



Whole Farm Planning:

A Survey of North American Experiments

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"I've always believed that if you envision something that hasn't been, that can be, and bring it into being, that is a tremendously worthwhile thing to do."

- Henry A. Wallace

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Preface

Farm planning has been championed by land grant universities and the Extension Service since the turn of the century. The predominant focus of early planning efforts was on improving the farmer's management skills and the farm's natural resources, especially soil. Some farm planning experts achieved legendary status, as the

simple application of sound physical, biological and financial production principles they espoused allowed many farms to endure the bad times and prosper during the good times.

As farmers and ranchers approach the new millennium, the rewards for effective planning have risen and extend beyond the farm. Heightened competition, less commodity program support, and robust public demand for clean water and air are pushing operators to manage their natural and other resources with even greater care. The joining of economic and environmental requirements has spawned a new era in farm planning. Operators must not only find ways to keep the cost of production low by conserving farm resources, improving their management skills, and identifying new crops and markets, but, increasingly, reduce pollution that travels beyond the farm's boundary. Simultaneously, the explosion of low cost information technologies spurred by the electronic revolution makes new planning resources, such as powerful home computers, digitized maps, and Internet access, accessible that were unfathomable a few years ago. These broader requirements, coupled with the improved technology, has expanded interest in a concept called "whole farm planning (WFP)," a concept that includes all farm operator goals, farm resources, and the environmental effects of production on and off the farm.

Whole Farm Planning: A Survey of North American Experiments is the first of two reports that describe the key features of nine WFP experiments in the US and Canada. This report briefly describes each of the efforts to draw implications for public policy that will allow WFP to reach its full potential in helping farmers satisfy their personal goals while protecting the environment for others. The findings in this report display a rich diversity of WFP approaches. The second (forthcoming) report will provide more extensive detail on each of the approaches as well as contact information. The two reports are the first major survey and analysis of WFP efforts. The Henry A. Wallace Institute does not advocate one approach over another. It does, however, advocate the development of mechanisms, such as WFP, that bring all benefits and costs of farming into operator decisions so that long term societal welfare can be enhanced.

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Executive Summary

In the past several years, USDA, farm organizations, and farmers themselves have endorsed and promoted the concept of whole farm planning. Used as a tool that encourages farmers to view and manage their farms as integrated systems—and to identify the effects that those systems have on environmental and other matters beyond the farm gate—whole farm planning allows farmers to assess their resources, long- and short-term goals, conservation objectives and many other concerns. Accordingly, whole farm planning has been the focus of a number of local and regional programs that help farmers design and implement plans for their farms.

But what is the nature of these programs? What, precisely, are they geared to achieve? This report examines nine programs that promote whole farm planning, in an effort to determine how they operate, who they are trying to reach, what they are seeking to achieve—and how government may assist their efforts, and others, to promote whole farm planning nationwide.

A striking characteristic of whole farm planning is that it has not, by any means, attracted a uniform constituency. Although they agree that whole farm planning is desirable, different groups in the agricultural community have substantially different reasons for backing whole farm planning, ranging from improving coordination of government programs to preserving specific natural resources. These different agendas have naturally colored the philosophies, approaches and goals that various programs have adopted in pursuit of whole farm planning.



Many farmers use resources such as private consultants and extension agents, to write their plans and to determine the impact that their plans are having on their farm.

Photo courtesy of the
Agricultural Research
Service, USDA.

Some of the programs surveyed for this report were instituted as a hedge against future government regulation; others for environmental protection. Some focus on helping farmers learn to write their own, personalized whole farm plans; others write the plans for farmers to use. Some have offered farmers direct funding to implement plans; others have not. Some are run by the public sector; others by the private sector. Whatever else may be inferred from the research conducted for this report, it is apparent that whole farm planning programs have not adopted, and will not adopt, a single method of approaching and achieving planning goals. Indeed, the goals themselves, whether protection of natural resources or increases in farmers' profits, vary from program to program.

Regrettably, a uniform characteristic among the programs is a weakness in their ability to assess the success of the whole farm plans that have been implemented. Additionally, and crucially, the programs have made virtually no provision for assessing themselves. By providing additional oversight and guidance, state and local governments can help to address problems such as these, and to advance the cause of whole farm planning in general. It is important to stress, however, that because whole farm planning has such a diverse constituency, and because the programs involved espouse no single approach to whole farm planning, government cannot take one direct path to fostering its development. Certainly, the role of regulation is crucial in spurring reluctant farmers to act—but it is not, and should not be, the sole or even the most important tool the government can use to promote whole farm planning. Of key importance, in our view, is well conceived and well executed assistance in the areas of training and research. These activities will ultimately lower the costs and increase the farmer and environmental benefits of such planning. Accordingly, we have concluded that to best promote whole farm planning, government can:

- help train farmers and those who work with farmers to look at the farm as a system;
- assist in research on farming systems;
- offer new streamlined frameworks for advancing and instituting whole farm planning;
- seek to improve coordination between programs and agencies;
- provide a statutory base for moving the nation's agricultural system toward whole farm planning;
- target a very limited number of regions to receive public funding for writing whole farm plans, implementing recommended practices and monitoring the results; and
- ensure that program requirements are flexible enough to allow for innovative practices and cost control.

By adopting these measures, government can help ensure that whole farm planning will, with time, become a permanent fixture on the American agricultural landscape.

1) Introduction

Virtually unheard of a decade ago, whole farm planning is a process that encourages farmers to manage their farms as full integrated systems, so that they may better assess their resources, long- and short-term goals, the environmental impacts of their operations beyond the farm gate and other concerns. In the past five years, there has been an explosion in the number and variety of groups in North America that endorse some variant of this new planning tool:

- 1992 The Watershed Agricultural Council of New York City Watersheds Program and the Ontario Farm Environmental Coalition's Environmental Farm Plan, two of the most widely recognized whole farm planning efforts, were established by farm organizations.
- 1993 The 1993 National Performance Review (NPR) recommended that USDA develop consolidated farm plans.
- 1995 The Natural Resources Conservation Service (NRCS) of the US Department of Agriculture (USDA) began studying whole farm and ranch conservation planning to follow up on the NPR's recommendations. The service initiated pilot programs in six states (Georgia, Idaho, Minnesota, Nebraska, New York, and Pennsylvania) to develop a process for devising comprehensive plans.

During the 1995 Farm Bill debate, whole farm planning was endorsed by many agriculture and environmental groups, as well as by Congress and the Clinton administration.

In addition, diverse groups in a 1995 Keystone Dialogue drafted a consensus statement supporting the general concept of comprehensive farm planning.

- 1996 USDA's Interagency Sustainable Agriculture Working Group stated in its report "Our nation's movement toward a more sustainable agriculture needs to include the development of integrated whole-farm and whole-ranch system approaches that balance the long-term environmental, economic and social implications of agricultural practices." The findings of this report were endorsed by the Secretary of Agriculture.

Obviously, whole farm planning is enjoying ever-greater acceptance among the farmers, industry, government program staff and legislators across the United States and Canada. But how are efforts to implement whole farm planning faring? What have they achieved—and what have they failed to achieve? How can they be improved? The aim of this report is to provide comprehensive information on the current state of whole farm planning policy, specifically as it affects nine key state and regional efforts. Further, the report uses this information to make recommendations about what the implications of these programs are for future programs, and for promoting whole farm planning nationwide. A special concern is how government policy can best serve the interests of whole farm planning in the years to come.

The Whole Farm Planning Paradox

Despite the growing consensus among farmers, farm groups and government agencies that whole farm planning is a legitimate policy tool, there is considerable disagreement on what whole farm planning means, beyond the broad definition offered above. There is disagreement on what should be included in a whole farm plan: should it encompass economic, social, environmental and production goals, or should it address only natural resource concerns? There is disagreement on the primary purpose of whole farm planning: is it the process of planning or

is it the plan itself? There is even disagreement on the name. Should the process be called whole farm planning, or should it be known as comprehensive farm planning, ecological planning, holistic management, resource management planning, or environmental farm planning?

This lack of consensus is in part based on the fact that the seemingly broad-based support for the concept of whole farm planning comes from individuals and groups with markedly different priorities and ideas about what the ultimate goals of whole farm planning should be. Some groups hope to realize greater cooperation among government programs through whole farm planning efforts; others seek to free farmers from burdensome regulation with regard to environmental protection; others feel that regulated, mandatory whole farm planning is a key route to achieving that protection. Below are brief descriptions of the four agendas that form the basis of support for whole farm planning in America:

COORDINATION AMONG EXISTING PROGRAMS The primary agenda of some whole farm planning advocates is to promote greater coordination among the different conservation, commodity and regulatory programs that farmers face. The 1993 National Performance Review, which noted that a "bewildering array of laws, regulations and interagency jurisdictions frustrates farmers' efforts to comply with existing environmental and conservation laws and regulations," recommended that USDA coordinate with other federal agencies and adopt consolidated farm management plans. Such plans would combine the requirements of all federal programs that farmers deal with into a single regimen (NPR, 1993). USDA-Natural Resource Conservation Service's Whole Farm and Ranch Conservation Planning Pilot Program, which began in 1995, was the agency's attempt to comply with the NPR (Wright, 1995).

Advocates of improved coordination tend to espouse this kind of "one plan" approach, which does not fundamentally change either existing programs or conservation goals. They contend that given sufficient coordination among agencies, all goals can be met with a single plan.

VOLUNTARY PLANNING For some groups, the most important benefit of implementing whole farm planning regimens would be to shift the burden of responsibility for natural resource protection from the hands of regulators into the hands of farmers, by encouraging the widespread adoption of voluntary, incentive-based conservation plans. Many farm organizations have recognized that unless farmers actively demonstrate a good-faith effort to improve environmental conditions on and off their farms, they will be subject to increasingly strict regulatory requirements. Several of the programs we examined for this report were formed by coalitions of agricultural organizations that were concerned about possible new regulations that would affect farmers in their area. They managed to get the farm planning programs authorized as a preemptive strategy (Sheradin, 1997; Rudy, 1997).

Indeed, a widespread resistance to environmental regulation cannot be overlooked—many farmers consider such regulation to be an intrusion into what was once considered legitimate behavior. Given this attitude, and given the physical difficulty in effectively regulating a diffuse industry responsible for pollution that cannot easily be traced to a single source (non-point-source pollution), many observers have put voluntary programs emphasizing education and technical assistance at the top of their agendas. They believe that such programs may be less costly and ultimately more effective than additional coercive measures the government might take (Santopietro, 1995; Coburn, 1996).

MANDATORY PLANNING A third group of interested parties wants to require farmers to implement whole farm plans that deal with the environmental impacts of their operations beyond farm borders. This group does not propose plans as a voluntary option. Rather, the idea is that whole farm plans will force farmers to include pollution minimization strategies as a part of their normal farming operations. The plans could be certified by a third party to ensure that they are appropriate, and the resources of concern on and off the farm would be monitored. This approach to farm planning is perceived as one way of ensuring that farmers make at least a minimal effort toward natural resource protection. It is intended to target farmers who are aware of

environmental problems associated with their operations but have little intention of changing their current practices (Duff et al., 1992).

