

As of 2005, at least seven states, including Washington, California, Oregon, New Mexico, Delaware, Massachusetts, and North Carolina, have made good progress in developing a range of incentive payment component practices that promote specific IPM practices tailored to different crop groups. Many distinguish among low, moderate, and advanced IPM, providing higher payments for more costly practices that are known to deliver higher environmental benefits, such as the use of reduced-risk pesticides or the introduction of insect pheromones for monitoring and/or mating disruption. These states, for the most part, are providing more meaningful incentive payments that encourage more diverse farmer participation and higher levels of management intensity and impact. In many cases, the development of these more detailed practices came about as part of a collaborative effort among NRCS staff, IPM cooperative extension, NGOs, and specialty crop grower associations.

Delaware

NRCS' state Pest Management Standard in Delaware is among the more advanced nationwide, focusing its policy specifically on reducing pesticide usage. Delaware's policy states its aim to "reward producers who implement pest management systems that go beyond the minimum requirements of the NRCS policy for pest management and the Pest Management Standard, 595. A multi-level system of incentives will be offered to producers who do a better overall job of reducing pesticide usage, reducing pesticide effects on the environment, and utilizing more environmental friendly pesticides."⁴¹ This encourages producers to pursue higher-performing practices, as described in Table 7 below. While the overall policy and approach are very good, the low rates are an important limitation, especially for specialty crop growers. In Delaware, only 16 percent of IPM assistance is awarded to specialty growers, while 83 percent goes to row crop producers.⁴²

Table 7. Delaware's NRCS Pest Management Incentive Payment Rates⁴³

Practice	Incentive payment per acre
Pest Management Tier I - Row Crop	\$6.00
Pest Management Tier I - Vegetable Crop	\$12.00
Pest Management - Tier II ⁴⁴	\$15.00
Tier II + Systemic Insecticide Treatment	\$1.00
Tier II + Conservation Practices to Reduce Runoff & Sedimentation	\$1.00
Tier II + Chemicals With Low or Very low Environmental Hazards	\$3.00
Tier II + Advanced Pest Monitoring Techniques	\$3.00
Tier II + Implement Filter Strips to Reduce Impacts to Water Courses	\$5.00
Tier II + Use of Site Specific Sprayer Technology	\$5.00
Tier II + Use of GPS Precision Sprayer	\$5.00
Tier II + Use of Reduced Drift / Rate Sprayer Technology	\$5.00
Pest Mgt Tier II + Use of Chemical Induction Sprayer	\$5.00
Pest Mgt Tier II + Utilization of Advanced Pest Monitoring Techniques	\$3.00

Massachusetts

In Massachusetts, NRCS has one of the most well-defined and advanced Pest Management Standards in the country. All growers seeking EQIP funds for pest management must keep records and develop an IPM plan that incorporates at least half of the IPM guidelines established by the University of Massachusetts Cooperative Extension Service and implement at least one additional component to reduce environmental

risk. Growers who adopt two-thirds of the university’s established practices and two or more additional pest management components are rewarded with a higher incentive payment. The additional components include weather monitoring, crop rotation, use of chemicals with “low” or “very low” environmental hazards, and spot treatments, among other practices.⁴⁵

Table 8. Massachusetts’ NRCS Pest Management Incentive Payment Rates	
Minimum Required Incentive Payment per Acre	
IPM medium level (50–66%)	\$20
IPM high level (>67%)	\$30
IPM record keeping (required)	\$10
Additional Components	
Weather monitoring and disease forecasting	\$500/farm/yr
Pest monitoring	\$10
Predator augmentation	\$20 per release
Crop rotation	\$10
Cranberry bog sanding	\$400
Old orchard removal	\$300
Select only chemicals with “low” or “very low” environmental hazard	\$15
Follow Mass. Dept. of Ag. Resources storage guidelines	\$5
Apply pesticides with a direct-injection sprayer	\$10
Perimeter trapping systems	\$20
Use pesticide equipment that minimizes offsite losses—hooded, sensor-guided sprayers, low-drift nozzles	\$10
Reduce treatment area by targeting application zone—banded spray, furrow treatments, spot treatment	\$10

