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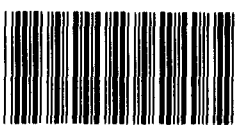
Report to the Chairman, Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives

July 1990

AGRICULTURE

USDA Needs to Better Focus Its Water Quality Responsibilities



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Resources, Community, and
Economic Development Division

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July 23, 1990

The Honorable Mike Synar
Chairman, Environment,
Energy, and Natural Resources Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

In response to your request and subsequent discussions with your office, this report discusses the Department of Agriculture's water quality activities, including, among other things, the management and coordination of those activities.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to interested congressional committees and the Department of Agriculture, and will make copies available to others upon request.

This report was prepared under the direction of John W. Harman, Director, Food and Agriculture Issues, who may be reached on (202) 275-5138, if you or your staff have any questions. Other major contributors to this report are listed in appendix V.

Sincerely yours,

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

The agricultural sector is the nation's largest user of pesticides and fertilizers, and studies have shown that these chemicals are increasingly being found in surface water and groundwater supplies. Agricultural activities have been identified as a source of pollution in drinking water in many states. Such exposure is increasingly perceived as a threat to human health.

Concerned about agricultural contamination of our nation's water resources, and recognizing the U.S. Department of Agriculture's (USDA) unique position to potentially influence actions that can affect water quality, the Chairman of the Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations, requested that GAO determine what USDA has done to protect water quality, including, among other things, assessing the management and coordination of its water quality activities.

Background

Numerous federal departments and agencies are involved in efforts to prevent, detect, or correct the contamination of our water resources, with major activities being carried out by the Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS), and USDA. EPA establishes drinking water standards and screens chemicals to prevent or control their use. USGS operates water quality monitoring programs and researches the movement and destination of chemicals. USDA researches water quality and related issues, provides technical assistance to farmers on the best ways to conserve natural resources, and educates users of agricultural chemicals on their use, handling, and disposal. Further, USDA's close association with the agricultural community and its extensive network at the state and local level put it in a unique position to potentially influence actions that can affect water quality.

While agricultural chemicals have increased the productivity of U.S. farms, their effects on the environment and human health have raised concerns. These chemicals pose a potential threat to farmers when they are applied and eventually may contaminate farm water supplies. Agricultural chemicals can also wash into surface waters or seep into groundwater reservoirs, thus affecting water quality hundreds of miles away. Nonetheless, many producers continue to use chemically intensive farming practices because they reduce the need for labor and increase their crop yields. In addition, the National Research Council and others have shown that USDA's commodity support programs indirectly encourage chemically intensive farming practices. This occurs because support programs generally encourage farmers to produce certain crops,

such as corn, which require high levels of agricultural chemicals to increase yields and thereby maximize program benefits.

Results in Brief

In response to increased recognition by scientists, environmental groups, the public, and the Congress about the close link between agricultural production and water quality, USDA has increased its water quality programs and activities and has attempted to better focus them. For example, in 1986 and 1987 the Department developed policies on nonpoint source pollution and groundwater quality, respectively, and in fiscal year 1990 began its Water Quality Initiative that expands ongoing water quality programs and starts new ones.

In order to better coordinate its water quality activities, USDA has established various mechanisms, such as the Secretary's Policy Coordination Council and the Working Group on Water Quality. However, GAO found that these coordinating mechanisms fall short of providing effective management of the Department's water quality activities because they do not establish a single point of responsibility for planning, coordinating, and evaluating all of USDA's water quality activities. Such a focal point would better assure that water quality-related programs, which fall under the direction of various Under and Assistant Secretaries, are carried out in a manner which is consistent with the water quality goals of the Department. In this regard, although USDA plans to make changes to its existing water quality policies, it does not have a single, comprehensive policy to guide its present and future activities. The two existing water quality policies do not address all water quality issues and can be contradictory in some instances.

GAO believes that USDA needs to establish a coordinating body, supported by dedicated staff, to be responsible for overseeing, coordinating, and evaluating all aspects of the Department's water quality activities. By focusing its water quality responsibilities in this manner and by developing a comprehensive water quality policy, the Department would enhance the effectiveness of its water quality activities. Without sufficient Department-wide focus on water quality, USDA may lose farmer and consumer confidence that the agricultural community can manage its resources to supply food and fiber in an environmentally safe manner.

Principal Findings

USDA Has Recently Initiated Programs That More Directly Address Water Quality

Historically, USDA's water quality activities have been add-ons to existing soil conservation programs or limited to regional surface water programs. In the late 1980s, the Department instituted broader programs and activities to address the contamination of surface water and groundwater by agricultural chemicals. USDA has developed a Water Quality Initiative for fiscal year 1990 that expands its ongoing water quality programs and establishes new programs. However, USDA's program to support low-input sustainable agriculture, which shares the primary goals of the Department's Water Quality Initiative, has not been integrated into the initiative.

Other activities carried out by the Department, such as its soil conservation and commodity assistance programs, can also directly or indirectly affect water quality. GAO believes that USDA needs to better understand the nature of the relationships between these programs and to identify appropriate changes to avoid conflicting goals and duplicative efforts. Further, these actions will allow the Department to make the most effective use of its available funding resources.

USDA's Water Quality Responsibilities Are Not Focused

Ten of USDA's 36 agencies are involved in water quality activities and plan to spend $155 million this year. As pointed out by USDA's Working Group on Agricultural Chemicals and the Environment in 1988, policy and program coordination among these agencies is essential. USDA uses a variety of coordinating mechanisms, including the Secretary's Policy Coordination Council, ad hoc working groups, formal agreements, and the President's management-by-objectives system. However, USDA has not established a single, full-time focal point or coordinating body with responsibility and accountability for all of its water quality activities as it has for other important cross-cutting issues such as transportation and energy. Rather, in November 1989, the Department established a Working Group on Water Quality, which it believes adequately focuses its water quality responsibilities.

GAO found that this new working group (1) does not have a full-time USDA staff, other than an individual on loan from the Department's Agricultural Research Service, dedicated exclusively to water quality issues; (2) does not have clear responsibility for coordination with interested parties outside of the Department; and (3) does not have clear responsibility for all of USDA's water quality activities. Because there is no full-

time, Department-wide mechanism to oversee all water quality activities, responsibility remains divided among the Working Group on Water Quality and the various Under and Assistant Secretaries. As a result, GAO is concerned that the Department may lack the organizational structure needed to effectively address this issue. Also, because USDA lacks a management system to effectively plan, coordinate, and evaluate its water quality activities, water quality may be perceived as less important by those in USDA as well as by those outside.

Although recent efforts show an increased emphasis on water quality, USDA still does not have a comprehensive water quality policy. Policies on nonpoint source pollution, issued in 1986, and groundwater protection, issued in 1987, focused attention on some types of water contamination, but they do not address all current water quality concerns and can be contradictory. For example, the existing policies do not address point source contamination of surface waters or provide a mechanism to encourage adoption of the policies the Department has developed. In addition, the policies do not recognize that practices used to protect some types of water sources could harm others. USDA officials told GAO that the Department is in the process of developing a comprehensive water quality policy and that they expect the policy to be available for departmental review around mid-summer 1990.

Recommendations

GAO recommends that the Secretary of Agriculture

- establish a Department-wide focal point or coordinating body, similar to those established for issues such as transportation and energy, with full-time staff support and responsibility and accountability for all of USDA's water quality activities and
- develop a comprehensive water quality policy that addresses all agricultural water quality concerns.

To prevent other USDA activities from adversely affecting its water quality efforts, GAO also recommends that the Secretary build on USDA's recent efforts to determine how USDA commodity programs and soil conservation activities, which may have competing goals or objectives, affect the adoption of farming practices to protect water quality.

Agency Comments

Although GAO did not obtain formal agency comments on a draft of this report, GAO discussed the information developed during its audit work with USDA officials and made adjustments as necessary.

Contents

Figures

Abbreviations

ASCS	Agricultural Stabilization and Conservation Service
EPA	U.S. Environmental Protection Agency
GAO	U.S. General Accounting Office
LISA	low-input sustainable agriculture
MBO	management-by-objectives
MOU	memoranda of understanding
SCS	Soil Conservation Service
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WGACE	Working Group on Agricultural Chemicals and the Environment

Introduction

Because water is a basic necessity of life, it is one of the most important natural resources in the United States. Degradation of its quality could have a major impact on the nation's welfare. Studies show that agriculture is one of the main contributors to water degradation, and there is increasing public awareness that agricultural chemicals may be a threat to human health and the environment. Although our understanding of factors affecting water quality is still incomplete, recent findings have raised concerns about the safety of our water supply, particularly the threat posed by some agricultural practices:

- About 165,000 miles of rivers and 8.1 million acres of lakes have been polluted by nonpoint sources, according to Environmental Protection Agency (EPA) estimates.[1]
- Groundwater contamination has been found in all 50 states, according to several federal agencies, and in 26 states there has been documented evidence of contamination resulting from normal field usage of agricultural pesticides.
- Agricultural nonpoint pollution was identified by 34 states as a major reason they failed to meet their own water quality goals.
- The U.S. Department of Agriculture (USDA) considers groundwater in 1,437 of the 3,150 counties in the United States at risk of contamination by fertilizers, pesticides, or both.