Generally, the advocates of this approach have concerns about water quality at the top of their agenda. Most of the existing whole farm planning programs that have come out of this agenda are in fact narrowly targeted to water quality. For example, a 1994 law in Kentucky requires all farmers with farms larger than 10 acres to develop and implement a plan that uses best management practices (BMPs) from a statewide manual to protect water quality. A producer's notebook that uses a series of questions to help the farmer choose from an array of appropriate BMPs has been devised. All farmers have five years to implement a plan. Enforcement is based on a bad actor protocol: regulators will respond to complaints and documented water quality problems. At the end of five years, if a watershed is still environmentally damaged, all farmers will be checked to see if they have correctly implemented an appropriate plan (Wells, 1997).

PERSONAL OBJECTIVES Many sustainable agriculture advocates, and certain individual farmers who are implementing whole farm plans, maintain that whole farm planning can be used as a tool not only to protect the environment and improve farming practices but to enhance farmers' well being. This group does not focus on regulatory requirements or even public policy. Rather, it subscribes to the concept that the act of creating a whole farm plan will help farmers make better decisions by having them think systematically about available resources, alternative solutions and potential impacts of their decisions (Kemp, 1996). The emphasis in this agenda, however, is on the farmer's personal planning objectives which may be financial, quality of life (i.e., additional leisure time), or environmental, and may not correspond to public policy objectives.

Given these four very different agendas, it is not surprising that two attempts in 1995 by the Keystone Center and the Wallace Institute, to bring farmers, farm groups, and other stakeholders together to uncover a consensus vision were unable to reach agreement on fundamental issues. That is in part why, in this report, we have chosen to look at nine programs with different styles of whole farm planning—they reflect the realities of whole farm planning's divided constituency. We selected programs that (1) were writing plans targeted to more than one resource or goal and (2) included conservation of natural resources as a goal. The programs surveyed were: the Ontario Environmental Farm Plan (Ontario, Canada); Holistic Management (international); whole farm plans written by independent crop consultants (not technically part of a program, but treated as one for the purposes of this report); Agri-21 Farming Systems (Tennessee Valley Authority region); the Whitewater Watershed Whole Farm and Ranch Planning Pilot Program (Minnesota); the Northeast Organic Farming Association of New York's Organic Certification Program (New York); the Pennsylvania One Plan (Pennsylvania); the Watershed Agricultural Council of New York City Watersheds, Inc. (New York); and the Idaho One Plan Project (Idaho).

Methodology of the Report

The nine programs were chosen with an eye to regional diversity and differences in leadership, size of the program, type of planning process and goal for the program. The nine as a whole are representative of efforts going on around the country. Not included in this report are many significant efforts. Only one of the six pilot efforts run by USDA-NRCS is included here, for instance, and hundreds of small watershed programs that include farm plans have been bypassed. Also not included are significant efforts going on in other countries, such as the Landcare movement in Australia (Garret, 1993; Campbell, 1995). Nevertheless, the nine examples contained here represent significant regional or state efforts in North America.

For this report, the author interviewed leaders (generally the program managers) of each of the nine programs, by telephone. The interviews were all conducted in January 1997, using a standard questionnaire with 87 questions on all aspects of the program. The questionnaire was reviewed prior to the surveys, a trial run was conducted on a volunteer and modifications were made to the questionnaire based on the test. The questionnaire was sent out to interviewees in advance of the interview. The interviews ranged in time from about 45 minutes to 1½ hours, depending on the complexity of the program surveyed and the degree to which the questionnaire

applied to the program. Additional information on the programs was gathered from public documents put out by the programs. This report highlights how the programs are responding to nine questions:

1. What is the program's goal—to improve on-farm systems or to reduce off-farm impacts of agricultural production?
2. Who are the programs targeting—farmers who are causing the worst problems or farmers who are receptive to planning efforts?
3. Who is leading the program and who is funding it?
4. What stakeholders are included in the program and how are they included?
5. Who writes the plan and is it evaluated prior to implementation?
6. Is the plan monitored and evaluated?
7. Is the planning program monitored and is progress evaluated?
8. What incentives are used to stimulate farmer's interest in the program?
9. Does the program move farmers toward sustainable agriculture?

In turn, the manner in which the nine programs addressed these questions led to conclusions regarding:

1. The suitability of whole farm planning approaches, given a specific program's objective and targeted farmer group.
2. The role of government (federal, state and local) to encourage wider adoption of whole farm planning.

It should be stressed that this report does not aim to evaluate how well the programs are actually meeting their stated goals. This question was beyond the scope of the report, and many of the programs are too new to make comparisons of their accomplishments with the other programs meaningful. This report more or less assumes that the programs will accomplish what they are setting out to do. However, the surveys did reveal that certain aspects of the programs (i.e., monitoring and evaluation) were generally weak or non-existent. Critical evaluations of the programs should be made if any them are to be used as role models for future efforts.

2) Nine Whole Farm Planning Programs

Agri-21 Farming Systems—Southeastern United States

Agri-21 farming systems was a five-year pilot program serving 41 farm families in the southeastern United States. It was the result of a partnership among the land grant universities in the Tennessee Valley Authority (TVA) region (which includes all of Tennessee and parts of Kentucky, Virginia, North Carolina, Georgia, Alabama and Mississippi), the Tennessee Valley Region Association of Demonstration Farm Families and the TVA. The program was administered and funded primarily by the TVA. The program's goal was to demonstrate the practical application of a whole farm planning process that takes into account the financial, environmental, sustainable agriculture and personal goals of farm families.

Participating families worked one-on-one with staff from their university's extension service and the TVA. They received incentive payments of \$1,000 per year to participate and for record keeping, and up to \$3,500 per year in cost-sharing funds to implement the practices recommended in their plans. Due to changes in TVA's overall program direction in agriculture, as well as lack of funding, the program was discontinued in May 1997.

Holistic Management[®]—International

Holistic Management¹ is a training program offered by the Center for Holistic Management in Albuquerque, New Mexico. The purpose of the program is to help individuals in all occupations, not simply farmers, make decisions that are economically, socially and environmentally sound, and to train them to evaluate the problem in order to make those decisions in a consistent manner based on their observations. Holistic Management training is available internationally.



A Texas cotton grower working with an entomologist and crop consultant to inspect fields.

Photo courtesy of the Agricultural Research Service, USDA.

Participants new to Holistic Management typically start with a three-day workshop led by a certified instructor, where they learn to develop an overarching goal for their operation and a plan out of this goal. The program strongly encourages networking and the formation of support groups. Participants pay the cost for attending the workshop themselves; no cost-sharing or incentive payments are offered.

Idaho One Plan Project—Idaho

The Idaho One Plan Project is a five-year pilot project that is run jointly by government agencies, commodity groups and grower associations. It features a computer-based, interactive system, available through the Internet (<http://www.oneplan.org>), that helps farmers develop a whole farm plan capable of satisfying all of the local, state and federal regulations applicable to their farms. The website is currently operational, and about a third of the information and worksheets needed to create a plan were complete at the time of the interview (staff expect it to be 90 percent complete in 1998). The greatest challenge in developing this project, and perhaps one of its chief benefits, has been for the different government agencies to integrate all of their programs into one system.

The project's staff expect that their effort will appeal to farmers because, by providing more coordination among different programs and agencies, it will reduce the time, expense and uncertainty of the existing system. Although the project will not offer any cost-sharing or incentive payments to farmers, it will provide them with information on other programs that do so, as well as information on how to apply to them.

Independent Crop Consultants—Availability Varies

Independent crop consultants are generally hired directly by farmers to assist in farm planning, soil and water testing, designing conservation practices, scouting for pests and other farm management activities. Traditionally, consultants have been hired to increase the farmer's profit margin, but increasingly farmers are using their services for conservation efforts. Given cutbacks in federal and state funding for conservation assistance, independent crop consultants are likely to be used more often by government programs and by individual farmers to provide conservation technical assistance. Some crop consultants are interested in whole farm planning and are beginning to offer the farmers that they work with services that go beyond nutrient and pest management. However, there is no uniform training available to them on this broader set of topics.

NOFA-New York's Organic Certification Program—New York State

The Northeast Organic Farming Association-New York (NOFA-NY) requires organic farmers in New York State to write a farm plan as a part of its organic certification process. The plan must pertain to the entire farm and follow set standards for the production system, use of manure and chemicals, and storage of hazardous materials.

When NOFA-NY receives a farmer's application for certification (which must include the farm plan), an inspector goes out to the farm to examine the operation, specifically targeting areas that would affect eligibility for certification, such as runoff, manure handling and use of chemicals. The inspector's report goes to a review board that looks over both the farm plan and the report, to ensure that the plan meets NOFA-NY's organic certification standards.

NOFA-NY does not offer any cost-sharing arrangements or incentive payments for its farm plan. However, NOFA-NY has instituted a mentoring program that pairs a new farmer with an established farmer to write a farm plan. NOFA-NY also offers workshops and classes on various issues of concern to organic farmers and has offered workshops that deal specifically with writing a whole farm plan.

Ontario Environmental Farm Plan—Ontario, Canada

The Ontario Environmental Farm Plan Program is intended to instill in farmers the ability to evaluate the impact of their farming practices on the environment. It is an attempt by a coalition of agricultural interests to actively protect the environment by encouraging farm plans, and to prevent more stringent regulations on agricultural activities. The program is administered by the Ontario Farm and Environmental Coalition, which consists of farmers and farm organizations, and is publicly funded through the year 2000.

The program is designed to be a user-friendly tool that assists farmers in developing their own plans. Participating farmers take part in two one-day workshops, the first of which helps them to complete reviews of their farms. After this workshop, farmers complete up to 23 risk-assessment modules, ranking their current practices from 1 (poor) to 4 (best). The second workshop prepares farmers to develop action plans to address practices that have received poor or fair ratings in the modules. This workshop trains farmers to analyze the identified problems and to rank them by priority. The farmers' action plans are reviewed by a trained committee of local farmers, who may make some suggestions. Plans that are reviewed and deemed acceptable are eligible for a one-time incentive payment of up to \$1,500 (Canadian). About 7,600 Ontario farmers had attended the workshops and picked up the workbook at the time of the survey. Some 3,800 of them had completed the workbook and turned it in for evaluation.

Pennsylvania One Plan—Pennsylvania

The Pennsylvania One Plan Program is an attempt to resolve conflicts among government programs and to make farm conservation plans more comprehensive. It is funded by EPA 319 funds, USDA-NRCS and, in some areas, Chesapeake Bay funds. It is administered by the Pennsylvania Association of Conservation Districts.

A planning coordinator (generally NRCS staff) works with individual farmers to develop conservation plans for their farms and brings in experts from other programs to provide technical assistance in other areas. At the time of the survey, about 50 farmers had completed a plan. The Pennsylvania One Plan does not directly offer any cost-sharing arrangements or incentive payments, but participants are given high priority for USDA cost-sharing. The program's staff also refers them to other sources of funding, such as the US Fish and Wildlife Service's Partners for Wildlife Program.