California

While NRCS has not allocated substantial funding for pest management under EQIP in California, the program there does offer some of the highest per-acre payment rates of any state, providing a total of up to \$300 per acre for pest management practices. California NRCS staff facilitated a working group on pest management to develop a state-specific Pest Management Standard for California. The new state standard recognizes prevention and non-chemical strategies as critical tools for minimizing risk. The high-value payment rates should make integrated pest management economically interesting to producers, including growers of specialty crops. Yet the low overall EQIP spending on pest management in California (less than 2 percent in 2005) indicates that other factors, possibly including low ranking priority for pest management projects, lack of awareness that IPM funds were available, and lack of technical support to prepare pest management plans, may have kept pest management from becoming a substantial activity area.

Table 9. California’s NRCS Pest Management Incentive Payment Rates	
Practice incentive payment (paid at 50%)	
Pest Management (595)	\$300 flat rate (100%)
IPM-Consulting	\$40
IPM-Mating Disruption	\$200

Practice incentive payment (paid at 50%)	
IPM-Reduced use of high-risk pesticides (St/Co. Listed)	\$20 flat rate (100%)
IPM-Sampling (multimedia: soil, plant, water, etc.)	\$276
IPM-Sampling (soil)	\$50
IPM-System (organic system, pheromones, application, scouting)	\$70
IPM-Beneficial Insects	\$80

Connecticut

In Connecticut, NRCS offers some of the highest rates in the country, tailored specifically to several crop groups. The program there sets rates based on the value of specific crops and the level expected to motivate farmers to try new pest management practices.⁴⁶

While the rates do not specify low, medium, or high levels of IPM performance, the high rates, coupled with intensive weekly technical assistance and training provided by University of Connecticut Cooperative Extension staff, helps ensure that over time farmers will be adopting more advanced IPM practices.

Table 10. Connecticut's NRCS' 595 Incentive Payment Rates

Practice	Incentive payment per acre
Silage or grain corn	\$25
Broadleaf tobacco	\$100
Shade tobacco	\$500
Vegetable crops	\$100
Small fruit or orchard crops	\$100
Nursery crops	\$300
Greenhouses and ornamentals	\$500

North Carolina

In North Carolina, NRCS recently incorporated new, detailed cost share practices targeted to specific grower groups, making it possible for Christmas tree, tree fruit, and nursery crop growers to participate in the EQIP program. These cost share practices were developed collaboratively by NCSU research station, the Center for Agricultural Partnerships (CAP), a local agricultural NGO, and the District Conservationist in Henderson County.

Table 11. North Carolina's NRCS Pest Management Cost Share Rates

Practice	50% cost share per acre
Mating disruption for codling moths	\$32.50
Mating disruption for oriental fruit moth	\$7.50
Reduced-risk pesticide usage in orchards	\$14.40
Improved-efficiency sprayer usage	\$25.00
Scouting orchards and Christmas trees	\$30.00
Scouting cotton, potatoes, peanuts, and cucurbits	\$16.00
Scouting field corn, soybeans, small grain, sorghum, and all others	\$6.00
Destroying abandoned orchards	\$200.00

4. The Technical Assistance Gap

Promoting Integrated Pest Management requires more in-house expertise and training at NRCS, better technical assistance for growers, and stronger partnerships. The lack of NRCS staff expertise and limited technical support available for farmers is highly problematic for reaching EQIP's goals and achieving higher levels of support for integrated land management practices, especially IPM. IPM is a knowledge- and labor-intensive process. Good technical assistance is vital to help growers acquire the tools and confidence needed to adopt new pest management practices. With the decline in funding for Cooperative Extension nationally and limited availability of IPM crop consultants in many states, it is essential that NRCS, directly or through consultants and partner organizations, provide growers with the training and technical assistance that is needed to develop and implement quality IPM plans. Our review found that such technical support for pest management is often insufficient to address grower needs.