Water contamination from agricultural sources affects both farmers and the general public. Despite concerns about potential health and economic risks, farmers continue to use conventional agricultural practices because of economic incentives and a lack of information about alternatives.

Numerous federal departments and agencies are involved in efforts to prevent, detect, or correct the contamination of our water resources, with major activities being carried out by EPA, the U.S. Geological Survey (USGS), and USDA. EPA activities include establishing drinking water standards and screening chemicals to prevent or control their use. USGS operates water quality monitoring programs and carries out research on the movement and destination of chemicals. USDA activities include conducting research on water quality and related issues, providing technical assistance to farmers on the best ways to farm and conserve natural resources, and educating agricultural chemical users on the use, handling, and disposal of such chemicals. Further, USDA's close

[1]Nonpoint pollution originates from diffuse sources, such as farm fields, as opposed to a distinct discharge point, such as an outflow pipe or production facility.

association with the agricultural community and its extensive network at the state and local level puts it in a unique position to potentially influence actions that can affect water quality.

Human Activities Threaten Water Quality

Groundwater contamination is a critical issue because groundwater is the major source of water for many Americans. Groundwater constitutes 96 percent of all available freshwater in the United States. Fifty percent of the general population and at least 95 percent of rural residents get their drinking water from groundwater sources. Agricultural irrigation accounts for 68 percent of the groundwater withdrawals in the United States.

Preventing groundwater contamination is essential because most contaminants are not easily removed. Once they reach groundwater, contaminants may persist for many years because groundwater moves slowly and there is no sunlight below the surface to break down the contaminants. The cost of removing contaminants from groundwater far exceeds the cost of preventing contamination.

Evidence of human contamination of our nation's water has been found above ground in surface water formations such as lakes and rivers, as well as underground in aquifers where groundwater is stored. Originating from both discrete, identifiable point sources and diffuse nonpoint sources, contaminants have degraded the quality of our water.

In the past, efforts focused on the control of point sources of surface water pollutants. Although progress has been made in this area, many of the nation's lakes, rivers, and estuaries continue to experience nonpoint source pollution. EPA now considers nonpoint sources the major cause of most current surface water pollution problems.

Our groundwater resources are also in danger. The expansion of groundwater testing, coupled with advanced analytical techniques, has revealed increasing numbers and types of contaminants found in groundwater. Although the total extent or seriousness of groundwater contamination is still not known, most states have reported groundwater pollution from at least one type of man-made or naturally occurring contaminant. These contaminants include nitrates, petroleum, pesticides, bacteria from septic systems, and ice-melting salts applied to roads.

Information about the dangers of water contamination, and the publicity generated by the detection of pesticides in wells across the country, has

Objectives, Scope, and Methodology

In response to a request from the Chairman, Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations, and subsequent discussions with Subcommittee staff, we reviewed USDA's water quality activities to determine

- what programs USDA has operated to protect water quality and the environment;
- how much funding and staffing water quality and related programs have received (for a discussion of staffing, see app. III);
- what the findings and recommendations of USDA working groups on the environment were and whether the recommendations are being implemented;
- how water quality and related programs are being managed and coordinated; and
- if there is a need for a centralized, departmental coordinating body or focal point for water or environmental issues within USDA.

To accomplish these objectives, we looked at USDA's historical activities, recent activities, and future plans for water quality-related programs, including the Water Quality Initiative that USDA began during fiscal year 1990. We gathered information on the staffing and budgets of these programs and discussed their management and coordination with Department officials. We also examined the work of USDA's Working Group on Agricultural Chemicals and the Environment (WGACE) and its Low-Input Sustainable Agriculture (LISA) program.

We interviewed officials and gathered documentary information from the USDA agencies with major water quality responsibilities: the Animal and Plant Health and Inspection Service, the Agricultural Research Service, the Agricultural Stabilization and Conservation Service (ASCS), the Cooperative State Research Service, the Economic Research Service, the Extension Service, the Forest Service, the National Agricultural Library, and the Soil Conservation Service (SCS). LISA program officials and former members of WGACE also provided us with information. In addition, we spoke with the Deputy Secretary of Agriculture and the Assistant Secretaries and Deputy Under Secretary responsible for water quality-related activities. Budget information was provided by the Office of Budget and Program Analysis. Other agencies, including EPA and USGS, were also consulted because they have responsibilities in the area, as were relevant interest groups. Finally, we discussed management issues with individuals who had previously run major government departments or agencies.

increased ground and surface water salt levels in the West and Southwest. Direct contamination by point sources, such as chemicals that drift while being applied by aircraft or improper disposal of chemical containers, also contributes to water degradation.

The public increasingly perceives that farm chemicals found in groundwater threaten human health and that limiting their use is warranted. Although the medical consequences of exposure to contaminated water are not always clear, some of the dangers have been identified. Fertilizers can cause nitrate contamination of water. The best documented human health risk from nitrates is infant death and illness from methemoglobinemia ("blue baby disease"). The risks to adults who use water contaminated with pesticides or nitrates are not as well understood.

The health effects many other chemicals have on humans have not been clearly established. Little is known about the effects of long-term exposure to low levels of pesticides or the interactive effects of multiple chemicals. Since all pesticides are designed to be toxic to some form of life, exposure under some circumstances could affect human health.[3]

Farm workers and their families are particularly at risk because they are close to the sources of agricultural contamination. Aside from health concerns, however, water contamination also poses a threat to farmers' and ranchers' economic well-being. Contaminated water can reduce the productivity of crops and livestock or cause livestock illnesses that raise expenses and lower outputs. Land itself may be damaged over time, lowering production levels and property values.

Despite the risks and costs involved, farmers continue to use conventional agricultural practices because of a lack of knowledge about both the potential consequences of chemical contamination and farming methods that reduce the risk while maintaining profitability. In some cases, conclusive results on the side effects of certain chemicals or practices do not exist. In others, information is available but may not be getting to those who could use it.

[3]Some pesticides known to be harmful to human beings in high concentrations have been removed from the market but continue to be found in groundwater.

increased public concern over surface water and groundwater quality. Public pressure, in turn, has led to increasing state and local efforts to monitor and regulate the use of agricultural and other chemicals.

Agriculture Contributes to Water Contamination

The agricultural sector is the nation's largest user of pesticides and fertilizers, and studies have shown that these chemicals are increasingly being found in our surface water and groundwater supplies. A 1984 EPA report on nonpoint source pollution cited 44 states where agriculture is an identified nonpoint pollution problem. In its 1988 interim report on pesticides in groundwater,[2] EPA reported that 26 states had confirmed various amounts of 46 different pesticides in their groundwater resulting from normal agricultural practices. Eighteen of these pesticides (involving 24 of the 26 states) were discovered at levels equal to or greater than health advisory levels established or proposed by EPA.

Since World War II, agriculture in the United States has become more specialized and dependent on chemical inputs. Before then, farmers often grew a variety of crops and raised livestock on the same farm. This type of operation was labor-intensive but required fewer chemicals. As more farmers specialized in certain crops or livestock, manufactured chemicals replaced labor, increasing farm productivity. In addition, many producers increased their use of agricultural chemicals because federal farm programs encouraged them to specialize in crops such as corn and cotton that tend to require more chemicals. Some federal policies also discouraged crop rotations, thus encouraging monoculture, the growing of a single crop year after year. On farms that practice monoculture, higher levels of chemical fertilizers and pesticides are needed to replenish the soil and control pests. For example, the use of nitrogen fertilizer to grow corn increased from about 58 pounds per acre in 1964 to 137 pounds per acre in the 1980s.

Although modern, large-scale, chemically assisted farming practices have benefited farmers and consumers by raising productivity, they can also endanger water supplies. Not all chemicals applied to fields are absorbed by crops or the soil. The excess can run off into surface waters or seep down through the soil to contaminate groundwater reservoirs, thus affecting water quality hundreds of miles away. Even natural materials such as manure can contaminate water when it leaves the field in high concentrations. Further, the irrigation of saline soils has

[2]Pesticides in Ground Water Data Base: 1988 Interim Report, United States Environmental Protection Agency (Dec. 1988).