Watershed Agricultural Council of New York City Watersheds, Inc.—Eastern New York State

The New York City Watersheds, comprising eight counties in eastern New York State, are collectively the largest source of drinking water in the world, serving more than nine million people in New York City. The Watershed Agricultural Council (WAC), which is made up of 20 farmers and agribusiness people and a representative from New York City's Department of Environmental Protection (DEP), came into being as a response to Clean Water Act provisions which required New York City either to install a filtration plant (an option that proved prohibitively expensive) or adequately protect its drinking water source. The Watershed Agricultural Council successfully held off stringent land use regulations proposed by the US Environmental Protection Agency (EPA) to protect water quality in the watersheds by developing a program that aggressively promotes whole farm plans on the watershed's 450 farms. The program is funded primarily by New York City's DEP.

The program is administered by the Watershed Agricultural Council and the plans are written by teams made up of traditional technical assistance providers (for example, NRCS or Extension Service). At the time of the survey, 121 farms had enrolled in the program. The program pays 100 percent of the cost for any practices farmers implement as part of their plans.

Whitewater Watershed Whole Farm and Ranch Planning Pilot Program—Southeastern Minnesota

The Whitewater Watershed Whole Farm and Ranch Planning Pilot Program was one of NRCS' six whole farm planning pilot projects. A one-year program that officially ended in the fall of 1996, it was administered and funded by USDA-NRCS. Five farmers currently have plans written by the program. However some additional farmers are still using the process to write plans. The program helped farmers to set goals, inventory resources, complete assessments of their farming conditions, and develop and evaluate alternatives. It used a rating system like Ontario's to identify areas of concern on the farm, and included a section on goal setting similar to that offered by Holistic Management (some of the planning staff had gone through Holistic Management training).

By design, the program did not offer cost-sharing or incentive payments. Participants were, however, directed to appropriate state, local and federal funding to implement practices recommended by their plans. In contrast to conventional USDA assistance, the program also helped farmers learn to do their own planning, by providing them with all of the information they needed to write a whole farm plan in a format that any of them could use.

3) Program Design: Three Approaches to Whole Farm Planning

Although individual whole farm planning programs vary, they generally are built around one of three basic approaches: what can be called the expert approach, the assisted decision approach, and the personal planning approach. These three approaches differ in three key regards: who leads the plan-writing process, how much one-on-one assistance the farmer receives and the resources (funds and staff) that a program uses to write a whole farm plan.

The Expert Approach

Table 1: Programs taking the expert approach.

PROGRAM NAME	NUMBER OF HOURS FARMERS HAVE SPENT WORKING INDEPENDENTLY ON THEIR PLAN	NUMBER OF HOURS PROGRAM STAFF HAVE SPENT ON PLAN	NUMBER OF FARMERS ELIGIBLE FOR THE PROGRAM	NUMBER OF FARMERS WITH PLANS	PROGRAM BUDGET
Agri-21	4 hours	60 hours	100 farm families in TVA region	41 farm families ¹	\$5 million for 5 years
Independent crop consultants	0 hours	6 hours per 100 acres <u>plus</u> an additional 3-10 hours working with the farmer on the plan	Any farmer	40-120 farmers per consultant ²	No data
New York City Watersheds	0 hours	300 hours	450 farmers ³	340 farmers	\$35.2 million for 5 years
Pennsylvania One Plan	0 hours	100 hours	Any farmer in Pennsylvania	50 farmers	\$30,000 per year

¹The pilot program had intended to enroll 100 farm families before it was discontinued.

²The number of farmers served depends on the number of farmers wanting to hire a consultant and the number of clients the consultant wants to work with. One consultant surveyed has worked with 120 farmers; another has worked with 40-50 farmers.

³Farmers earning over \$10,000 per year from farming.

Four of the programs examined in this report—the Pennsylvania One Plan, independent crop consultants, the New York City Watersheds Program and the Agri-21 Farming Systems Program—have taken an expert approach to whole farm planning [Table 1]. Instead of teaching farmers to write their own plans, the programs have used an "expert" or team of experts to assess the resources and the farmer's needs, as well as write a plan for the farmer. This approach has traditionally been used by government programs that provide technical assistance to farmers and is also used by independent crop consultants. The managers of several of the programs we surveyed reported that they chose to take this approach because farmers are comfortable with it (Sheradin, 1997). Other surveys have, in fact, indicated that farmers are generally satisfied with the assistance provided by staff in programs that use this approach (Kraft, 1996).

Although the degree to which the farmer is involved in writing a plan varies by program and by farmer, in general the farmer has the least responsibility for writing a plan in programs that take the expert approach. Of the four programs we surveyed that fell in this category, only Agri-21 required farmers to do any independent work on their plans.

The amount of time spent assisting farmers with their plans varied among programs taking the expert approach, but was greater than that of any other approach. We found that, the staff of programs that take the expert approach generally spent 60-300 hours working on a particular farmer's plan.

The estimated per-farmer cost of each of the programs, which includes staff, materials, and overhead was generally higher than the other approaches. It came out to \$3,000 per farmer for the Pennsylvania One Plan, \$16,906 per farmer for the New York City Watersheds Program, and \$99,451 for the Agri-21 Farming Systems Program. Program budgets calculated this way may also not reveal the full cost of planning, as some programs rely on staff and resources that are not funded by the program to write the plans².

STRENGTHS OF THE EXPERT APPROACH

- Experts can bring a depth of technical knowledge to specific parts of the plan in question, especially in areas of economics, soil sciences, wildlife management and agricultural engineering that are beyond the abilities or experiences of most farmers.
- This approach requires the least independent work from farmers, and provides them with a considerable amount of personal assistance (up to 300 hours in the New York City Watersheds Program).
- By working closely with a farmer, an expert can design a plan that meets the unique needs of that farmer. A more formalized or general process may not be as precise.

WEAKNESSES OF THE EXPERT APPROACH

- If farmers are left out of the decision-making process, the resulting plans may not adequately meet their needs or desires and may never be implemented. All of the programs taking the expert approach reported that more than half the time their staff spent on a whole farming plan did not involve the farmer who was to implement that plan.
- This approach is more time consuming and expensive than others, as it requires hiring enough staff to visit farms and write plans for farmers. If public funds are cut, it is likely that either the quality of the plans will suffer or that fewer farmers will be served.
- Experts must have access to a great deal of a farmer's information if they are to provide a truly useful service. However, a number of farmers will not participate in voluntary USDA conservation programs that require plans because they have negative attitudes about government (Kraft, 1996; USDA, 1996c). Programs taking the expert approach therefore rely on building trust between farmers and experts or on regulatory "sticks" that will require farmers to participate.

The Assisted Decision Approach

Three of the programs surveyed for this report take the assisted decision approach: the Ontario Environmental Farm Plan, the Idaho One Plan and Whitewater [Table 2] (because the Idaho One Plan Program is still being developed, it had not officially produced any plans at the time of the survey).

Table 2: Programs taking the assisted decision approach.

PROGRAM NAME	NUMBER OF HOURS FARMERS HAVE SPENT WORKING INDEPENDENTLY ON THEIR PLAN	NUMBER OF HOURS PROGRAM STAFF HAVE SPENT ON PLAN	NUMBER OF FARMERS ELIGIBLE FOR THE PROGRAM	NUMBER OF FARMERS WITH PLANS	PROGRAM BUDGET
Idaho One Plan	No plans written yet	No plans written yet	No plans written yet	No plans written yet	\$150,000 for 5 years
Ontario Environmental Farm Plan	8-10 hours to go through the workbook on their own	10 hours class time (serving more than one farmer) <u>plus</u> about 1 hour follow up per farmer	50,000 farmers ¹	3,800 farmers	\$5.6 million per year (Canadian dollars) ²
Whitewater	Plan takes 40 hours no matter who writes it	Plan takes 40 hours no matter who writes it	600 farmers	5 farmers	No data

¹All farmers in Ontario.

²This figure is in effect starting in 1998; from 1993-1997 the budget was \$8 million (Canadian) per year.

Programs using the assisted decision approach help farmers identify problem areas on their farms, and develop solutions, through the use of a workbook or computer program into which they insert information about their farm. This information is compared with recommended farming practices given their farm's resource base (e.g., soils, slope, climate, crops grown). Farmers use the guidelines in the worksheets or generated by the computer to rank what they are currently doing from best to worst. Should farmers determine that they have problems, they are given information on possible solutions to pursue. The amount of direct technical assistance that the farmer receives varies by program.

One process that involves using worksheets to rank various aspects of the farm was popularized by the Farm*A*Syst Wellhead Protection Program, which was developed by the University of Wisconsin Extension Program. Farm*A*Syst-type worksheets have been adopted by the Ontario Environmental Farm Plan, Whitewater, the Idaho One Plan, Agri-21 and one of the independent crop consultants that we interviewed.

Computer models such as Planetor, CROPS and FINPACK, which generate different scenarios based on information that farmers or technical assistance providers enter into the program, are also employed by several of the programs.

The assisted decision approach is becoming increasingly popular with public programs because it does not require the staff resources of the expert approach. It was also chosen by some projects specifically because it gives farmers the power to create their own plans (Rudy, 1997). In addition, because it does not involve staff visits to farms or the sharing of confidential information, this approach is attractive to farmers who are generally happy with the way they operate their farms, but want to make sure that they are complying with the law. Using this approach, farmers can evaluate their operations against a framework of what is acceptable.

Programs taking the assisted decision approach used 10-40 hours of staff time per plan (compared with the 60-300 hours spent by the staffs of programs using the expert approach). The Ontario Environmental Farm Plan (the only program of the three considered in this section that supplied budget and farmer participation data for this report) spends \$2,710 (Canadian dollars) per farmer³.

STRENGTHS OF THE ASSISTED DECISION APPROACH

- Farmers play a more active role in identifying the problems on their farms, which means that they learn more about the issues at hand than they do by relying on experts.
- The worksheets and computer databases are (ideally) relatively simple to understand.
- Because the farmer follows a set procedure and does not rely exclusively on staff assistance, the assisted decision approach uses fewer resources than the expert approach.
- Because farmers identify problems themselves, they enjoy more confidentiality than they do in programs relying on the expert approach. Accordingly, farmers who mistrust the government may be more likely to use programs employing this approach.

WEAKNESSES OF THE ASSISTED DECISION APPROACH

- Because the farmer is following a workbook or a computer program to write the plan, only the issues/recommendations specifically built into the program are likely to be covered in the plan. This limits the comprehensiveness of the program.
- As the recommendations generated by the computer or worksheet, which are based on a formalized algorithm, are not necessarily tailored to fit the specific needs of an individual farm, programs using this approach cannot offer the depth of planning available from programs taking the expert approach, which can provide site/operation/scale-specific recommendations.
- The worksheets and databases tend to address each resource on a farm as a separate unit, which does not intuitively lead farmers to thinking of the farm as a unified system.
- Because participating farmers have relatively little personal contact with the program staff, they may not be strongly motivated to follow through with the recommended changes. A study conducted by North Dakota State University found that all farmers completed Farm*A*Syst assessments when they were hand delivered by local high school students, but that only 34 percent completed the assessments when they were sent by mail (Nowatzki and Klenow, 1996). Another study found that farmers who had more contact with NRCS were more likely to enroll their farms in a conservation program (Kraft et al., 1996).
- Problems identified by the system are addressed only on the initiative of the farmer, who may avoid or ignore certain parts of the plan. As a result, overall program goals may not be met.