NRCS Needs More In-house Staff Training and Resources to Promote IPM

Over a relatively short time, USDA's Natural Resource Conservation Service (NRCS) has been challenged to keep up in assisting producers to protect increasingly diverse resources and promote an ever-growing array of conservation practices through a wide range of agricultural conservation programs. Formerly called the Soil Conservation Service, NRCS has seen its mandate and responsibilities grow over the years to include support for IPM, nutrient management, habitat preservation, surface water and groundwater protection, water conservation, and air quality protection, among other conservation objectives. The growth of the agency's mandate and responsibilities over the last several years without sufficient increases in staffing resources or

changes in staff composition has created numerous challenges in providing the quality of technical assistance, tools, and resources needed by growers to implement complex land management practices such as IPM.

At the national level, NRCS lacks the leadership and staff expertise needed to provide sufficient IPM guidance, oversight, and coordination among NRCS state offices. The agency currently employs three technical support staff charged with providing basic IPM training and technical support to NRCS state offices. Stakeholders, including NRCS staff, interviewed for this report overwhelmingly reported that at the state and county level too, NRCS lacks the necessary staff expertise to provide the up-front and ongoing conservation planning that growers need to develop and effectively implement more advanced integrated management practices.

More External Technical Assistance for IPM Implementation Is Needed

The need to reform NRCS' technical assistance program has been widely voiced and is not limited to pest management. According to the Soil and Water Conservation Society, weakness in the nation's technical services infrastructure was named in five regional farmer workshops as "the single greatest impediment to addressing the nation's conservation and environmental management needs."⁴⁷ A review of the program by the Center for Agricultural Partnerships (CAP) arrives at a similar conclusion.⁴⁸ According to these reports, the Technical Service Provider (TSP) program suffers from the following challenges: a) Payment levels are too low to attract sufficient participation in the program; b) TSP expertise is insufficient, especially for more comprehensive conservation planning, advanced IPM, and the needs of specialty crops; and c) and the geographic distribution of TSPs is uneven.⁴⁹ California is a case in point, where fewer than 10 TSPs are certified to offer pest management assistance even though California is a state with significant pesticide issues.⁵⁰ According to CAP, "for the majority of farmers who produce specialty crops and for small and limited-resource farmers, technical assistance through a TSP is not likely to be available to meet their needs for participating in EQIP and other Farm Bill conservation programs."⁵¹

Prerequisite criteria for becoming a Technical Service Provider are not adequate to ensure that TSPs offering technical assistance in pest management have expertise in integrated pest management. Current standards require TSPs to hold a state license to apply pesticides, a professional certification from the American Society of Agronomy, and completion of an NRCS course covering introductory concepts and NRCS procedures.⁵² None of these credentials requires the holder to have crop-specific expertise in managing pests, much less expertise in non-chemical or biologically integrated pest management practices.

A Way Forward: Stronger Partnerships and Cooperation

A number of NRCS offices have addressed these technical assistance challenges by strengthening partnerships and cooperation with groups that can fill gaps in expertise and capacity, including NGOs, IPM crop consultants, grower associations, and, most important, the USDA Cooperative State Research, Education and Extension Service (CSREES) and its Land Grant University Partners.

In the fall of 2005, at least a dozen eastern state NRCS offices and a range of IPM experts from Cooperative Extension, state agriculture departments, independent crop advisers, and others met to share information and discuss ongoing needs of their respective groups. As a result, they identified a number of ways that Cooperative Extension can collaborate with NRCS to improve the delivery of IPM technical service, information, and incentives to Northeast vegetable producers. These include:

- 1) providing IPM training, protocols, and other tools to NRCS Technical Service Providers and NRCS staff;
- 2) providing education and information to growers at local and state levels to encourage the use of EQIP to support IPM adoption;

- 3) providing opportunities for increased networking, partnership, and outreach between NRCS and IPM advocates and technical support organizations in their states; and
- 4) assisting in the modification of ranking and incentive structures to promote increased adoption of IPM practices. The efforts under way in this region could provide an important model for other regions.