To examine how USDA coordinates the delivery of information and research findings from its programs to farmers and ranchers, we interviewed officials in two midwestern states—Minnesota and Illinois. These states have active agricultural sectors overlying important water sources, have identified water quality concerns, and have participated in USDA activities related to water quality. We discussed USDA's programs in these states with USDA state and county staff and with state and local environmental and agricultural officials.

We discussed our findings with USDA officials and have included their comments where appropriate. However, as requested, we did not obtain official comments on this report.

Our review work was conducted between February 1989 and December 1989 in accordance with generally accepted government auditing standards.

USDA Has Not Emphasized Water Quality Until Recently

Historically, USDA has conducted voluntary programs with indirect water quality benefits, but these programs were designed primarily to address soil conservation. Recently, in response to external pressures and recommendations of a USDA working group, the Department developed its fiscal year 1990 Water Quality Initiative. The initiative expands the ongoing programs and establishes new programs to protect water quality from agricultural chemical contamination through research, data base development, and education and technical assistance by 10 USDA agencies. The Water Quality Initiative does not include activities under the Department's LISA program even though it shares the initiative's focus on agricultural chemical management.

Historically, USDA Has Not Emphasized Water Quality Concerns

As a major user of the nation's land and water, agriculture can have a significant impact on water quality. Yet, USDA has only recently emphasized water quality concerns in its programs. Because USDA's responsibilities are diverse, water quality is only one of a number of competing priorities within the Department. When it has addressed water quality, USDA has relied on soil conservation programs and regional programs to protect surface water.

Water Quality Has Been One of Many Departmental Priorities

USDA operates programs to accomplish numerous goals including disseminating information, supporting farm incomes, boosting production and exports, ensuring a safe food supply, managing the nation's forests, improving nutrition, and promoting land and water conservation efforts. Often, these programs have competing objectives, and some may even endanger water resources.

For example, the National Research Council and others have shown that USDA's commodity support programs encourage practices that could degrade water quality. About two-thirds of the nation's cropland is enrolled in commodity programs. These programs have historically encouraged the production of crops like corn and cotton which tend to require high levels of chemicals and increase soil erosion. Because these programs pay farmers according to how much they produce, they encourage farmers to use large amounts of fertilizers and chemicals and to expand chemically intensive crop production on marginal lands to achieve higher yields. Some farm program provisions also discourage crop rotations, thus encouraging continuous, single-crop farming, known as monoculture. Single-crop operations can require the use of higher levels of pesticides and fertilizers than farming methods that employ crop rotations to replenish the soil and break pest cycles. USDA's 1990

farm bill proposal calls for flexible crop bases that would allow farmers to rotate their crops without being penalized.

USDA also operates programs to prevent soil erosion and flooding and to estimate water availability. Some of the programs designed to prevent soil erosion, however, can be harmful to water quality. For example, conservation tillage and other best management practices promoted by the Department to reduce soil erosion and runoff can require higher levels of pesticide use and increase the seepage of chemicals into groundwater. Also, the conservation reserve and sodbuster provisions of the Food Security Act of 1985 (P.L. 99-198) take fragile land out of production but can increase pressure on farmers to maintain or raise yields by using additional chemicals on their remaining cropland.

USDA Has Addressed Water Quality Goals Through Soil Conservation and Regional Programs

USDA has operated programs to reduce soil erosion for over 50 years. During that time, most USDA conservation programs were designed to stop erosion by offering producers financial and technical assistance to adopt conservation measures. Some of these programs were later amended to allow assistance for practices to reduce pollution of surface water as well as soil erosion. Table 2.1 lists the major statutory USDA programs with water quality provisions.

Table 2.1: Statutory USDA Programs That Benefit Water Quality

Program name	Year authorized	Main program purpose	Water quality provisions added	Year added
Small Watershed Program	1936	Provides assistance to encourage practices that prevent flooding	Water quality management and pollution control	1954
Agricultural Conservation Program	1936	Provides cost-sharing for adopting conservation practices	Agricultural pollution abatement	1971
Great Plains Conservation Program	1956	Promotes conservation in areas with high erosion levels	Reducing agricultural water pollution	1969
Water Bank Program	1970	Protects wetlands through annual payments to farmers	[a]	[b]
Colorado River Salinity Control Program	1974	Directs the Interior Department to protect water quality in the Colorado River	USDA role in establishing an on-farm salinity control program	1984
Rural Clean Water Program	1980	Promotes water improvement in 21 selected areas	[a]	[b]
Conservation Reserve Program	1985	Encourages planting of permanent cover on highly erodible croplands	Use of "filter strips"[c]	1988
Conservation Compliance Provision	1985	Requires the adoption of conservation practices in order to receive USDA benefits	[a]	[b]
Sodbuster/ Swampbuster Provisions	1985	Denies USDA benefits to those who convert erodible lands or wetlands for agriculture	[a]	[b]

[a]Water quality benefits were included in original legislation.

[b]Data not applicable.

[c]Strips of land along bodies of water that serve as filters for sediment and chemical runoff from farm fields.

The Conservation Reserve Program is a recent example of how conservation programs have been amended to include water quality goals. When the program was approved in the 1985 Food Security Act, it offered rental payments to producers taking highly erodible land out of production for 10 years and assistance in planting a protective vegetative cover. Regardless of the erodibility of the land, the program now provides funding for "filter strips" along bodies of water. Further, USDA has included in its fiscal year 1990 farm bill proposal a provision to expand the program to include areas that may be vulnerable to water contamination.

Other conservation programs address regional surface water pollution problems. As with its soil conservation programs, USDA's main role in regional water protection programs has been to promote the voluntary adoption of conservation practices through education and technical and

financial assistance. In some areas of the country, such as the Great Lakes, Chesapeake Bay, Puget Sound, Gulf Coast, Tennessee Valley, and Colorado River Basin regions, cooperative efforts to improve surface water quality involve USDA, other federal agencies, and state and local agencies.

USDA Funds Help Support Local Water Quality Activities

Many of USDA's research and education activities involve cooperative funding and administration with state and county governments for local water quality problems. State agricultural experiment stations and the Cooperative Extension Service have used some of their funds from USDA's Cooperative State Research Service and Extension Service for local water quality activities. The state agricultural experiment stations have combined federal, state, and other funds for research on chemical movement, pesticide and nitrogen application rates, and other issues related to water quality. Some states have hired their own local water quality specialists, and state and local Cooperative Extension Service staff have included water quality concerns in their training of pesticide applicators and conservation education programs. In one state we visited, the local project staff responsible for administering the Rural Clean Water Program project (the Garvin Brook project in southeast Minnesota) expanded the project's scope to include groundwater protection, even though the program was established to focus on surface waters.

USDA Has Recently Expanded Its Water Quality Activities

During the late 1980s, USDA expanded its water quality activities. Responding to outside pressures and recommendations of a USDA working group, the Department developed a Water Quality Initiative for fiscal year 1990 that expanded ongoing programs and established new ones. USDA is also continuing its LISA program, which could improve water quality, although the program is not included in the Department's Water Quality Initiative.

USDA Water Quality Initiative Is Being Implemented

Several events led to the USDA Water Quality Initiative. The Congress was considering revisions to federal pesticide legislation and had introduced numerous pieces of groundwater protection legislation. EPA had begun a national survey of pesticides in drinking water wells and had proposed a pesticide strategy for groundwater protection. State governments had proposed and implemented nonpoint source water quality programs. The discovery of pesticides in some drinking water supplies had also increased public apprehension. In addition, there was a new

emphasis on water quality in USDA's 1988-97 National Conservation Program plan and pressure from the Executive Office of the President.

Responding to these events, in January 1988 the former Secretary of Agriculture accepted the recommendation of three Assistant Secretaries that he establish the Working Group on Agricultural Chemicals and the Environment (WGACE). The working group, which included senior-level officials from 13 USDA agencies, reviewed Department policies and served as an interim clearinghouse for information on agricultural chemical use and related environmental concerns, including water quality. In June 1988, WGACE issued a report on its findings and recommended that the Secretary establish a focal point for agricultural chemical management in the Department. This report was a major impetus for the Secretary's decision to develop USDA's Water Quality Initiative beginning in fiscal year 1990. As of March 1990, the Secretary had not yet approved the WGACE report. A more detailed discussion of WGACE and its findings and recommendations appears in appendix I.