The Personal Planning Approach

Two of the programs we surveyed, Holistic Management and NOFA-NY's Organic Certification Program, take a more personal approach to whole farm planning: the planning is generally done not under the auspices of the program, but rather is the personal work of individual farmers [Table 3]. Both Holistic Management and the Organic Certification Program offer farmers access to resources and classes on how to plan, but the actual plans are developed by the farmers, subject to certain guidelines established by the programs.

Table 3: Programs taking the personal planning approach.					
PROGRAM NAME	NUMBER OF HOURS FARMERS HAVE SPENT WORKING INDEPENDENTLY ON THEIR PLAN	NUMBER OF HOURS PROGRAM STAFF HAVE SPENT ON PLAN	NUMBER OF FARMERS ELIGIBLE FOR THE PROGRAM	NUMBER OF FARMERS WITH PLANS	PROGRAM BUDGET
Holistic Management	Unknown	3-day course on how to plan (serving more than one farmer)	Open to anyone	Thousands of farmers in the US and abroad	No data (farmer fees)
NOFA-NY's Organic Certification Program	Unknown	6-18 hours (primarily spent on review of plan for certification and farm inspection)	Any farmer in NY	300 farmers	\$70,000 per year (farmer fees and grants)

As the personal planning approach requires the farmer to both instigate the writing of a plan and to actually write the plan, it tends to attract farmers who are especially innovative or desperate (Johnson, 1997; Rudy, 1997). These farmers may therefore be more willing to make significant changes on their farms than others. Program staff responding to our survey reported that farmers writing plans for Organic Certification and Holistic Management were likely to include drastic changes in farming practices and operations. This was not as true for farmers creating plans in conjunction with programs using the expert or assisted decision approaches (many of which explicitly sought to minimize disruption to the existing system).

For both of the programs using this approach, the cost and effort of writing the plan is borne by the farmer. The Organic Certification Program charges farmers a minimum of \$275 (based on the production of their farms), which covers the costs of inspection. Holistic Management charges about \$400 for a three-day workshop. Staff time for these programs is minimal and spent mainly in courses or in plan evaluation. The exact amount of time that an individual farmer spends on the plan is unknown, but is expected to be significant.

STRENGTHS OF THE PERSONAL PLANNING APPROACH

- Because the plan is initiated and written by the farmer, it is likely to be successfully implemented. Farmers who are motivated to deal with conservation issues are more likely to maintain the practices that

they implement without external incentives (DeYoung, 1993).

- There is little or no cost to the public for plan writing.

WEAKNESSES OF THE PERSONAL PLANNING APPROACH

- As each plan is highly specialized in application, there is a lack of overall coordination among individual plans. Consequently, there is no guarantee that a farmer's plan will contribute to what is publicly desired in a given area.
- This approach is particularly time consuming for farmers. It may make planning an overwhelming job for some farmers who otherwise might be interested.
- This approach is unlikely to attract farmers who are causing environmental problems but are happy with their existing system of operation.

Factors Influencing Choice of Approach

The programs seemed to choose the approach based on a combination of three factors: habit, cost and program objective. Some programs, particularly USDA-led, seemed to choose the expert approach because that is the way that they have always provided technical assistance and farmers are comfortable with it. New York City Watersheds Program, for example specifically chose the expert approach because they didn't want to have to introduce farmers to an unfamiliar process for writing whole farm plans.



Computer software allows farmers and program staff to select timely management strategies in the field.

Photo courtesy of the Agricultural Research Service, USDA.

The cost of writing whole farm plans, both in time and financial resources, was a factor that was driving many programs to choose the assisted decision approach or to incorporate aspects of the assisted decision approach with other approaches. Ontario EFP, Idaho One Plan and Whitewater all specifically indicated that constraints on resources available led to the decision to adopt this approach.

Program objective was the third reason why an approach was adopted. The NOFA-NY Organic Certification Program and Holistic Management are specifically targeting highly motivated farmers and have adopted the personal planning approach. Many of the programs that chose to use the assisted decision approach or to incorporate it into their program did so to empower farmers to evaluate their own farms and to increase the privacy of the program. Programs selecting the expert approach generally needed to have farmers engaged with the program and staff—either because they needed to meet environmental regulations or because it was a pilot research program (like Agri-21 and New York City Watersheds Program)—or they were targeting farmers who were highly motivated to make changes, but did not want to or could not write a plan on their own and were

amenable to a highly personal approach (Independent crop consultants and the Pennsylvania One Plan, for example).

4) Two Policy Goals of Whole Farm Planning Programs

Table 4: Program goals.		
PROGRAM NAME	STATED GOAL	PRIMARY GOAL
Agri-21	To improve a whole farm planning process that includes financial, environmental and sustainable agriculture and that supports the goals of farm families	on-farm
Holistic Management	To help people make decisions that are economically, socially and environmentally sound, not just production oriented; to improve participants' evaluation and decision making skills	on-farm
Idaho One Plan	To provide assistance to develop farm plans that simultaneously fulfill all agency requirements	off-farm
Independent crop consultants	To increase clients' profits as well as their own	on-farm
New York City Watersheds Program	To protect the drinking water supply of 9 million people	off-farm
NOFA-NY's Organic Certification Program	To provide organic certification for farmers, which (1) assures consumers that produce marketed as organic has been produced using a legitimate organic system and (2) provides a level playing field for farmers marketing organic produce	off-farm and on-farm
Ontario Environmental Farm Plan	To improve environmental conditions through a voluntary plan that identifies areas of risk on farms in the province	off-farm
Pennsylvania One Plan	To improve the effectiveness of government and private assistance to farmers	on-farm
Whitewater	To provide a resource and goal setting process that would allow landowners to evaluate their farms by themselves	on-farm

Ervin and Smith (1996) recognized two broad categories of policy goals for whole farm planning programs:

1. achieving farmers' business, quality of life, natural resource and stewardship goals; and
2. managing the full range of environmental effects from farm operations in line with responsibilities to others, such as downstream water users.

Federal agricultural conservation efforts have focused on the first set of goals since the 1930s, through programs to improve soil productivity and boost farm income. Whole farm planning in this context is a unifying framework that allows farmers to meet their goals and satisfy environmental objectives by offering opportunities for innovation and low-cost solutions.

The second set of goals was not generally addressed until the 1970s, and reflects a shift in policy toward reducing the effects of agricultural production on the environment beyond farm borders (Magleby et al., 1995). Whole farm plans, stemming either from existing environmental regulations or from a consensus among involved parties, attempt to ensure that the health of the environment both on and off the farm can be sustained.

The nine programs surveyed in this report have subscribed to either the first or second set of goals, depending on whether the program has been geared primarily to benefit the farm or natural resources beyond farm borders [Table 4]. About half of the programs have chosen to stress the first set of goals; the other half have emphasized the second set.

As was stated earlier, the goal of a program will have an impact on the program design. However, whether or not the program was targeting on- or off-site benefits did not primarily affect the program approach selected—possibly because all of the programs were voluntary. The programs that were targeted to address off-farm concerns were more likely to direct the farmers who participated in the program to explicitly incorporate compliance with environmental regulations in their plan (Ontario EFP and Idaho One Plan) and the programs were also more likely to have included a broad spectrum of stakeholders in the program design or oversight.

5) Targeting Farmers

There are two basic philosophies of whole farm planning. One is to help farmers who are generally good managers and conservationists do even better on their farms. The other is to focus on establishing a base level of acceptable farming practices and getting farmers who fall below that level up to standard. One concern of the program staff, therefore, is to design a program that will attract the right farmers. For programs that adopt the former philosophy, this means seeking out farmers who are already predisposed to whole farm planning; for the latter, it will either mean attracting the worst environmental offenders or the poorest managers who are most in need of improvement (which for a voluntary program could mean attracting the widest array of farmers possible to the program to insure that the program reaches the sub-standard farms).

Duff et al. (1992) suggested that the best compromise between farm-specific policies and a universally applied policy would be to target different policies to different groups of farmers, depending on how receptive they were to conservation efforts. He proposed a framework that categorized potential recipients of conservation assistance by their receptivity to that assistance and for each category of farmer the components of a program that he expected would be needed to attract them. The farmers were defined as:

- EXPERIENCED AND RECEPTIVE (are already putting in considerable conservation effort);
- RECEPTIVE (are conservation minded but have not yet acted);
- MAINTENANCE (have put in effort to a personally determined level but have no plans to improve (i.e., complacent));

- AWARE (are aware of environmental problems on their farm but have put in no conservation effort and have no plans to (i.e., "bad actors"));
- UNAWARE (do not know that there is a problem).

Each of these categories of farmers have specific program needs (Duff et al., 1992). The experienced and receptive farmers respond to programs that emphasize application of research results and involvement in new technologies, information sharing and networking, and a public recognition of their efforts. Both the receptive and the maintenance farmers respond to education, extension, information sharing, demonstrations, incentive payments and cross-compliance. The maintenance farmers are more likely to require incentive payments and cross-compliance, however. Aware farmers are less likely to respond to voluntary programs than the other categories and are the category to be targeted for regulation and control. Unaware farmers, on the other hand, mostly need education, extension and demonstrations as they are not necessarily bad actors, but are unlikely to have the knowledge base to respond to voluntary incentives.

Table 5: Farmers targeted by the programs.

TYPE OF FARMER	TO ATTRACT THIS TYPE OF FARMER THE PROGRAM SHOULD OFFER (DUFF, 1992)	PROGRAMS WE SURVEYED THAT ARE TARGETING THIS TYPE OF FARMER
Experienced and receptive	Research Information sharing Involvement in new technologies Public recognition of efforts	Holistic Management NOFA-NY Organic Certification Program Agri-21 Independent crop consultants
Receptive and Maintenance	Education Extension Information sharing Demonstrations Incentive payments Cross-compliance	Agri-21 New York City Watersheds Program Pennsylvania One Plan Whitewater Independent crop consultants Idaho One Plan Ontario EFP
Aware	Targeted regulation and control	New York City Watersheds Program
Unaware	Education Extension Demonstrations	Idaho One Plan Ontario EFP

Not surprisingly, most of the programs we surveyed focused on attracting farmers who are already receptive to conservation [Table 5]. All of the programs we surveyed, except Holistic Management and NOFA-NY Organic Certification Program, primarily target farmers who fall into the receptive or maintenance categories, as these are the farmers who are likely to practice conservation but may need some encouragement or assistance. These

programs generally seek to meet farmers' goals or create voluntary plans to assist farmers in complying with environmental or farm program regulations. Four programs actively target the experienced and receptive farmer, Holistic Management, the NOFA-NY Organic Certification Program, Agri-21 Farming Systems and Independent crop consultants. Holistic Management and NOFA-NY focus on this category exclusively.

Only three programs are actively trying to get farmers who are not conservation-minded to improve their practices. The Ontario Environmental Farm Plan and Idaho One Plan, with their heavy emphasis on education and outreach, are specifically targeting unaware farmers for whole farm plans. Similarly, only the Watershed Agricultural Council's New York City Watersheds Program explicitly threatens non-participants with regulation and provides the greatest level of incentive payments for participation—targeting maintenance and aware farmers more than any of the other programs.