Given the significant IPM experience that resides with many cooperative research and extension programs, closer partnership with this agency is desirable. In fact, NRCS' national Pest Management Standard recognizes the vital role that CSREES should play. According to the Pest Management Standard: "1) CSREES agrees to provide assistance to NRCS in support of the development and use of site-specific information and to address water quality issues; (2) CSREES and NRCS agree to cooperate in encouraging each State's (or equivalent) Extension and NRCS organizational unit to develop guidelines and appropriate pesticide and nutrient management components for use in landowners'/operators' conservation plans."⁵³ Many stakeholders have stressed the importance of implementing a meaningful collaboration between these entities, as envisioned in the NRCS Pest Management Standard.

NRCS has also collaborated with NGOs and grower associations in a number of other states including Michigan, Wisconsin, and North Carolina, leading to a significant growth in the use of EQIP for IPM practices, especially among small farmers and high-value specialty crop groups.⁵⁴ Many farmers have benefited from high-quality technical assistance and training provided by these organizations. However, in these cases, financial support came from grants outside of NRCS. More funding is also needed to support this kind of partnership, in which intermediary organizations assume more responsibility for project implementation.

Up-front Outreach and Planning Support Is Needed for Growers

As currently implemented, EQIP technical assistance funds are available to producers only if, and when, they are awarded a project contract. Growers who are unable to provide technical assistance on their own dime, must therefore rely on NRCS staff to provide whatever up-front advice, planning, and technical support they need to develop their initial conservation and IPM plans and EQIP applications. The development of the initial plan and proposal can be quite technical, requiring significant time and expertise—particularly for integrated pest management.⁵⁵ If both NRCS staff and the grower applicants are unfamiliar with IPM practices, prospects for incorporating sound IPM practices into the application are very unlikely.

In Michigan and North Carolina, where there has been a significant jump in EQIP funds allocated for pest management, growers benefited a great deal from the use of voluntary consultants, Cooperative Extension, and NGO support in the up-front development of more advanced IPM plans for inclusion in their EQIP applications.⁵⁶ The technical support and encouragement of these intermediary organizations played a critical

Connecticut: A Model Partnership

At the state level, NRCS in Connecticut has decided to use part of its technical assistance funding to develop a partnership with the University of Connecticut's (UConn) Cooperative Research, Education and Extension Service (CREES) and the Connecticut Agricultural Experiment Station. The agreement, which was first established in 2004, provides funding for CSREES to provide technical assistance to EQIP growers for IPM and nutrient management. Now in its third year, UConn Extension is essentially fulfilling the role that a private sector TSP would provide in other states. Notably, the level and quality of service is much higher than what TSPs provide in other states. Under this agreement, UConn Extension is providing weekly training and support service to growers in the first two years of enrollment and slightly less in year three. The focus of this training is to help growers adopt more advanced biological and cultural approaches to pest management over time, helping growers farmers acquire the expertise to implement IPM on their own over the long term.

This arrangement benefits both growers and NRCS. UConn's IPM specialists provide a high-quality service to producers. Because the agreement is based on CSREES contributing 50 percent of the funds and staff time from non-federal sources, NRCS is able to leverage its resources. Many more farmers in Connecticut are now able to take advantage of EQIP funding for pest management practices, with fund allocations growing from 0 percent in 2003 to 11 percent in 2005.

role in expanding pest management projects. Limited funding for this kind of intermediary organization remains a major impediment for expanding this type of partnership.

Outreach Is Necessary to Encourage Program Participation, Especially Among Specialty Growers

Many interviewees expressed concern that growers may not think of EQIP as a source of funding for pest management practices, particularly specialty crop producers. For example, a recent survey in Michigan showed that only 25 percent of vegetable and fruit growers were aware of the availability of EQIP incentives for IPM use.⁵⁷ Given EQIP's traditional focus on other conservation practices and low ranking priority and payment rates for pest management, this comes as no surprise. Yet if producers do not think of EQIP as a source of support for pest management, and do not ask for it, NRCS may not feel the need to provide it. Low levels of IPM "supply" and "demand" can therefore create a self-reinforcing cycle that makes it difficult to increase IPM adoption.