USDA's Water Quality Initiative is designed to determine the relationship between agricultural activities and groundwater quality and to develop and encourage the adoption of economically effective agricultural and chemical management practices that protect water quality. To accomplish these goals, USDA will carry out work in three areas: (1) research and development, (2) data base development and evaluation, and (3) education and technical assistance. A detailed explanation of the initiative is included in appendix II.

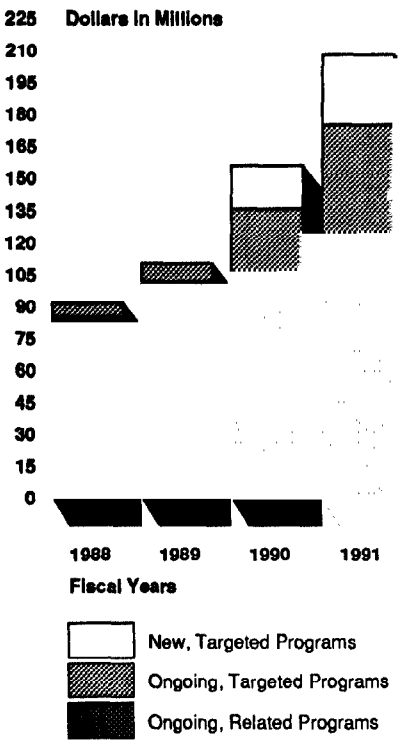
USDA expects its Water Quality Initiative to be more comprehensive and better coordinated than its previous water quality activities. The initiative differs from past programs because it focuses on agricultural chemicals and groundwater contamination, whereas previous programs had centered on the effects of soil runoff on surface waters. The initiative also addresses general concerns about agricultural nonpoint pollution.

The initiative is also expected to be better coordinated than prior water quality programs, which were managed using a decentralized, agency-by-agency approach. For the initiative, USDA developed a 5-year Water Quality Program Plan. According to that plan, many of the initiative's activities will be joint efforts among a number of USDA agencies, as well as EPA, USGS, state agricultural experiment stations, and other state and local entities. In addition, intradepartmental committees are responsible for the ongoing coordination of each of the initiative's activities. All the

agencies involved in the initiative will participate in coordinated evaluations of their respective activities.

In fiscal year 1990, the Department plans to spend $155 million for its water quality programs, a $45-million increase over fiscal year 1989. The Department's water quality budget includes funding for programs with direct water quality benefits as well as funding for other programs that relate to water quality. As shown in figure 2.1, during the past few years most of what USDA considered its water quality budget went to these related programs. For example, in fiscal year 1988 USDA spent $6 million on programs specifically targeted to water quality (mostly regional surface water programs), while devoting $85 million to programs related to water quality, such as research on pesticides, nutrients, and hydrology, and education and technical assistance for water conservation. In fiscal year 1989, $8 million went to programs specifically targeted to water quality and $102 million to programs related to water quality. By fiscal year 1990, USDA's funding request for efforts targeted specifically to water quality had increased to $49 million out of its $155 million overall water quality budget. About $20 million of the targeted total will go to the new programs of the initiative. In its fiscal year 1991 budget request, USDA is proposing to fund $83 million for efforts targeted specifically to water quality out of its $207 million water quality budget. About $33 million of the targeted total will be for new programs of the initiative.

Figure 2.1: Funding for USDA Programs Targeted or Related to Water Quality, Fiscal Years 1988-91



Notes: Fiscal year 1990 levels are estimated. Fiscal year 1991 levels reflect the Department's budget request.

Ongoing programs were funded prior to fiscal year 1990. New programs were funded beginning in fiscal year 1990. Targeted programs make up the Department's Water Quality Initiative.

Funding levels for targeted programs include all program funding each year. The funding figures for related programs include only the amount of each program's funding that USDA considers related to water quality each year.

Related LISA Program Not Included in USDA's Water Quality Initiative

Although USDA's Water Quality Initiative increases the Department's focus on water quality, it does not include all of USDA's activities that could have an impact on water quality.

USDA's LISA program offers grants to research and promote agricultural production methods that reduce the use of agricultural chemicals and protect the environment. LISA program efforts to reduce chemical use on the farm could augment the Department's efforts to protect water quality, but the LISA program has not been included in USDA's water quality planning.

The Water Quality Initiative and the LISA program are distinct programs, but they have similar goals. LISA's efforts to develop cost-effective and environmentally benign agricultural practices are similar to the Water Quality Initiative's efforts to develop practices that protect water quality. Both programs focus on the effects of agricultural chemical use and were designed to combine the efforts of various USDA agencies and outside groups through interagency coordinating groups. Concern about water quality was one of the reasons the LISA program was adopted, and such concerns are addressed in some LISA projects. Some Water Quality Initiative research and demonstration projects will include LISA-type programs. Appendix IV explains the LISA program in more detail.

Despite the similarities in their goals, the two programs operate separately. The Water Quality Program Plan states that USDA's Water Quality Initiative will complement the LISA program. However, each program has its own separate committee to coordinate the efforts of its participating organizations.

Better Management and Coordination of USDA's Water Quality Activities Are Essential

Water quality is an important and complex issue that cuts across agency lines and requires strong USDA leadership and commitment. Close coordination and cooperation are essential between the numerous USDA agencies as well as with other federal departments and agencies, state and local governments, and agribusiness.

The Department has recently begun to better manage and coordinate its water quality activities. It has established arrangements to develop and coordinate programs, and, as discussed in chapter 2, the Department recently prepared a 5-year Water Quality Program Plan. Nevertheless, USDA has not clearly established responsibility and accountability for planning, coordinating, managing, and evaluating all of its water quality activities. This lack of clear responsibility may have also contributed to USDA's not having developed a comprehensive water quality policy. As a result of these problems, the Department may not be in a good position to transfer information on the results of its water quality efforts to users in the field. If farmers and consumers are to believe that USDA is serious about water quality, it is important for the Department to bring a focus to these responsibilities.

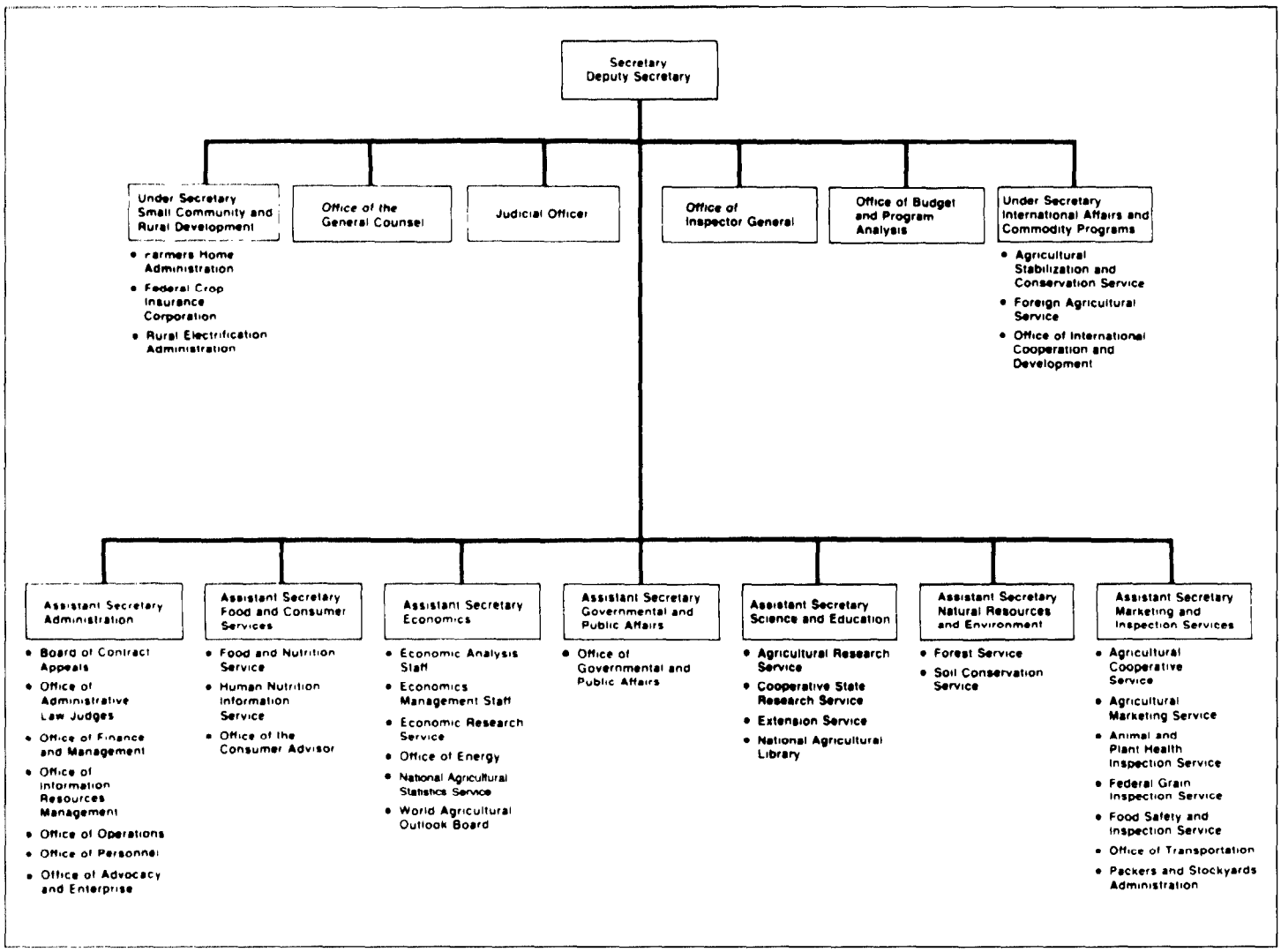
USDA Has a Varied Organizational and Coordinative Structure