6) Program Leadership and Funding

Because whole farm planning is being advocated by a wide variety of different groups, ranging from public agencies to farm organizations, programs at the local and regional level are being funded by many different organizations [Table 6]. Four of the programs examined in this report have been both run and funded by public agencies: Agri-21 was led by the Tennessee Valley Authority (TVA) and the land grant universities in the region; the Pennsylvania One Plan operates under the aegis of USDA-NRCS, as did Whitewater; and the Idaho One Plan is led by a coalition of government agencies in Idaho.

Table 6: Program leadership and funding sources.		
PROGRAM NAME	LEADERSHIP	PRIMARY SOURCE OF FUNDING
Agri-21	Public agency	Public funds
Holistic Management	Private	Farmer fees
Idaho One Plan	Public agency	Public funds
Independent crop consultants	Private	Farmer fees
New York City Watersheds Program	Non-profit	Public funds
NOFA-NY's Organic Certification Program	Non-profit	Farmer fees and grants
Ontario Environmental Farm Plan	Non-profit	Public funds
Pennsylvania One Plan	Public agency	Public funds
Whitewater	Public agency	Public funds

The Ontario Environmental Farm Plan and the New York City Watersheds Program are both run by non-profit coalitions made up of farm organizations and agribusiness, but are publicly funded. Both programs were started by the agriculture industry to avoid potential regulation but ended up being endorsed by the EPA in New York State, and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) in Ontario—a development that lends some weight to the argument that both farmers and regulators are more interested in getting farmers to

implement plans voluntarily than in additional regulation (USDA, 1996c). NOFA-NY's Organic Certification Program, independent crop consultants and Holistic Management (which is administered at the local level by trained instructors who are often private consultants) are private entities that assist farmers for a fee.

As the information above indicates, many of the programs are being led or largely administered by coalitions. Indeed, one of the most important short-term benefits of whole farm planning may be its ability to bring together diverse organizations. The Idaho One Plan, as an example, has reported that different government agencies have worked together very well in developing one computer program that will help farmers meet all federal, state and local environmental and farm program regulations. Achieving this consensus has been the most challenging part of the project (McFall, 1997).

7) Stakeholder Involvement

It is clearly critical to include stakeholders—such as farmers, farm organizations, certain government agencies, environmental groups and other concerned parties from the start of a program, to ensure that the program's goals are appropriate and that the program reflects the needs, concerns and choices of those affected by it. In their study, Davies and Mazurek (1996) found that a common element of successful programs was trust between participants and stakeholders. Conversely, they found that common elements of less successful government programs were mistrust among the participants and government control over establishing program objectives. Fostering trust may be one of the more challenging aspects of implementing a successful whole farm planning program.

The nine programs examined here report varying levels of direct stakeholder involvement in program administration [Table 7]. All of the publicly led or publicly funded programs, as well as NOFA-NY's Organic Certification Program, have had some formal stakeholder involvement. Many of these stakeholders were specifically invited to participate by the lead organization. Because the programs must balance openness with manageability, each of them invited only stakeholders whose expertise has related directly to the program's work. For instance, most of the programs limit active stakeholder involvement to farmers, farm organizations, agribusiness and government agencies that represent agriculture and conservation. Among the nine programs examined in this report, New York City Watersheds Program has one of the most comprehensive groups of active stakeholders—reflecting the fact that the program has to receive input from a wide variety of sources, including non-farmers, if farmers are to avoid regulations and continue receiving substantial public support. NOFA-NY's Organic Certification Program also requires relatively broad stakeholder participation, especially by consumer groups, to ensure that consumers can have confidence in its certification process.

This kind of selection process can, however, be a problem for a publicly funded program, especially if it is targeted to protect a critical community resource. In this regard, some programs are under particular pressure to demonstrate their accountability to the general public. Although most of the nine programs have allowed for some active participation by key stakeholders, few have offered a formal process for the general public to make comments on the program. These programs were generally designed to deal with environmental problems beyond the farm gates. Programs primarily concerned with farmer's welfare have not been as likely to offer this opportunity for understandable reasons.

Table 7: Stakeholders.

PROGRAM NAME	STAKEHOLDERS FORMALLY INVOLVED IN THE PROGRAM'S DESIGN OR ADMINISTRATION	HOW ARE THEY INVOLVED?	IS THERE A FORMAL PROCESS THAT ALLOWS COMMENT FROM OTHER INTERESTED PARTIES?
Agri-21	Tennessee Valley Association of Demonstration Farm Families, Auburn University, University of Georgia, University of Kentucky, Mississippi State University, North Carolina State University, University of Tennessee, Virginia Polytechnic Institute and State University, Tennessee Valley Authority (TVA), Sustainable Agriculture Research and Extension Program (SARE), EPA, NRCS, state organizations, Progressive Farmer Magazine, American Farmland Trust (AFT), soil and water conservation committees, Applied Technology Transfer to Rural Areas (ATTRA)	Various formal committees	No
Holistic Management	Certified trainers	Run program at local level	Yes
Idaho One Plan	Bureau of Land Management (BLM), Idaho Association of Soil Conservation Districts, Idaho Dairymen's Association, Idaho Division of Environmental Quality, Idaho Grain Producers, Idaho Soil Conservation Commission, USDA-Agriculture Research Service, USDA-NRCS, US-EPA, Idaho Department of Agriculture, Idaho Department of Fish and Game, Idaho Department of Water Resources, Idaho Farm Bureau, Idaho Rural Partnership, Office of the Governor, USDA-Forest Service, US Bureau of Reclamation, University of Idaho Cooperative Extension System	Advisory group	Yes: on-line survey
	farmer test panel	Tested process	
	110 individuals	Invited to meetings	
Independent crop consultants	Not applicable	Not applicable	Not applicable

New York City Watersheds Program	Watershed Agriculture Council, Water Resources Institute of New York, New York Department of Health, NRCS, Cornell Coop-Extension, AFT, Coalition of Watershed Towns, New York City Department of Environmental Protection, New York Farm Bureau, Agway Syracuse, Environmental Action Coalition, Governor's Office, Cornell Center for the Environment, Hudson River Keeper, Empire State Forestry Products	Make up an advisory council	Yes: public meeting every six months
NOFA-NY's Organic Certification Program	Consumer groups, distributors, retail representatives, farmers	Review board (5 food systems people) and standards board (6 farmers)	Yes: surveys and public meetings
Ontario Environmental Farm Plan	The lead organizations of the 4 major farm organizations (Ontario Federation of Agriculture, Christian Farmers Federation of Ontario, AGCare, and Ontario Farm Animal Council)	Steering committee	Yes
	Government organizations, individual farm organizations	Provide technical, legal, food and environmental expertise	
Pennsylvania One Plan	Pennsylvania Farm Bureau, Grange, Pennsylvania Farmers Union, Pennsylvania Agronomic Products Association, Pennsylvania Association for Sustainable Agriculture, NRCS, Pennsylvania Department of Agriculture, Pennsylvania Association of Conservation Districts, USDA-Farm Service Agency (FSA), Pennsylvania Game Commission, Pennsylvania Fish Commission, USDA-FmHa (Farmer's Home Administration, Pennsylvania Department of Environmental Protection	Stakeholders make up a state-level coordinating committee	No
Whitewater	Watershed-based effort that included local, federal and state natural resource specialists, agribusiness, non-profit ag-entities, farmers, planning and zoning, Farm Bureau, USDA-Farm Service Agency, USDA-NRCS	Came up with planning process and are involved in other watershed activities	Yes

8) Plan Writing and Evaluation

Among programs promoting whole farm planning, there is no set procedure for establishing who will be the author of a particular plan, and to what extent such a plan should be evaluated prior to implementation. Government employees, consultants, program staff and farmers, alone or in combination, have written the whole farm plans that have emerged from the nine programs examined in this report [Table 8]. The New York City Watersheds Program, which involves large public funds and is targeted to protect a specific public resource, has plans that are written by teams of government employees. The Pennsylvania One Plan, Whitewater, Agri-21, independent crop consultants also had plans that were written for farmers. Ontario EFP, Holistic Management, Organic Certification Program and Idaho One Plan had plans that were written by farmers.

Table 8: Plan writing and evaluation.

PROGRAM NAME	WHO WRITES THE FARM PLAN?	IS THE PLAN EVALUATED BY A THIRD PARTY?	WHO EVALUATES THE PLAN?	IS THE FARMER REQUIRED TO CHANGE THE PLAN BASED ON AN EVALUATION?
Agri-21	Farmer and extension staff	Yes	Agri-21 state committee (8-10 people)	No
Holistic Management	Farmer and family	No	Not applicable	Not applicable
Idaho One Plan	No restriction	No ¹	Not applicable	Not applicable ²
Independent crop consultants	Consultant	No ¹	Not applicable	Not applicable ²
New York City Watersheds Program	Teams made up of Cooperative Extension Service (CES), NRCS, CEDSWD	Yes	Watershed Agricultural Council	Yes ³
NOFA-NY's Organic Certification Program	Farmer	Yes	Review committee	Yes
Ontario Environmental Farm Plan	Farmer	Yes	Peer group employed by program	No ⁴

Pennsylvania One Plan	Government employees led by USDA-NRCS	No	Not applicable	Not applicable ²
Whitewater	No restriction	No ¹	Not applicable	Not applicable ²

¹The plan may be evaluated by a third party if the farmer uses it to meet a program requirement, a regulation or to apply for cost share or an incentive payment for a practice included in the plan.

²The plan may have to be changed if the farmer wants to use it to meet a program requirement, a regulation or to apply for cost share or an incentive payment for a practice included in the plan.

³The farmer has to change any practice that the Watershed Agriculture Council determines will fail to meet water quality objectives.

⁴In order to receive cost share the plan must be considered to be "appropriate" by the peer group.

Although some farmers might be more likely to adopt whole farm planning if it were led by farm organizations or peers (USDA, 1996c), some environmental groups mistrust industry-led programs that lack an open evaluation process. Their misgivings are particularly pronounced about plans that are intended to address significant environmental problems that occur off the farm or that involve public money.

Most of the programs where plans were not written by the farmer did not have the plans evaluated by a third party. The exceptions were the New York City Watersheds Program where a team writes the plan but it is evaluated by the Watershed Agriculture Council to ensure that it will protect water quality, and Agri-21 Farming Systems where the plans are written by extension staff and the farmer but are evaluated by the Agri-21 state committee.



A Georgia farmer works with an extension agent, engineer and systems analyst to gather data on his farm.

Photo courtesy of the Agricultural Research Service, USDA.

Programs where the farmer wrote the plan were only slightly more likely to have the plans evaluated by a third party. The Ontario Environmental Farm Plan has a committee of farmers who evaluate plans for appropriateness and NOFA-NY's Organic Certification Program has a committee that evaluates all plans in order to ensure that they meet the standards for Organic Certification. The plans of other programs are only evaluated if the farmer

wants to use them to meet an environmental requirement or to apply for cost share. As all of the programs were voluntary, none of the evaluations were binding, except that they determined eligibility for cost share or certified that the plan met program requirements.

9) Monitoring and Assessing the Performance of Programs and Plans

An attempt to monitor and assess programs and the whole farm plans they produce can reveal whether the programs are attracting the farmers necessary to effect change, whether the farmers are implementing the changes called for in their plans, and whether the plans are having any impact. However, evaluating and assessing the effects of the whole farm plan and the effectiveness of the program was the weakest part of most of the programs [Table 9].