Outreach can break this cycle. Targeted outreach would be especially beneficial in priority regions where pest management activities have resulted in environmental impacts or regulatory pressure, or where producers are facing increasing demand from their buyers to practice IPM.⁵⁸

Where specialty crop groups and support organizations have been more actively engaging NRCS, such as in Michigan and Wisconsin, NRCS support for IPM and specialty crop producer participation has increased significantly. In Michigan, a significant outreach effort to vegetable and fruit producers by Cooperative Extension, asparagus and cherry grower associations, and the Center for Agricultural Partnership (CAP) was a major factor in doubling the number of projects funded and achieving a significant increase in incentive payments allocated for IPM.⁵⁹ Similarly, outreach to specialty growers by Cooperative Extension and CAP is helping to increase interest and demand from specialty crop growers in North Carolina. This has resulted in a more robust inclusion of IPM in the state's EQIP program. A similar story unfolded in Wisconsin, where active support and outreach by local university IPM experts and NGOs led to increased EQIP applications from specialty crop producers.

Proactive advertising and promotion on the part of NRCS can also make a huge difference. In the case of Connecticut, for example, NRCS actively promoted its IPM option in EQIP to a range of diversified growers through direct advertising and promotion, thus increasing IPM demand. Funding subsequently jumped from 0 percent in 2003 to 11 percent in 2005.

Of course, increasing outreach alone is not sufficient. If states do not also provide adequate ranking and incentive payment structures to specifically address the needs of specialty crop growers, as they did in Connecticut, no amount of outreach will elicit effective participation.

Diverse Stakeholder Participation Can Make EQIP Work Better for Pest Management

The experience of state NRCS programs in Michigan, Wisconsin, and North Carolina demonstrates the need and importance for specialty grower groups and supporting NGOs to engage with NRCS—both through their staff and advisory structures, the local work groups, and the state technical committees. When these groups have engaged more directly in the NRCS advisory process, important improvements have been made in the ranking, prioritization, and incentive payment structures for pest management. Stakeholders report that the response from NRCS has been very positive. Lacking the staffing resources needed to fulfill growing responsibilities, NRCS staff frequently welcome the input and support of a wide range of partners. More active outreach, however, is needed to include traditionally underserved grower constituencies, regulatory agencies overseeing pesticide-related issues, environmental organizations, and others in these advisory groups. Including these groups will undoubtedly improve the quality and effectiveness of EQIP's pest management support.

5. Conclusion and Recommendations

NRDC research has identified nine priority actions that will significantly improve NRCS's ability to promote IPM under EQIP and better help growers reduce hazards to health and the environment. The recommendations presented below will be most effective if adopted and implemented together. For example, improving EQIP project ranking systems without changing incentive payment structures to better meet the needs of specialty crop producers is not likely to generate significant improvements. Similarly, changing the incentive payment rate structures to encourage more advanced management practices without doing sufficient outreach or providing adequate technical assistance will likely fail to deliver the support that producers need. Furthermore, it is critical to implement the recommendations within a policy framework that seeks real reduction in risk and use of pesticides and that encourages more advanced IPM.

1. Implement IPM initiatives in priority regions. NRCS should identify priority regions around the country where IPM is needed to address pesticide-related environmental problems and where producers need help to comply with existing environmental regulations or prevent the need for new regulations. In these regions, NRCS should launch initiatives to better integrate IPM into EQIP and other conservation programs through revised ranking criteria, differentiated and adequate payment rates, the publication of IPM protocols, expert technical assistance, and partnerships with other organizations. Congress should task NRCS to implement such initiatives and should authorize funding for this purpose. In addition, NRCS should provide outreach to growers in these regions to ensure that they know IPM assistance is available. Through these initiatives, and the adoption of the recommendations listed here, NRCS should strive to increase EQIP allocations for pest management to at least 10 percent of program spending on average—an increase of more than threefold over current spending levels.

2. Recognize multiple benefits provided by IPM. NRCS should ensure that IPM is adequately ranked in terms of its positive impact on multiple resource concerns, including water, air, soil, habitat, and human safety. This will increase mitigation of these resource concerns through IPM.

3. Encourage increased environmental performance by establishing tiered payment rates for advanced IPM practices, including those for organic systems. Rates for specific advanced practices must be set sufficiently high to encourage the participation of diverse farmer groups, including specialty crop growers who face higher pest management costs, and tiered according to the level of management intensity and expected environmental performance. Expanding payments and practice standards for conversion to certified organic production would further accelerate the adoption of highly integrated systems with multiple conservation benefits. Payments for organic conversion are currently available in fewer than 10 states.