To carry out its many missions, responsibilities, and programs, USDA employs an extensive network of agencies and offices and a large, highly decentralized field office structure. In addition, a growing number of emerging policy issues that USDA must deal with cut across agency lines, requiring the close coordination and cooperation of numerous departmental agencies as well as other federal agencies and outside groups. Water quality is one such issue. To manage its water quality activities, USDA has established or participates in a variety of coordinating arrangements within its existing organizational structure.

USDA's Organizational Structure

The Department is headed by the Secretary of Agriculture, a Deputy Secretary, two Under Secretaries, and seven Assistant Secretaries. Thirty-six individual agencies are divided into 9 groups, each headed by 1 of the Under or Assistant Secretaries. In addition, there are four offices that report directly to the Secretary. Figure 3.1 shows the Department's organizational structure at the time of our review.

Figure 3.1: USDA's Organization



Source: USDA

Ten USDA agencies operating under the jurisdiction of 5 different Under or Assistant Secretaries (International Affairs and Commodity Programs, Economics, Science and Education, Natural Resources and Environment, and Marketing and Inspection Services) are involved in water quality activities. These 10 agencies are the Agricultural Research Service, the Animal and Plant Health Inspection Service, ASCS, the Cooperative State Research Service, the Economic Research Service, the

Extension Service, the Forest Service, the National Agricultural Library, the National Agricultural Statistics Service, and SCS.

ASCS, SCS, and the Extension Service are primarily responsible for delivering USDA water quality programs through their extensive field networks. ASCS administers water quality programs and provides financial assistance to eligible program participants. SCS provides technical assistance to ASCS as well as to landowners and operators participating in USDA soil and water conservation programs. ASCS and SCS maintain field offices in over 85 percent of the 3,150 counties in the United States. The Extension Service, the federal partner in the Cooperative Extension System with its 21,000 state and local employees and field offices in virtually every county in the United States, is the educational arm of USDA. The Cooperative Extension System transfers research information through educational demonstration activities and provides program outreach services.

Coordination of USDA Water Quality Activities

To assist it in managing and coordinating its water quality activities, the Department has established or participates in a variety of formal and informal arrangements. Most of these mechanisms seem to have been developed on an as-needed basis, with little overall planning for how these activities should be coordinated Department-wide.

The Secretary's Policy Coordination Council

In August 1989, the Secretary of Agriculture established the Secretary's Policy Coordination Council. This Council meets at the call of its Chairman, the Deputy Secretary, to formulate departmental policy where cross-cutting issues require intradepartmental coordination and to resolve internal differences that arise during the implementation of the Council's policy decisions. Council members include the Deputy Secretary, the Under and Assistant Secretaries, the General Counsel, and the Director of Public Affairs. Under the Council, working groups are being appointed by the Deputy Secretary to address specific cross-cutting issues.

Specific Groups Established to Study or Coordinate Water Quality or Related Issues

On November 1, 1989, the Deputy Secretary established the Working Group on Water Quality to coordinate intradepartmental activities related to water quality. Chaired by the Deputy Assistant Secretary for Science and Education, the working group's responsibilities include (1) reviewing USDA's policies and programs relating to water quality and reporting to the Secretary's Policy Coordination Council on their implementation, effectiveness, appropriateness, and adequacy; (2) developing and recommending to the Council appropriate strategies and guidelines

for carrying out programs relating to water quality; and (3) providing advice and guidance to the Council on existing and emerging issues related to water quality with an emphasis on potential impacts on agriculture. USDA officials participating in this working group also told us that the primary purpose of this group as it now exists is to coordinate the Department's water quality activities. The working group includes representatives of four Assistant Secretaries, the Office of Budget and Program Analysis, and the 10 agencies involved in water quality activities at the Department. Under this working group, individual committees have been established to develop and coordinate programs in the three areas being emphasized in the Department's Water Quality Initiative: (1) research and development, (2) data base development and evaluation, and (3) education and technical assistance.

USDA also coordinates its water quality activities with those of other federal departments and agencies through the President's Office of Science and Technology Policy's Federal Coordinating Council for Science, Engineering, and Technology. The primary vehicle for federal coordination of water quality activities is the Subcommittee on Ground Water, which was established in December 1987 as a component of the Council's Committee on Earth Sciences. The Subcommittee, whose membership includes representatives from 11 federal organizations, including USDA, USGS, and EPA, is responsible for coordinating federal nonregulatory groundwater activities. In June 1989, the Subcommittee published a report that provides an overview of federal scientific and technical activities focusing directly on groundwater.[1]

In addition to the Subcommittee on Ground Water, USDA participates in other interagency committees or working groups that have been formed to coordinate specific water quality activities. For example, to facilitate interagency coordination of USDA's Midwest Initiative, the Department, USGS, and EPA established an interagency committee in early 1989 to develop a coordinated plan to study the effects of agricultural practices on the occurrences of pesticides and fertilizers in ground and surface water in the Midwest. Similarly, other interagency committees have been established to deal with specific water quality programs such as the Chesapeake Bay, the Great Lakes, and the Colorado River Salinity Control programs.

[1]Federal Ground-Water Science and Technology Programs: The Role of Science and Technology in the Management of the Nation's Ground-Water Resources, Subcommittee on Ground Water, Committee on Earth Sciences; Federal Coordinating Council for Science, Engineering, and Technology; Office of Science and Technology Policy (June 1989).

Memoranda of Understanding

To formalize cooperative and coordinative arrangements, USDA has established memoranda of understanding (MOU) with other federal agencies and between its own individual agencies. Some of the more significant MOU dealing with water quality activities include the following:

- A June 1988 MOU between USDA's Extension Service and SCS details each agency's responsibilities in implementing the Department's water quality policies and identifies cooperative arrangements between the two agencies.
- An April 1988 USDA and Department of the Interior MOU addresses research on the impact of agricultural practices on groundwater quality. Specific collaborative activities have been attached to the MOU. For example, Annex I to the MOU, dated June 1988, identifies research responsibilities, joint activities, and implementation and coordination responsibilities for groundwater quality between USDA's Agricultural Research Service and SCS, and Interior's USGS.
- A 1984 USDA MOU with EPA provides for the exchange of information and coordination of activities concerning water quality. Under this MOU, USDA's SCS and Extension Service have developed individual agreements detailing cooperative arrangements with EPA.

Informal Coordinative Efforts

Federal agency officials pointed out that, in the past, most of the intra- and interdepartmental coordination of water quality activities has been at the staff, or working, level. According to these officials, agency personnel at the technical level have historically worked closely together on a day-to-day basis, exchanging information on their programs and plans. The officials further pointed out that this informal type of interaction has generally had a very positive influence on program coordination.

Also, according to federal agency officials, high-level officials from the federal departments and agencies with water quality activities meet periodically to discuss specific water quality programs or issues and to formulate policies. The officials noted that such meetings have become more common as water quality and related issues have received greater national attention.

Management-By-Objectives System

In April 1989, President Bush called for establishing a management-by-objectives (MBO) system to keep him informed on the progress in major areas of policy, programs, and management. From the agricultural issues that USDA submitted, the President selected two USDA objectives for inclusion in the MBO system: (1) the expansion of U.S. agricultural

markets and (2) the encouragement of environmentally sound agricultural production and land management policies. A major element of the latter objective is the Department's Water Quality Initiative.