Table 9: Monitoring and assessing farm plans.				
PROGRAM NAME	ARE BASELINE DATA COLLECTED?	CAN GOALS BE QUANTIFIED OR MEASURED?	WHICH INDICATORS DO FARMERS USE TO MEASURE THEIR PROGRESS TOWARD THE PLAN'S GOALS?	HOW OFTEN ARE THE PLANS REASSESSED?
Agri-21	Yes	Yes	Percentage of farm plan implemented, changes in crop yield, soil test results, change in profits, change in productivity, other improvements in the overall farm	Annually
Holistic Management	Yes	Yes	All plans must include some means by which to measure progress toward goal	Annually
Idaho One Plan	Unknown	Not decided	Not decided	Not decided

Independent crop consultants	Yes	Yes	Crop health, change in profit, implementation of practices called for in plan	Depends on farmer
New York City Watersheds Program	Yes	No	Correctly implementing BMPs called for in plan	Annually
NOFA-NY's Organic Certification Program	Yes	Yes	Board follows up with farmer to see what has been done	Annually
Ontario Environmental Farm Plan	Yes	Yes	Plan includes a 1-4 rating scale of farming practices and conditions (such as proximity to wellhead, soil type, slope); action plan moves farmer to conditions that rank a 3 (good) or a 4 (best)	Encourage annually
Pennsylvania One Plan	Yes	Yes	Yields, change in profit, implementation of practices called for in plan	Annually
Whitewater	Yes	Yes	Plan included a 1-4 rating scale of farming practices and conditions (such as proximity to wellhead, soil type, slope); action plan moved farmer to conditions that ranked a 3 (good) or a 4 (best); implementation of practices called for in plan	Annually

Monitoring and Assessing the Plans

To ensure that plans remain relevant, and that the practices implemented are having the desired impact, plans must be reevaluated periodically, to provide feedback. Plans should be written so that they are flexible and can be changed based on new information. Most of the programs had the farmers reassess their plans annually. However, in order to determine whether plans are meeting their goals, some baseline measure of the starting conditions should be taken and measurable goals established, so that farmers can evaluate their progress toward these goals. Although the managers of all of the programs (except Ontario's) indicated that they require farmers to gather some baseline data, we do not know the quality of these data. Responses to the survey indicate that these data have not been collected rigorously—they generally entail only soil tests for a certain year and yield data.



A Washington farmer and soil scientist examine a previous crop's residues remaining after practicing conservation tillage.

Photo courtesy of the Agricultural Research Service, USDA.

None of the programs, with the exception of Holistic Management, implemented techniques that would allow farmers to assess actual changes in their natural resource base. Most of the measurable goals reported for the nine programs relate to changes in profits and yields (not surprising—these reflect the baseline data collected). Absent measurable goals, most plans have been evaluated based on how much of the plan, or how many of the designated practices, have been implemented. The Whitewater and Ontario Programs rated environmental conditions on a 1-4 scale, and farmers have ranked what they do or the physical condition of their farm from worst to best. However, the literature distributed by Ontario leads farmers to implement specific BMPs for targeted conditions and to measure success based on implementation of these BMPs rather than on observed changes. In part, this reliance on measuring the number of practices implemented to measure success is due to the lack of cost-effective, efficient measuring tools that are useable by both farmers and program staff.

Monitoring and Assessing the Program

Program monitoring and evaluation are important, and often neglected, steps. Most of the programs surveyed in this report did not make provisions for such steps. Significantly, many of the programs (the Idaho One Plan, Whitewater, Agri-21) were pilots created to test the applicability of whole farm planning—but they have not

allocated funds to monitor and evaluate themselves. Only the Ontario Environmental Farm Plan reported that it has gone through several independent evaluations.

All in all, the programs have placed more of an emphasis on evaluating process than on results. Evaluations conducted by the programs have focused for the most part on user satisfaction and participation rates, (several programs have used pilot groups of farmers to test how user-friendly their services are). Programs have taken action based on evaluations of the process by revamping their handbooks or planning process. However, because the programs have generally not been geared to addressing specific environmental concerns (only the New York City Watersheds Program targets a specific resource in a watershed), few of the programs have had coordinated monitoring efforts.

Monitoring and evaluation are the areas where the programs are consistently weak. This is a problem because the programs are not setting themselves up to be able to show that whole farm planning can improve environmental conditions—especially when compared to a standard piecemeal approach. Without a coordinated monitoring and evaluation effort, tying program actions to their impacts on the environment will be difficult. This problem pervades most agricultural conservation programs.

10) Incentives Provided for Farmers to do Whole Farm Planning

In general the nine programs considered in this report rely on encouraging the adoption of complementary technologies (i.e., technologies that would both benefit the farmer and have an additional, off-farm, benefit such as protecting the environment) in order to minimize program costs and because they have a higher likelihood of farmer adoption. Where simply encouraging complementary technologies is insufficient to meet program objectives, a range of incentives, both positive and negative are used. The positive incentives used are either monetary (funds for writing or implementing plans) or they focus on improving a farmer's information base through education, technical assistance or networking. Negative incentives include a battery of sticks such as user fees or regulatory penalties. None of the programs directly used negative incentives. They were used indirectly by some programs by threatening to target farmers that did not participate in the program for regulations if the quality of the natural resource degraded [Table 10].

Improving Efficiency—Encouraging Complementary Technologies

Soil and water conservation district directors in New York State, responding to a survey question that asked why some parts of conservation plans were implemented and not others, hypothesized that farmers implemented the practices that were most profitable for them. Conversely, they tended to put off implementing unprofitable practices or practices that required an initial investment and would reap benefits only after several years (Hexem et al., 1979). The managers of the nine programs we surveyed stressed that practices had to make economic sense to the farm operation. Several of them considered increasing farmers' profits or streamlining the planning process for existing programs to be a primary goal of their program. Most programs routinely recommended practices that would generally be considered complementary technologies. Recommended practices included nutrient management, integrated pest management, rotational grazing, conservation tillage and soil testing. Because the practices directly benefit farmers, often economically, use of complementary technologies can reduce the incentives that the program must offer to persuade farmers to make changes on their farm that have off-farm benefits.

One recurring criticism of environmental/conservation programs and regulations is that there are too many different and conflicting rules and reporting requirements. This is due to the interaction of state, federal and

local programs and different agencies regulating the same resource. Another complementary technology offered by some of the programs is to simplify the process of meeting program and environmental requirements on the entire farm. This is the approach of the Idaho One Plan, Ontario Environmental Farm Plan and the Pennsylvania One Plan.

Table 10: Improving efficiency.				
PROGRAM NAME	DO FARMERS PAY TO HAVE THEIR PLANS WRITTEN?	DOES THE PROGRAM SEEK PRIMARILY TO INCREASE FARMERS' PROFITS?	DOES THE PLAN IMPROVE FARMERS' ABILITY TO MARKET THEIR PRODUCE?	DOES THE PLAN OFFER SIMPLIFIED PLANNING FOR COMPLYING WITH EXISTING PROGRAMS?
Agri-21	No	Yes	No	No
Holistic Management	Yes	Yes	No	No
Idaho One Plan	No	No	No	Yes
Independent crop consultants	Yes	Yes	No	No
New York City Watersheds Program	No	No	No	No
NOFA-NY's Organic Certification Program	Yes	No	Yes	No
Ontario Environmental Farm Plan	No	No	No	Yes
Pennsylvania One Plan	No	No	No	Yes
Whitewater	No	No	No	Yes



**Ridge tillage
(a conservation
tillage technique)
on an Iowa farm.**

Photo courtesy of the
Agricultural Research
Service, USDA.

Monetary Incentives

As noted previously, farmers are more likely to respond to social welfare concerns—for instance, environmental damage beyond the farm borders—when the personal cost of addressing them is low. However, complementary technologies may not be sufficient to solving some environmental problems. In these cases, the cost of protecting the environment must be borne either by the public, using positive incentives (monetary and non-monetary) to encourage farmers to make changes, or by the farmer, through negative incentives such as regulations. If monetary incentives are chosen, the more it would cost farmers to implement a needed practice, the greater the monetary incentive needed to get a farmer to voluntarily institute the change (Hexem et al., 1979). New York City, for example, pays 100 percent of the cost of recommended practices, as many of the plans call for expensive livestock waste management facilities.

The use of monetary incentives can be problematic, particularly because they may not result in lasting changes in behavior. Both common sense and observation indicate that farmers are likely to stop implementing a needed practice when the funding ends. Monetary incentives may even work directly against innovative practices in some instances: for example, farmers may implement only those changes that will qualify for incentive payments (DeYoung, 1993). Nonetheless, monetary incentives are likely to spur rapid changes in behavior in large numbers of farmers and may be the best choice when the costs of maintaining the status quo are high (DeYoung, 1993; Santiopietro, 1995).

One use of monetary incentives in whole farm planning is to pay farmers to write and maintain a plan. As was demonstrated earlier, the plan writing, data collection, monitoring and evaluation portions of a plan are time consuming and will make some farmers less interested in participating. The use of incentives to promote the act of planning is not unprecedented in USDA programs as both the Integrated Crop Management and Water Quality Incentive Programs offered a small incentive payment (\$.25/acre) for record keeping. Of the programs we surveyed only Agri-21 offered farmers direct funding specifically to write plans. Agri-21 gave farmers

significant payments for record keeping because it was, in part, a demonstration program promoting plan writing and required that the farmers kept accurate records to be able to show results. However, there is the concern that offering too high a monetary incentive simply to write a plan would attract farmers to write a plan who would be unlikely to follow through. The Whitewater Program, which was also a pilot demonstration program promoting whole farm planning, specifically did not offer a payment to write a plan, as it wanted to attract farmers who were very interested in whole farm planning and would do it without a payment [Table 11].

Table 11: Incentive payments or other funding for planning or implementing practices.

PROGRAM NAME	DOES THE PROGRAM OFFER AN INCENTIVE PAYMENT FOR A PLAN?	DOES THE PROGRAM OFFER AN INCENTIVE PAYMENT OR COST SHARING FOR IMPLEMENTING CERTAIN PRACTICES?	DOES THE PROGRAM ROUTINELY ASSIST FARMERS IN GETTING FUNDS FROM OTHER SOURCES?
Agri-21	\$1000 per year	\$3,500 per year	Yes
Holistic Management	None	None	No
Idaho One Plan	None	None	Yes
Independent crop consultants	None	None	No
New York City Watersheds Program	None	100 percent of cost ¹	Yes
NOFA-NY's Organic Certification Program	None	None	No
Ontario Environmental Farm Plan	None	\$1,500 per farmer	Yes
Pennsylvania One Plan	None	None	Yes
Whitewater	None	None	Yes

¹\$75,000 maximum.

The other option is to provide monetary incentives to implement plan practices. This approach was more commonly taken by the programs. New York City Watersheds Program, Agri-21 and the Ontario EFP offered farmers payment directly to implement practices recommended by the plan. Whitewater and the Pennsylvania One Plan routinely referred clients to sources of USDA cost sharing as both are led by USDA. Program participants were given priority for receiving USDA cost-share dollars. The cost-share payments made by Agri-21 were in line with USDA assistance levels.