4. Improve the delivery of quality technical assistance by forging new partnerships to fill gaps in IPM expertise. Congress should authorize significant partnership and cooperation funds to support the implementation of cooperative projects and specialized technical assistance, including more coordinated support for IPM in high-priority regions. Partners should include Cooperative State Research, Education and Extension Service (CSREES), NGOs, and other public or private entities. These partners can help develop IPM protocols and tools and provide outreach, upfront pest management planning, ongoing IPM training, and technical assistance to farmers in specific geographic areas. Funding should be allocated from a dedicated source rather than NRCS' own budget, so the agency does not have an incentive to avoid spending these resources. Given the significant IPM experience that resides with many cooperative extension programs, NRCS should establish a more formalized partnership with this agency in particular, and both agencies should allocate specific funds for this purpose.

5. Increase reimbursement and increase performance expectations for Technical Service Providers (TSPs), and provide more training to TSPs in integrated pest management. NRCS should increase TSP reimbursement levels in order to adequately cover costs and attract a pool of expert IPM assistance providers. NRCS also should provide sufficient training and make qualification requirements more stringent, including establishing a new certification for experts in organic agriculture practices. More training is also needed for TSPs and other partners in the use and application of IPM as part of a comprehensive conservation plan that includes multiple, integrated conservation practices.

6. Prioritize integrated stewardship practices. Integrated pest management practices will be most effective when integrated with other farming practices, including irrigation, nutrient management, crop rotation, tillage, and animal husbandry. This can best be achieved by establishing EQIP project ranking criteria to prioritize multiple, synergistic land management practices (see Michigan case study, page 8). NRCS may also achieve this objective by providing set-aside funding for integrated land management practices that include pest management, following the example set in Delaware (see the case study on page 9).

7. Elevate national leadership to promote IPM within NRCS and increase state and local staff training and expertise in NRCS offices. National leadership and oversight at NRCS is needed to ensure that EQIP provides adequate financial and technical assistance for promoting IPM where appropriate and for ensuring that state and local offices have the information, tools, training, and expertise they need to deliver effective IPM assistance.

8. Revise NRCS national IPM standard to clearly promote pest prevention, pesticide use reduction, biological approaches, and use of least hazardous pesticides. The existing standard focuses predominantly on “end-of-pipe” risk mitigation of pesticide use, missing important opportunities for greater risk reduction.

9. Develop metrics for evaluating and monitoring IPM performance under Farm Bill conservation programs. NRCS should develop a means to score a pest management plan and its components along a continuum from chemically intensive treatment methods to prevention-based, non-chemical or biologically integrated practices. The score should reflect the quantity and hazard potential of the pesticides used, among other factors. Such a system would enable NRCS to more objectively rank EQIP proposals and, by aggregating scores, report on IPM performance over time and throughout regions.

Congress, NRCS, growers, and other stakeholders all have important roles to play in helping NRCS continue expanding its capacities. It is Congress, ultimately, that is responsible for ensuring that the agency has adequate funding, staffing, and guidance for achieving its mission. With the reauthorization of the Farm Bill looming, congressional action to help NRCS increase its capacity in this area is both timely and critical.