The goal of the MBO system is to establish specific milestones for each of the objectives selected, develop a tracking and reporting system for them, monitor progress toward achieving the objectives, and ensure that adequate resources are provided within overall fiscal constraints to guarantee their implementation. USDA has provided the Office of Management and Budget with a statement of the Department's overall strategy for achieving the selected objectives and with the critical milestones for measuring the progress of a limited number of activities under each of the objectives. The Department is also in the process of establishing a tracking and reporting system for the objectives selected.

The MBO system will not track all of the activities that make up USDA's total water quality effort. Instead, the Department has established milestones and will track only a selected number of its water quality activities. Those selected will then serve as "indicators" of the progress (or lack thereof) of USDA's total water quality effort. When fully implemented, the MBO system is expected to provide some measure of the Department's timeliness in implementing certain water quality activities.

USDA's Water Quality Responsibilities Are Not Adequately Focused

Although the Department has several mechanisms to coordinate its water quality activities, USDA's top management has not provided the leadership needed to effectively manage these activities by establishing a single point of responsibility and accountability for implementing them. Further, the Department has not developed a comprehensive departmental policy on water quality. As a result of these problems, USDA may not be in a position to effectively transfer information on the results of its water quality activities to users in the field.

Attention and commitment by top management, particularly the Secretary, are crucial to the successful implementation of effective water quality policies and related programs at USDA. Without such leadership initiative and commitment, USDA may not be able to limit agriculture's effects on water quality.

USDA Has Not Established Clear Responsibility for Managing All of Its Water Quality Activities

The Secretary has not established a permanent, full-time, Department-wide mechanism to oversee planning, coordinating, managing, and evaluating all of the Department's water quality activities. Currently, this responsibility is divided between the Working Group on Water Quality and the various Under and Assistant Secretaries who have water quality-related programs.

Nearly 1-1/2 years after WGACE recommended a focal point to address agricultural chemicals and related water quality concerns, the Department established the Working Group on Water Quality. This working group is the Department's first effort to establish a focal point for water quality issues. According to the Deputy Assistant Secretary, the working group will meet periodically, on an "as needed" basis, to coordinate intradepartmental activities related to water quality. Unlike offices that have been established in USDA for other cross-cutting issues such as transportation, energy, and biotechnology, the Working Group on Water Quality will not have a full-time staff. The group will, therefore, have to rely on staff with other responsibilities in their respective agencies to oversee key USDA water quality activities.

Although the working group's stated responsibilities include reviewing water quality policies and programs for effectiveness, appropriateness, and adequacy, it does not have the authority to monitor the progress of the Department's total water quality effort and to change the directions of programs, if necessary. As established, this group is overseeing only the targeted programs of the Department's Water Quality Initiative. These targeted programs are the smallest part of the Department's total water quality effort, and the only part being planned and integrated Department-wide. The major portion of USDA's water quality activities are still being planned and implemented at the Under and Assistant Secretary level, agency-by-agency, in the Department's annual planning cycle. This cycle provides for limited interaction between agencies' program planning or implementation.

As initially established, the Working Group on Water Quality's operational nature (i.e., meeting periodically with part-time staff) and its level of responsibility and authority to oversee and coordinate a limited set of water quality activities, raise questions concerning the Department's management of this issue. Two former federal managers told us that it is important to have a full-time staff assigned in order to achieve the Department's water quality goals. These individuals said that a full-time staff did not necessarily have to be large, but it must be competent and knowledgeable on the issue.

As of May 1990, the working group had one USDA employee, who is essentially full-time, on loan from the Agricultural Research Service, and another person on loan from EPA to help coordinate the Department's water quality activities. These officials noted that at this time the working group does not have independent financial or administrative support from the Department. Support for the group's activities comes from individual USDA agencies, such as the Agricultural Research Service.

USDA officials we spoke with believe that the current arrangement is adequate. They said the working group is responsible for coordinating all of the Department's water quality activities and that the group plans to broaden its oversight of such activities over time. In terms of having responsibility to change USDA water quality programs, these officials noted that while the working group does not have direct responsibility to do this, they believe it could be accomplished by raising concerns to the Secretary's Policy Coordination Council, which is chaired by the Deputy Secretary.

The former federal managers also believed that a central responsibility and authority was necessary to oversee and coordinate all water quality activities; otherwise, agencies in a department as large as USDA may work at cross-purposes or implement programs that are duplicative. In fact, we pointed out in U.S. Department of Agriculture: Interim Report on Ways to Enhance Management (GAO/RCED-90-19, Oct. 26, 1989) that, as a result of the work by WGACE, many agencies were surprised to learn of the activities of the other USDA agencies. The former federal managers also said that it is important for the Secretary to express his support for the Department's water quality activities and make himself directly accessible to those responsible for these activities. This effort would help to signal that the Department is serious about water quality and that the person(s) in charge has the Secretary's support.

Managing and coordinating such an important and complex issue without focusing responsibility, accountability, and authority also makes it difficult for USDA to establish short-and long-term objectives that reflect its overall water quality goals. That is, the Working Group on Water Quality may be focusing on one set of objectives for the Department's Water Quality Initiative while the individual agencies are developing another set of objectives for water quality-related programs for which they are responsible. Under USDA's existing structure, there is no centralized management system that could address such potentially

conflicting objectives. The Department's MBO system will not be sufficient because it is too limited in scope to provide the Department-wide perspective that is needed. Further, the MBO system, which will monitor programs by focusing on several "indicator" programs, is not designed to provide a qualitative evaluation of water quality programs.

A management system that would consider water quality activities in light of Department-wide objectives could help ensure that USDA is successful in reaching goals established in its water quality policy. Such a system would also be important in planning, implementing, and evaluating water quality and related programs and would assist the Department in answering questions about what is working and what is not. This information could be used to redirect existing water quality programs, develop new ones, or determine whether new or different approaches are needed to address this issue. Without a focused management system to regularly carry out these activities Department-wide, USDA water quality activities may continue to be a collection of individual efforts with varying goals and objectives. If this occurs and the Department does not assess the extent of the water quality problem, agriculture's role, and possible solutions, farmers and state and local governments may experience increased costs to treat contaminated water resources in the future. Without sufficient Department-wide focus and emphasis on water quality, USDA also may lose farmer and consumer confidence that agriculture can manage its resources to supply food and fiber in an environmentally safe manner.

Finally, the Department still does not have a single focal point for water quality who will be responsible for internal as well as external coordination of its numerous activities. The memorandum establishing the working group mentions only internal coordination responsibilities for the group. The memorandum does not discuss the working group as an identifiable focal point for external coordination with other federal departments or agencies or with state-level representatives for water quality issues. Because the Department's policies and programs may affect the activities of other federal agencies, such as USGS and EPA, clear responsibility for such coordination is essential. Further, these federal agencies, and perhaps others, may develop information as a result of their activities that could add to USDA's understanding of water quality issues. In this regard, USDA has entered into agreements with both of these federal agencies. However, much of the exchange of information will occur between USGS or EPA and specific USDA agencies, such as SCS and Extension Service. It is particularly important, therefore, that an easily identifiable focal point, at the Department level, be responsible

for overseeing these activities. It seems equally important that such a focal point be responsible for coordinating Department activities with the states, since this is where USDA's policies and programs will ultimately be implemented. Although the Working Group on Water Quality was not formally given responsibility for external coordination, USDA officials noted that the working group is carrying out this activity. USDA officials also agree that better coordination with states and the private sector is important, but told us that limited resources have prevented them from establishing such relationships.

USDA Has Been Slow in Developing Water Quality Policy

USDA's water quality policy is comprised of its formal policy statements and its prioritization of long-term objectives for the Department. With respect to the former, USDA has been slow to develop a policy for addressing water quality concerns associated with agricultural production.

Although agriculture consumes the majority of water in the United States and has been identified as a major contributor to water degradation, the Department had not developed a basic water quality policy until several years ago. Instead, USDA had only a general conservation policy based on the idea of resource stewardship. This policy made individual landowners responsible for deciding how to use the resources on their land. The Department believes that, with assistance from USDA and other interested parties, landowners have been responsible managers, or stewards, of their natural resources. Nevertheless, recent studies raise concerns about the threat that agriculture poses to our nation's water supplies.

The Department has recently developed policies to directly address two aspects of agriculture's role in the degradation of water quality. In December 1986, it issued a policy on nonpoint source pollution that supports the continued use of best management practices and voluntary actions by landowners to deal with nonpoint sources of agricultural pollution. Less than a year later, in November 1987, USDA issued a policy on groundwater. This policy supports the prudent use of agricultural chemicals and states that USDA will advocate practices that can prevent harmful contamination so as to minimize, or make unnecessary, regulatory restrictions on the use of agricultural chemicals.