Ontario EFP offers low payments by US standards, a total of \$1,500 (Canadian) per farmer. The program emphasizes education and places few restrictions on the practices eligible for this payment. The New York City Watersheds Program offered payments of 100 percent of the cost of implementing practices. This was higher than any of the other programs (USDA assistance generally maxes out at 75 percent of cost). Cost share was set at this level because the program needed to get most of the farms in the watershed to implement recommended practices, regardless of their interest in whole farm planning.

Education, Networking and Technical Assistance

Table 12: Education, networking and technical assistance.

PROGRAM NAME	TECHNICAL ASSISTANCE OFFERED BY THE PROGRAM¹	ENCOURAGE FARMER TO FARMER NETWORKING	OFFER TRAINING COURSES OR OTHER TRAINING TO FARMERS	OFFER AND AWARD OR SOME PUBLIC FORM OF RECOGNITION TO PARTICIPATING FARMERS
Agri-21	Very high	Yes	Yes	Yes
Holistic Management	Low	Yes	Yes	No
Idaho One Plan	Medium	Unknown	Unknown	Unknown
Independent crop consultant	High	Yes	It depends on the consultant	No
New York City Watersheds Program	Very high	Yes	No	Yes
NOFA-NY's Organic Certification Plan	Low	Yes	Yes	Yes
Ontario Environmental Farm Plan	Medium	Yes	Yes	Yes
Pennsylvania One Plan	High	Yes	Yes	No
Whitewater	High	Yes	No	No

¹Where high = lots of one on one assistance plus significant additional resources such as literature, field days, courses; medium = group course, literature, and some one on one assistance; low = group course, some literature and referrals to assistance.

Because of problems with monetary incentives (cost, durability, commitment) programs also seek to find ways to encourage farmers to plan and make changes recommended by their plans that do not rely on external payments. Commonly this is done through education, technical assistance and promoting networking. These three aspects to planning programs try to encourage farmers to find internal reasons for doing the plans, make doing the plan as painless as possible and provide a support network.

Holistic Management, NOFA-NY, and the Ontario EFP have made education and networking the central part of their programs to attract farmers. Education and networking are also a very important part of the Agri-21 Farming Systems Program and are often used by independent crop consultants to attract and keep clients through newsletters, seminars and other literature [Table 12].

Technical assistance was stressed in all the programs using the expert model (New York City Watersheds Program, Agri-21, Pennsylvania One Plan and independent crop consultants) and in Whitewater. The other programs offered varying amounts of technical assistance to farmers, but in general it was provided through farmer to farmer networking, literature, group training courses and referrals to outside technical assistance providers.

Instituting Regulatory Requirements

Regulatory requirements may be necessary to get bad actors—farmers whose operations adversely affect the environment and who have no intention of changing their behavior—to implement conservation practices. They also provide incentives to farmers who are well intentioned but have not acted to make changes. Regulations can be used to ensure that farmers adhere to a minimal code of conduct (Hexem et al., 1979) which levels the playing field for the good actors. However, using regulatory power as the primary method of inducing farmers can backfire if farmers purposely do not comply as an act of protest (for example, because they resent government intrusion into their businesses or because they oppose the use of regulations to force them to do things). This is why education and other positive incentives, such as payments, are often the first choice of policy makers to achieve compliance (Santiopietro, 1995).

The threat of regulation was a significant reason for farmers to participate in most of the programs. Two of the nine programs, New York City Watersheds Program and the Ontario Environmental Farm Plan, were started by farm organizations specifically in response to proposed regulations. The managers of all of the programs surveyed indicated that farmers were attracted to whole farm planning, at least in part, because they were worried about regulation or liability for accidents. Clearly, the threat of regulation can help to make planning a priority for farmers and farm organizations for whom it would generally not be. For example, farmers without plans in the New York City Watersheds Program may find themselves subject to EPA regulation should water quality in the watershed fall below standards [Table 13].

Regulatory requirements of a different sort are used to ensure compliance with an Organic Farm Plan. Organic certification, while optional and completely voluntary for farmers, is an important marketing tool. However, when the final rules for the Organic Standards Act are released, the requirements for organic certification will be defined at the federal level (it is currently defined and administered by various state, local and independent organizations—NOFA-NY being one of them) and for a product to be sold as "organic" it will have to meet the national standards.

Table 13: Impact of plan on farmers' regulatory requirements.

PROGRAM NAME	DOES THE PLAN OFFER REGULATORY RELIEF?	IS THERE A STATED THREAT THAT NOT HAVING A PLAN WILL BE A PROBLEM IN THE FUTURE?	IS THE PLAN A MANDATORY PART OF A PROGRAM THAT IS DESIRED BY FARMERS?	IS THERE A PERCEIVED THREAT THAT MAKES PLANNING SEEM PREEMPTIVE?
Agri-21	No	No	No	Yes
Holistic Management	No	No	No	Yes
Idaho One Plan	No	No	No	Unknown
Independent crop consultants	No	No	No	Yes
New York City Watersheds Program	Yes	Yes	No	Yes
NOFA-NY's Organic Certification Program	No	No	Yes	Yes
Ontario Environmental Farm Plan	Yes	No	No	Yes
Pennsylvania One Plan	Yes	No	No	Yes
Whitewater	No	No	No	Yes

11) Promotion of Sustainable Agriculture

The food, agriculture, conservation and Trade Act of 1990 (FACTA) defined sustainable agriculture as:

"an integrated system of plant and animal production practices having a site-specific application that will, over the long-term: satisfy human food and fiber needs; enhance environmental quality and the natural resource base upon which the agriculture economy depends; make the most efficient use of nonrenewable resources and on farm resources and integrate, where appropriate,

natural biological cycles and controls; sustain the economic viability of farm operations; and enhance the quality of life for farmers and society as a whole."

Used as a tool that helps farmers manage their farms as integrated systems, whole farm planning is a key ingredient in helping them transition to sustainable agriculture (Kemp, 1996). Whole farm planning allows farmers to assess their resources, long- and short-term goals, conservation objectives and other concerns. Rather than targeting specific problems and applying one of a menu of BMPs to address them, an integrated, systems-oriented planning process encourages farmers to look at their entire farms for the underlying causes of problems. The planning process also shows farmers the negative impacts that their decisions may have beyond the farm gate, and helps to address these impacts. Plans can be flexible, encourage innovation and can be readily adapted to conditions specific to a particular farm.

Whole farm planning, as defined by some programs, does not necessarily promote sustainable agriculture. As we have seen, some programs have been designed solely with a goal of minimizing conflicts between existing programs for farmers, others are focused on a single objective, others fail to address the "whole farm" (looking only at cropland or feedlots or farmsteads) and still others look at the whole farm but rely too much on prescribed BMPs for targeted problems (thus failing to address underlying problems with systemic changes) [Table 14]. A program that promotes whole farm planning and also promotes sustainable agriculture would:

- promote as goals all of the following: production, long-term economic vitality of the farm and farm family, comprehensive environmental and natural resource objectives, and quality of life for the farm family and society as a whole;
- address the impact that the whole farm has on natural resources;
- use a holistic approach and not deal with problems on the farm in a piecemeal fashion;
- not rely on prescribed BMPs, but offer farmers many alternatives, including sustainable agricultural systems, to meet their goals; and
- hire a planning staff knowledgeable about sustainable agriculture or aware of resources that could assist farmers looking for information.

Independent crop consultants, Agri-21 Farming Systems and Holistic Management were the programs that most explicitly promoted long-term economic vitality of the farm and farm family in the plans they helped produce. The bulk of the programs were focused strictly on environmental/conservation goals. When the other programs measured the plan's achievement by short run change in profitability, economic impact was primarily a concern to insure that recommended practices were cost effective in the short run. The managers of several programs said that they would have liked to include long-run profitability and other farm family considerations, but that doing so would have added too much work to the plan, especially given that the emphasis of the program was on natural resources.

Most programs are focused on the entire farm, but several have not taken into account natural resources off the farm that are affected by the farming operation. Also, because the programs are voluntary, some of the program managers indicated that plans written in their programs are limited to what farmers want to do and do not necessarily include the entire farm, but hope that once participating in the program farmers will want to expand their plans to include their entire farm.

Few of the nine programs approach planning by looking at the farm as an integrated system from the start. Most of the plans they have helped produce can be considered "whole farm" in that they dealt with the entire farm, but they are traditional in their approach to planning and consider each resource (such as water quality) separately. Only Holistic Management absolutely requires the farmer to look at the entire farm as a single system. Ontario attempts to get farmers to look at the farm as a system by offering training on writing an action plan that is based on integrating the components of the plan and has taught farmers to set priorities for their goals. The lack of

integration is a serious weakness in the programs and will be difficult to overcome, as most program staff and farmers are not trained in whole farm planning. They are more familiar with handling individual problems than with thinking in terms of systems.

Table 14: Program support for sustainable agriculture.

PROGRAM NAME	IS THE WHOLE FARM CONSIDERED, INCLUDING LAND RENTED AND THE FARM'S POTENTIAL OFF-SITE IMPACTS?	DOES THE PROGRAM REQUIRE FARMERS TO IMPLEMENT PRACTICES CHOSEN FROM A LIST OF SPECIFIC BMPs?	ARE THE DIFFERENT RESOURCES AND GOALS WELL INTEGRATED?
Agri-21	Yes	No	By enterprise
Holistic Management	Yes	No	Yes
Idaho One Plan	No	Not decided	No
Independent crop consultants	No	No	Unknown
New York City Watersheds Program	Yes	Yes	Yes
NOFA-NY's Organic Certification Program	Not off site ¹	No	No
Ontario Environmental Farm Plan	Not off site	No	No
Pennsylvania One Plan	No	No ²	No
Whitewater	Yes	No ³	No

¹Does not look at the farm's off-site impacts but the plan does consider what off-farm sources might negatively affect the organic status of the farm (e.g., through pesticide drift).

²Must do approved BMP to qualify for USDA cost share.

³To qualify for some sources of cost share funding the farmer would have to do an approved BMP.

An evaluation of the effectiveness of incentive programs for environmental improvement found that most successful programs set goals for environmental improvement rather than dictate the use of certain technologies (Davies and Mazurek, 1996). Other evaluations of conservation programs have found that allowing flexibility in

the practices that can be applied is likely to lead to a successful program (Gale et al., 1993). Most of the programs surveyed here have allowed some flexibility in the practices that farmers can use in their plans. However, eligibility for most cost share is dependant on implementation of approved BMPs (except for Ontario EFP and Agri-21).

In general, the staff of the nine programs are supportive of sustainable agriculture. Some programs have been explicitly supportive: they have actively promoted practices targeted to sustainable agriculture and have networked with sustainable agriculture groups. The staff of other programs have been less explicitly supportive, but have on occasion worked with sustainable agriculture groups or promoted some sustainable agriculture practices. The private consultants interviewed support sustainable agriculture but may or may not be representative of independent crop consultants as a group.