ENDNOTES

- 1 The \$786 million figure does not include technical assistance funds.
- 2 United States Geological Survey, *The Quality of Our Nation's Waters, Pesticides in the Nation's Streams and Ground Water, 1992–2001*, March 2006.
- 3 Ibid.
- 4 A comprehensive review of IPM support under CSP was beyond the scope of this analysis.
- 5 The Farm Security and Rural Investment Act of 2002, Section 1240B(e)(2).
- 6 Ibid., Section 1240A(3).
- 7 Proposed Rules, Environmental Quality Incentives Program, Federal Register, 14578 Vol. 70, No. 55, March 23, 2005.
- 8 NRCS Pest Management Policy, 190-GM, Amend. 6, November 2001. Policy states that “NRCS, Third Party Vendors, and other non-NRCS employees will incorporate IPM that strives to balance economics, efficacy, and environmental risk into planning alternatives where it is available. If commodity-specific IPM information is not available, NRCS, Third Party Vendors, and other non-NRCS employees will encourage the use of general IPM methods and principles, including pest prevention, avoidance, monitoring, and suppression strategies.”
- 9 The 2003 data source is: EQIP Program Administrative data, Farm Service Agency; 2005 data source is: Conservation Program Administrative data, Natural Resources Conservation Service ProTracts database. Data summary and analysis by Ralph Heimlich, Agricultural Conservation Economics (ACE), and Natural Resources Defense Council. This percentage is based on total funds that went to growers for conservation practices and does not include funds that went directly to technical assistance providers.
- 10 Ibid.
- 11 Ibid.
- 12 These numbers vary from official EQIP numbers since they exclude technical assistance funds.
- 13 <http://www.mt.nrcs.usda.gov/news/releases/equipweeds.html>.
- 14 The 2003–04 data source is: EQIP Program Administrative data, Farm Service Agency; 2005 data source is: Conservation Program Administrative data, Natural Resources Conservation Service ProTracts database. Data summary and analysis by Ralph Heimlich, Agricultural Conservation Economics (ACE), and Natural Resources Defense Council.
- 15 USGS, *Pesticides in the Nation's Streams and Groundwater 1992–2001—A Summary*, March 2006.
- 16 <http://pubs.usgs.gov/fs/2006/3028/>.
- 17 United States Geological Survey, *The Quality of Our Nation's Waters, Pesticides in the Nation's Streams and Ground Water, 1992–2001*, p. 121. <http://ca.water.usgs.gov/pnsp/pubs/circ1291/showdescription.php?chapter=6&figure=5>.
- 18 Conservation Program Administrative Data, Natural Resources Conservation Service, ProTracts Database. Data summary and analysis by Ralph Heimlich, Agricultural Conservation Economics (ACE), and Natural Resources Defense Council. Percentages are based on total funds that went to growers for conservation practices and do not include funds that went directly to technical assistance providers.
- 19 http://www.nrcs.usda.gov/programs/csp/pdf_files/FY_2005_CSP_Payments_Approved_by_State.pdf.
- 20 United States Department of Agriculture, Natural Resource Conservation Service. ProTracts database October 1, 2005. Analyzed by Ralph E. Heimlich, Agricultural Conservation Economics (ACE).
- 21 NRCS Pest Management Policy, revised 2001, section 404.30 (d).
- 22 Ibid.
- 23 State of New York, NRCS office, Electronic Field Office Guide, Section V, A. Conservation Practice Physical Effects.
- 24 M.J. Brewer, R. J. Hoard, J.N. Landis, and L.E. Elworth, “The Case and Opportunity for Public-Supported Financial Incentives to Implement Integrated Pest Management,” *Journal of Economic Entomology*, Vol. 97, No. 6, p. 1784.
- 25 ftp://ftp-fc.sc.egov.usda.gov/CT/equip/2004_CT_EQIP_Approved_Practice_List.pdf.
- 26 These include application of pesticides using a retrofitted sprayer, application to foliage only using a laser guided precision sprayer and spot treatment on less than 20 percent of field, as described in Massachusetts 2006 EQIP Pest Management Calculator.
- 27 In the case of Pennsylvania, it should be noted that it recently awarded more than \$650,000 to farmers for IPM as part of its Agriculture Management Agency (AMA) Program.
- 28 See ftp://ftp-fc.sc.egov.usda.gov/IL/farbill/2006_NonLivCriteria.pdf cite website with ranking procedure.
- 29 Ibid.
- 30 California Air Resources Board, Almanac Emission Projection Data, 2005 Estimated Annual Average Emissions, San Joaquin Valley Air Basin, 2006.
- 31 ftp://ftp-fc.sc.egov.usda.gov/NV/web/equip/FY06_FundsAllocation.pdf.