Concerning policy development through prioritization of objectives, USDA has continued to emphasize soil conservation over water quality. The

Soil and Water Resources Conservation Act of 1977 requires the Department to evaluate the nation's soil and water resources periodically and to prepare plans based on those appraisals. The first National Conservation Program plan, released in 1982, established the reduction of soil erosion as its top priority. That program plan did not list water quality as a priority issue, designating it instead as a "national long-term objective." In its 1988 update of this plan, USDA elevated water quality to a priority issue that would be emphasized in existing USDA programs of research, education, and technical and financial assistance. Erosion control continues to be the top priority of the 1988-97 program.

These policies and priorities represent the Department's current position on the protection of water resources and, according to the WGACE documents, appear to have resulted from reactions to public and political pressure rather than USDA's concern about setting long-term goals to address this issue. For example, in its review of the Department's policies on the use of agricultural chemicals and their effect on the environment, WGACE pointed out that USDA policy and strategy development in this area has been largely reactive to outside pressures and influences. In July 1988, WGACE told the Secretary that the Department needed to get ahead of the situation "so we don't continue to respond in the crisis mode." Concerned about the potential for increased chemical regulation, WGACE, in an April 1989 draft of its working papers, stated that an alternative would be more prudent use of agricultural chemicals to limit their effects on the environment. A senior USGS official we spoke with believes much of USDA's emphasis on water quality is occurring because of political pressures. The official expressed concern, therefore, that if the political atmosphere changes, USDA may deemphasize water quality in favor of a new, pressing political issue.

Although the existing formal policy statements are a first step in addressing water quality problems resulting from agricultural practices, they are not sufficiently comprehensive to address all aspects of water quality or to resolve potential conflicts when they occur. For example, the current policies do not prohibit point source pollution of surface waters by agricultural producers. Although other laws and regulations may apply, the lack of a similar policy at USDA could create the impression that the Department condones such activities.

The two overlapping policies on nonpoint source pollution and groundwater are also duplicative and potentially confusing. By attempting to comply with the nonpoint source policy, an operator may increase the danger to groundwater. This could occur, for example, when an operator

uses ridge tilling practices to reduce the runoff of agricultural chemicals in compliance with the nonpoint source pollution policy. When prevented from running off the field, water is more likely to percolate through the soil to groundwater supplies, taking chemical contaminants with it. While it may not be easy to decide, in all cases, which water resources to protect first, the Department should be able to deal with these situations when they occur. Such decisions will have to be based on the geological conditions of the soil and water in the area, weather conditions, and other factors related to resource use. By developing a comprehensive water quality policy, USDA could identify many of these potential problems and provide itself the lead time to better understand them.

These policies also do not take into consideration other longer-term issues, such as how to ensure compliance or the effect of these policies on other departmental agencies. According to two individuals with previous experience in managing federal departments or agencies, USDA's water quality policy should cite the type of penalties that might be used for noncompliance and generally state how these penalties would be applied. This information would help signal to those affected that the Department is serious about water quality. Without some compliance provisions, the policy might be ineffective.

In addition, USDA's water quality policies do not consider the possible impacts on other departmental activities. Economic incentives provided by USDA-administered commodity programs can promote farming activities that are contrary to the Department's water quality policies. For example, government policy encourages farmers to strive for high yields on program crops, which in most cases means intensive use of agricultural chemicals—the same chemicals that have been associated with long-term danger to soil and water quality. On the other hand, USDA relies on farmers to be good stewards of their land and water. USDA's water quality policy should take these conflicting factors into consideration.

Finally, the former federal managers believed that the development of a long-term departmental policy on water quality should actively incorporate input from other federal agencies as well as from the states. By considering the goals and objectives of these entities, the Department will be in a better position to develop a single, comprehensive policy that will guide its actions on water quality into the next century. In recent discussions with USDA officials, they said that the Department is in the process of developing a single, comprehensive water quality

policy. According to these officials, this policy is expected to broadly state the Department's commitment to water quality. They estimated that a policy statement should be available for Department review by mid-summer 1990.

Focusing Water Quality Responsibility May Improve the Transfer of Information

In the two states we visited, we identified several obstacles to an effective and widespread water quality educational effort. We believe that if the Department focuses its water quality responsibility, it would signal that water quality is to receive increased emphasis and thus reduce these obstacles and enhance the transfer of water quality information.

One such obstacle is USDA's traditional reliance on state and local decision-making bodies to set educational priorities. With over half of extension funding coming from state and local sources, USDA educational activities are influenced by state extension offices and county advisory boards. In Minnesota, for example, local needs and priorities are identified annually through a county-level needs assessment process. County priorities are then forwarded to the state extension committee. As a result, USDA's educational activities generally reflect the level of emphasis placed on the issue at the state and local level. By focusing its responsibility for water quality, USDA could elevate the interest this issue receives from state and local level decision-making bodies.

Another obstacle we identified is the scarcity of readily transferrable research information on alternative agricultural practices. According to officials of two major farm organizations, agricultural practices will not change unless the alternatives are based on sound economic and scientific research. USDA officials pointed out that such research will take time to compile, analyze, and replicate for several reasons:

- Although research into reducing chemicals has recently gathered momentum, land-grant universities have traditionally been more concerned with a chemical's effectiveness on agricultural crops than with its environmental impact.
- Groundwater contamination levels, sources, and potential solutions vary not only from state to state and county to county, but even on the same farm. The site-specific nature of this issue heightens the importance of local research and demonstration activities.

Similarly, focusing USDA's responsibility for water quality could send a signal to the research community regarding the importance of this issue and the need for increased research in these areas.

Finally, farmers receive information concerning pesticide and nutrient use from a wide range of sources besides USDA. These include their own previous experiences, neighboring farmers, local dealers, agricultural chemical company representatives, farm magazines, and private consultants. Consequently, it would be difficult for USDA to change farm attitudes and behaviors, particularly if water quality is not a high-priority issue in the Department. By focusing its responsibility for water quality, USDA may become a more important source of credible information about the extent of water quality problems in a given area and what actions farmers need to consider.

Largely because of the lack of USDA leadership, some states and localities have taken the initiative to address water quality concerns. For example, in Minnesota, one of the two states we visited, the Minnesota Extension Service recently created two regional water quality extension positions on a 2-year experimental basis. The positions are jointly funded by the Minnesota Extension Service and the participating counties. These regional agents service a number of counties and are responsible exclusively for water quality activities—directing educational activities on the impact of agricultural practices on water quality; conducting educational programs on drinking water purity, closure of abandoned wells, and waste management; and advising county officials responsible for developing county water management plans under section 319 of the Federal Water Pollution Control Act.

Conclusions and Recommendations

Water is an important natural resource. Because it is a major user of the nation's land and water, the agricultural sector has a significant effect on water quality. USDA has a long history of activities to promote conservation, but has only recently begun to focus those activities on the protection of the nation's water from agricultural contamination. The Department has initiated new programs to assist farmers, has attempted to improve coordination of its water quality activities, and is considering changes to its water quality policies. However, USDA still needs to make some changes to its current management structure and water quality policies. We believe these changes would increase the level of attention the Department gives water quality while enhancing its ability to convince farmers, who depend on water for personal and production needs, and consumers, who associate farm practices with water quality and food safety, that the Department is serious about the protection of this vital natural resource. The Department also needs to consider how other farm program activities affect water quality and make appropriate changes to avoid conflicting goals.

USDA Lacks an Effective Management Structure and a Comprehensive Policy for Water Quality

Several considerations lead us to conclude that the Department's responsibilities need to be better focused if USDA is to establish and accomplish its water quality goals: (1) the importance of water as a national resource, (2) public perception about its quality and the effect of this quality on human health, and (3) the fact that water quality falls under the jurisdictions of numerous USDA agencies. A full-time focal point for water quality and related environmental issues, together with a comprehensive water quality policy, would help to provide that focus.

Nearly 1-1/2 years after the WGACE recommendations were made, the Department established its Working Group on Water Quality. The WGACE report called for a focal point with full-time staff and responsibility for coordinating chemical management and environmental programs within USDA and with other interested parties. The working group that was recently created has one USDA staff person who is essentially full-time, meets only periodically, is directly responsible for only part of USDA's water quality efforts, and does not have clear program accountability or responsibility for coordination outside of USDA.