12) Conclusions

Whole farm planning will never be a magically simple, straightforward exercise, because there is no single type of farmer, or single type of plan. Farmers are a diverse group; some will pursue whole farm planning strategies because they wish or need to; others are well intentioned but will not act until government assistance, or the threat of new legislation, induces them to; and still others, who wreak environmental havoc and yet firmly resist change, will respond only to the sharp prod of regulation. Coping with different types of farmers requires different strategies, and programs of the kind examined in this report are on the whole best suited for dealing with farmers who are already receptive to whole farm planning. Farmers who are happy with their current production systems, despite off-site damages, the kind of group specifically targeted by the Ontario Environmental Farm Program, are more in need of such programs, but at present are less likely to be attracted by them. Additional incentives or the threat of regulatory penalties may be needed to induce these farmers in large numbers to implement a whole farm plan.

Whole Farm Planning Strategies for Government

In August 1995, USDA's Sustainable Agriculture Working Group (SAWG), which was established to identify the barriers to and opportunities for promoting sustainable agriculture within the Department, concluded that:

"Our nation's movement toward a more sustainable agriculture needs to include the development of integrated whole-farm and whole-ranch system approaches that balance the long term environmental, economic and social implications of agricultural practices." (USDA, 1996a)

Since that time, USDA has made clear its commitment to whole farm planning and, as we have seen, has implemented pilot programs to advance the concept. However, the bulk of the work of the Department has, in recent times, been meeting the legislative requirements of the Farm Bills. For example, Conservation Compliance requirements for erosion took up much of the time of NRCS field staff in the 1985-1995 period, at the expense of broader, more innovative discretionary programs.

Whatever the public sector superstructure for fostering whole farm planning efforts might be, a statutory base that makes planning an economic and attractive option is vital. As Davies and Mazurek (1996) stress, there is no easy way around the need for a statutory base that defines "what gets done, when it gets done, and how it gets done." Ideally, well crafted statutes should set clear environmental and other objectives that guide the plans, establish firm timetables for compliance, and create tangible penalties for non-compliance that will stimulate the voluntary adoption of WFPs that give maximum flexibility to farmers. However, it is important to stress that while actual or potential regulation is driving farmer interest in all WFP programs surveyed for this report, whole farm plans should not be mandated as part of environmental regulations at this point. If mandatory, the

likely result, given the knowledge base and technical resources currently available, would be plans that are either single resource focused or extremely costly. Compliance would likely be low as the majority of farmers are not likely to be prepared to implement comprehensive whole farm plans, and cost effective monitoring protocols are not well developed.

Several other government actions could help achieve the full potential of WFP: more research on production systems that maintain economic viability and improve on-farm and off-farm environmental conditions; streamlined planning processes that respond to clear coordinated requirements from multiple agencies; basic education and training for private suppliers of WFPs and farmers, and; low-cost monitoring and evaluation techniques that feedback to the research system to stimulate appropriate R&D and to the education and training processes for improving information delivery. Most critically, government cannot afford to adopt a single approach, to promoting WFP, as this analysis of experiments makes abundantly clear. Keeping in mind the diversity of objectives that can drive WFP, we recommend the following roles for government:

1. GOVERNMENT CAN ASSIST IN RESEARCH ON FARM SYSTEMS.

A key role of government should be to support and encourage research on farming systems by both traditional researchers and farmers. The aim would be to give greater understanding to farmers who want to devise whole farm plans, and to make plans more conducive to supporting sustainable agriculture. Most current research on conservation practices focuses only on a single objective, such as water quality protection, and on BMPs directed to achieving that objective; it does not take into account the impact of these practices on the farming system. In particular, it tends to miss the effects of the interactions of several practices. Research should also be focused on methods for delivering farm plans effectively, and for low cost, reliable methods to measure or evaluate the impact of whole farm plans on the natural resource base and on other factors such as farm economics, farm family satisfaction with changes in management practices. There is also a need for research on the role of whole farm planning in fostering simultaneous long-run farm profitability and environmental improvement off-farm.

2. GOVERNMENT CAN HELP TRAIN FARMERS AND THOSE WHO WORK WITH FARMERS TO LOOK AT THE FARM AS A SYSTEM.

One crucial government role in improving whole farm planning is to provide resources for training. Program staff, as well as interested farmers, need more guidance with creating a multi-objective whole farm plan. Such training, which is strikingly lacking in most of the programs surveyed in this report, should be multi-disciplinary, across agencies and departments; it should also be extended to independent crop consultants and non-governmental agency staff who are interested in whole farm planning.

Training is a role for government because whole farm planning programs are generally government run or funded, and technical assistance and information on whole farm planning options is often provided as public goods by government program staff. However, it is also crucial that crop consultants and others who work with farmers are included in designing the training protocol as many consultants and non-profit organizations are currently working with farmers on whole farm planning and have a significant knowledge base to offer to a training program. They should also be included in training programs as non-agency staff and crop consultants are likely to play a significant role in leading publicly-funded whole farm planning efforts in the future.

3. GOVERNMENT CAN PROVIDE A BASIC STATUTORY FRAMEWORK FOR ADVANCING AND INSTITUTING WHOLE FARM PLANS.

Whole farm planning need not be limited to one of the frameworks already discussed in this report. Even on a single farm, a variety of approaches may be appropriate. For instance, a two tier planning system that combines elements of several of the approaches could be used. For the first tier, all farmers could be

encouraged or required to carry out an Ontario Environmental Farm Plan or Idaho One Plan-type assessment that would cover their legal obligations and clearly outline significant potential problems. A base-level program, coordinated nationally but tailored to local conditions (i.e., like the Farm*A*Syst Program), would help better coordinate regulations and programs and help farmers see opportunities to meet minimum requirements for laws. Requiring all farmers to complete this assessment and demonstrate compliance would help to isolate bad actors and provide other farmers a base from which to start planning.

A program such as that described above would be a first step toward improving coordination on the national level, by helping farmers clearly identify all applicable regulations they are subject to. However, improved coordination between agencies with regard to programs, regulatory requirements and data collection, monitoring and paperwork, and between public agencies and the private sector, would make it possible to provide even better assistance to farmers with whole farm planning. Efforts such as Idaho's through their One Plan, to ensure that regulations are compatible, help make the various agency staff more knowledgeable about each other's programs and better able to coordinate their efforts both at the state and federal level and between local, state and federal agencies.

To complement the base-level effort for farmers who wish to go further with planning, tier 2 would include USDA, other agencies, non-profit agricultural organizations, and consultants as resources to create voluntary intensive whole farm plans. Small incentive payments could be offered to assist these farmers, but all publicly-funded cost-sharing and incentive payments would be contingent upon a farmer's willingness and ability to carry out and comply with the findings of the initial basic (tier 1) assessment.

4. GOVERNMENT CAN PROVIDE THE REGULATORY BASE THAT MOVES THE NATION'S AGRICULTURAL SYSTEM TOWARD WHOLE FARM PLANNING.

Although not the ultimate answer to widespread implementation of whole farm planning programs, there is no denying that regulation to protect natural resources has provided a strong incentive for farmers, farm organizations and regulators to support and implement whole farm planning programs and to write plans. Proposed environmental regulations in Ontario and in New York State were the catalysts that brought together broad coalitions of agriculture groups and got them to take the lead on whole farm planning. To be most effective, regulations should be performance based, and penalties should be progressively increased for the worst offenders.

5. GOVERNMENT CAN TARGET A LIMITED NUMBER OF REGIONS OR FARMERS TO RECEIVE INTENSIVE PUBLIC ASSISTANCE FOR WRITING WHOLE FARM PLANS, IMPLEMENTING RECOMMENDED PRACTICES AND MONITORING THE RESULTS.

Clearly, no public agency can write and implement comprehensive whole farm plans for all farms (as evidenced by the 300 hours spent on each farm in the New York City Watersheds Program). Programs can be kept affordable by targeting the most intensive planning resources to critical geographic areas where success is likely and where there are additional sources of funding. To get broad farmer involvement in planning, the bulk of government effort should be in information dissemination, education and networking, technical assistance for practices and small grants to farmers for planning.

Targeted areas for more comprehensive public efforts could include small impaired watersheds where there is a strong network, additional local funding sources and an interest in whole farm planning, or through partnerships with non-profits who work with farmers for pilot demonstration projects to test various whole farm planning techniques and management practices.

6. GOVERNMENT CAN PROMOTE MONITORING AND RESOURCE EVALUATION STRATEGIES THAT WILL MEASURE THE PROGRESS OF PLANS AND PROGRAMS AND SERVE AS AN EDUCATIONAL CLEARINGHOUSE.

Strategies for evaluating and monitoring the efficacy of programs involved with whole farm planning are crucial. Government could promote the development of low-cost ways for farmers to monitor changes in their resource base and link with existing monitoring efforts where it makes sense. Evaluation of programs—the Achilles heel of conservation programs—could be facilitated by better monitoring capability, and improved training of farmers and staff to evaluate changes. Programs should designate adequate funds for program evaluation, especially programs that have invested significant public resources in targeted whole farm planning projects. Programs should be evaluated—not only on participation rates—but also on the overall economic, environmental and other changes that are made. Therefore evaluation efforts will need to be on-going.

7. GOVERNMENT CAN ENSURE THAT PROGRAM REQUIREMENTS ARE FLEXIBLE ENOUGH TO ALLOW FOR INNOVATIVE PRACTICES.

Pains should be taken to avoid implementing legislation that might constrict, and not expand, the options available to farmers involved in whole farm planning. The 1996 Farm Bill legislation, for instance, replaced many of USDA's single-objective, cost-sharing conservation programs with two new conservation programs, the Environmental Quality Incentive Program (EQIP) and the Conservation Farm Option (CFO), that require farm plans. The language of the law was vague as to what is required in a plan, but a proposed EQIP rule, which came out in October 1996, limits acceptable practices to what is in the NRCS Field Office Technical Guide (FOTG).

An analysis of the proposed EQIP rule by E. Keith Menchey and Terry Nipp (1997) criticized limiting the allowable conservation practices to the FOTG. Menchey and Nipp made a strong case that there are many other scientifically-based sources of information on conservation practices generated by other USDA agencies, universities and private research organizations beyond the FOTG. They recommended broadening the rule to allow other widely used guides that provide many additional scientifically-based management practices. Subsequent regulations should not preclude farmers from adopting innovative strategies to meet environmental objectives.

Just as there is no single type of farmer, there can be, as this report has demonstrated, no single type of whole farm plan. The varying circumstances of each farm require different kinds of plans, each targeting different problems, and each with different funding and technical requirements. Options range from basic whole farm plans, such as the Idaho One Plan and Ontario EFP, that focus on having farmers meet all of the regulations that apply to their operations to comprehensive whole farm plans, such as Holistic Management and Agri-21 that address a full spectrum of economic, environmental and even social objectives of farmers within the framework of their communities. Each strategy entails radically different costs, different players and different levels of expertise on the part of farmers and planners, which means that a single approach to planning is not feasible. And that is why, in approaching whole farm planning, government has not one, but a variety, of roles to play. By adopting these seven measures, government can help ensure that whole farm planning will, with time, become a permanent fixture on the American agricultural landscape.

Endnotes

1. Formerly known as Holistic Resource Management or HRM.
2. The \$5 million Agri-21 budget included the full cost of the program: all administration, staff salaries and training and equipment costs.
3. This figure was estimated by multiplying \$8 million (Canadian) per year times four years, then dividing by 7,600 farmers (the number of farmers who have received the workbooks) and subtracting \$1,500 from the dividend (the incentive payment).

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