- 32 ftp://ftp-fc.sc.egov.usda.gov/DE/programs/equip/2006/equip_06_icm_ranking_points_de.xls.
- 33 General Accounting Office, *Agricultural Pesticides, Management Improvements Needed to Further Promote Integrated Pest Management*, Report to the Chairman, Subcommittee on Research, Nutrition and General Legislation, Committee on Agriculture, Nutrition and Forestry, US Senate, August 2001. According to the GAO report, the introduction of pheromones in a USDA research project with apple and pear growers in Washington, Oregon, and California reduced the need for chemical pesticides by at least 80 percent.
- 34 The policy, revised in 2001, states that “NRCS, Third Party Vendors, and other non-NRCS employees will incorporate IPM that strives to balance economics, efficacy, and environmental risk into planning alternatives where it is available. If commodity-specific IPM information is not available, NRCS, Third Party Vendors, and other non-NRCS employees will encourage the use of general IPM methods and principles, including pest prevention, avoidance, monitoring, and suppression strategies.”
- 35 The policy requires the use of one or more unspecified mitigation practices in cases where growers are using “pesticide alternatives with a WIN-PST soil/pesticide Hazard risk rating of ‘Extra High,’ ‘High’ or ‘Intermediate.’ This may or may not involve the use of reduced-risk pesticides.
- 36 In Indiana, however, growers are required to use prevention practices and avoid unnecessary and poorly timed applications—one step beyond what is required by the NRCS national policy.
- 37 Natural Resources Conservation Service, USDA, ProTracts data, processed by Ralph Heimlich, Agricultural Conservation Economics.
- 38 Ibid.
- 39 The Farm Security and Rural Investment Act of 2002, Section 1240B(e)(2).
- 40 Cost and Return Studies, Dept. of Agriculture and Resource Economics, University of California, Davis. These studies base pest management costs on crop-specific IPM protocols published by the University of California’s Integrated Pest Management Program. Data were taken from studies published in 2001 through 2005. See <http://www.agecon.ucdavis.edu/>.
- 41 NRCS Delaware Pest Management Fact Sheet, ftp://ftp-fc.sc.egov.usda.gov/DE/programs/equip/2006/equip_06_pest_management_tiers_de.pdf.
- 42 2005 ProTracts data provided by ACE Consulting.
- 43 ftp://ftp-fc.sc.egov.usda.gov/DE/programs/equip/2006/equip_costList_12_21_06.xls.
- 44 A maximum of \$15 is paid out for any combination of the practices described under Tier II. There is a maximum of 1,000 acres per Farm Bill cycle that can receive tier II incentive payments.
- 45 See 2006 Massachusetts EQIP Pest Management Guide for a complete list.
- 46 Interview with NRCS staff.
- 47 Soil and Water Conservation Society (SWCS), *Realizing the Promise of the Farm Security and Rural Investment Act of 2002*, p.15.
- 48 Center for Agricultural Partnerships, *Limited Access: How a Lack of Conservation Planning and Technical Assistance Is Limiting the Ability of Small Farmers and Specialty Crop Producers to Participate in Federal Conservation Programs*, December 2005, p. 1.
- 49 For more detailed critiques and recommendations for the TSP Program, see SWCS, *Realizing the Promise* and CAP, *Limited Access*.
- 50 CAP, *Limited Access*, p. 4.
- 51 Ibid.
- 52 <http://techreg.usda.gov/>.

53 NRCS Pest Management Policy, revised 2001.

54 For more information on the Michigan case, see Brewer, et al.

55 While growers need not develop a comprehensive plan for their EQIP application, they must have enough technical advice to understand which practices are most complementary and which IPM practices would be most beneficial to apply for under the EQIP program. Anecdotal evidence indicates that many growers who apply for IPM, for example, may not be applying for support for other complementary land management practices that would make their IPM practices more effective. Also, in states with more advanced IPM component practices, growers need sound technical expertise regarding which component practices are most relevant to their production needs.

56 Brewer et al., 2004.

57 Brewer et al., 2004.

58 Sysco, a \$30 billion food service company, is now requiring all of its vegetable growers that produce for its processed food market to implement IPM. Other companies, including Unilever, DelMonte, and General Mills, encourage their producers to adopt IPM practices.

59 Brewer et al., 2004.