We believe that the lack of a Department-wide focal point or coordinating body to manage water quality issues and programs will hamper USDA's efforts in this area. Without adequate full-time staff that is responsible and held accountable for water quality activities, other

departmental priorities may take precedence. The size of the Department and the varying missions of its agencies require more Department-wide planning and management of water quality issues to avoid duplication of efforts and conflicting objectives. Because other federal and state agencies also have water quality responsibilities, coordination with these other organizations is also essential. We believe that a strong focal point at the federal level would enhance water quality activities in the states. We also believe that if there is not greater Department-wide focus and emphasis on water quality, USDA may lose farmer and consumer confidence that agriculture can manage its resources in an environmentally safe manner.

Some states have recognized the need for a focal point and have appointed state or regional specialists to coordinate local water quality activities. This idea of designating specialists with water quality responsibilities may merit attention by the Secretary of Agriculture.

Even though USDA has been operating programs related to water pollution for more than 35 years, it has only recently developed official policies encouraging producers to consider the effects their production practices could have on water quality. The Department's current policies on nonpoint source pollution and groundwater protection emphasize the importance of water quality, but USDA continues to rely on voluntary actions by producers. That may not be enough. Some producers may not take actions to protect water quality, or individual actions that are taken may work at cross purposes or conflict in other ways with broader national or state-level concerns. In this regard, USDA officials told us they plan to develop a single, comprehensive water quality policy that will be ready for departmental review by about mid-summer 1990.

Although USDA is considering changes to its policies, we believe that the timing of the existing policies and their lack of comprehensiveness demonstrate USDA's lack of commitment to water quality issues. The two existing policies were developed, to a large extent, in response to growing public concern about agricultural threats to water quality. There is concern that these policies could be deemphasized just as easily in the future as new issues shift the Department's priorities. The lack of a long-term perspective is also evident because the policies do not address all aspects of water quality, including point source surface

water contamination, the potential conflict between surface and groundwater protection, and penalties to encourage compliance. USDA's development of a single, comprehensive policy this summer will provide important clues about the Department's commitment to water quality.

Other USDA Efforts Affect Water Quality

Water quality is only one of a number of priorities shared by USDA and its agencies. Programs in other areas such as soil conservation and commodity assistance can also affect water quality. Before major policy changes can occur, the Secretary needs to understand how these activities interact and how they affect a farmer's decisions in the field.

It is not clear how current farm policies affect water quality. Some agriculture experts fear that policies that promote high production levels by encouraging chemical use and discouraging crop rotations have contributed to the contamination of water. Others are concerned that reducing chemical use will hamper the productivity of agricultural producers. USDA has taken some initial steps toward a better understanding of how some of these policies may be influencing production and water quality activities and has proposed changes to the Food Security Act of 1985 in this regard. These proposals include, among other things, targeting the Conservation Reserve Program to areas that may be vulnerable to water contamination as well as allowing for flexible crop bases so farmers can plant crops in rotation without being penalized. The Department needs to continue these efforts and identify appropriate changes to avoid competing goals among its various policies.

Recommendations

In order for USDA to improve the management and coordination of its water quality activities, we recommend that the Secretary of Agriculture clearly establish responsibility and accountability for the Department's water quality efforts by creating a permanent, full-time focal point for water quality. The focal point should have a small full-time staff responsible for planning, managing, coordinating, and evaluating all of the Department's water quality activities and assessing these activities in light of Department-wide objectives. The focal point should also coordinate the Department's water quality activities with related departmental activities, such as its LISA program, as well as with the efforts of other federal and state government entities. Finally, the focal point should have authority to redirect or make recommendations to the Secretary to redirect the Department's water quality activities, as well as have access to and support from the Secretary. To enhance the transfer of water quality information in the field, the Secretary may

also want to consider the merits of establishing state or regional specialists to coordinate local water quality activities.

To avoid the confusion and contradictions created by overlapping policies, we also recommend that the Secretary of Agriculture develop a comprehensive policy that demonstrates the importance of water quality, regardless of the source of the contamination or the location of the water. Although the Department's current activities to develop such a policy are a move in the right direction, the policy should also include the possibility of penalties to help ensure participation if voluntary efforts are not successful. A comprehensive water quality policy should also consider the interrelationship of soil, water, and other natural resources, and acknowledge the trade-offs that sometimes are necessary when designing conservation measures.

Because USDA's water quality efforts could be adversely affected by some of the Department's other activities, we also recommend that the Secretary build on recent efforts to determine how the Department's commodity, soil conservation, and other activities affect its efforts to protect water quality. Such a task should determine the types of information that farmers use when making production decisions and identify appropriate penalties and incentives to ensure that water quality activities serve both national conservation and private property interests. Such a study could be carried out by the focal point GAO recommended above.

USDA's Working Group on Agricultural Chemicals and the Environment

The Secretary of Agriculture, in response to events occurring outside the Department during the late 1980s, established the Working Group on Agricultural Chemicals and the Environment (WGACE) in January 1988 to review USDA policies, develop strategies, and serve as an interim clearinghouse for agricultural chemical issues. Although the focus of this temporary working group was agricultural chemicals and their impact on the environment, WGACE placed special emphasis on the impact of agricultural chemicals on water quality. The members of the working group were senior-level officials from 13 USDA agencies.

As a result of its work, the group prepared a pair of documents in June 1988 summarizing its findings, recommendations, and accomplishments, as well as background information on agricultural chemicals and the environment and the benefits farmers would gain from stronger USDA leadership on the issue. The WGACE report had not been approved as of March 1990.

WGACE issued nine findings and one formal recommendation. Although the findings dealt generally with environmental issues, water quality was often mentioned as an environmental concern. WGACE identified current USDA efforts in the area of agricultural chemicals and the environment and suggested that USDA needs to

- conduct research and compile data on the extent and effects of current agricultural chemical use and ways to avoid future contamination,
- provide additional information and assistance to farmers and rural residents on the prudent use of agricultural chemicals,
- foster and provide incentives for reduced chemical use, and
- cooperate fully with other federal agencies working in the agricultural chemical management area.

WGACE also stated that the Department had used ad hoc committees for interagency policy coordination and development but that these committees were not well designed for developing and coordinating joint interagency programs and did not provide an easily identifiable focal point for interdepartmental coordination with external interests. Therefore, the group recommended that the Secretary of Agriculture create a Department-level Executive Policy Committee on Agricultural Chemicals, chaired by the Deputy Secretary of Agriculture. The committee would include the relevant Assistant and Under Secretaries of Agriculture and be authorized a small support staff. It would (1) recommend joint actions by USDA agencies, (2) facilitate internal and external coordination of agricultural chemical management programs, (3) serve as a

clearinghouse for related information and legislative initiatives, and (4) pursue other actions to improve agricultural chemical management, including addressing the findings of the WGACE report.

USDA's Water Quality Initiative

In fiscal year 1990, USDA began implementing its initiative to focus Department efforts on water quality. The initiative establishes new programs and expands ongoing efforts in three areas: (1) research and development, (2) data base development and evaluation, and (3) education and technical assistance.

Research efforts are designed to determine the extent of the groundwater problem, improve understanding of chemical leaching, and provide remedies for existing contamination problems. The Department plans to address these concerns by conducting basic studies on groundwater contamination and chemical movement. The research will also identify improved agricultural production systems—better management of soil, water, and chemicals—that are economically and environmentally sound. Finally, improved methods will be developed to sample and evaluate contaminated groundwater. USDA's Agricultural Research Service, Cooperative State Research Service, and state land grant universities have the lead role in USDA's research plan. In addition to this targeted research, USDA plans to continue ongoing research on subjects related to water quality.

New data bases will make information available to evaluate the economic and environmental impacts of current and newly developed agricultural production practices. USDA plans to develop a data base on agricultural chemical use and related farm practices for use in preparing computerized maps that can analyze land use in relation to soil characteristics and water quality. USDA's Economic Research Service and National Agricultural Statistics Service will lead these efforts. Additionally, USDA's National Agricultural Library's Water Quality Information Center will provide public information and referral services, and operate an electronic bulletin board system on water quality.

A wide range of education and technical assistance programs will be undertaken to improve the dissemination of existing and newly developed information on chemical management and production practices. Staff will be trained and field guides will be updated to include current information on water quality. On-farm demonstration projects will exhibit the viability of practices that reduce the movement of agricultural chemicals. Eight of these projects are planned for fiscal year 1990, followed by eight more in each of the next 2 fiscal years. Moreover, existing outreach activities will be increasingly targeted to areas with identified water quality concerns. Funding for interagency programs in areas with identified water quality problems, such as the Chesapeake

Bay and Great Lakes, will also be increased. USDA's SCS and Extension Service will jointly lead the education and technical assistance efforts.

One project in particular, the Corn Belt (or Midwest) Initiative, demonstrates how the components of the Water Quality Initiative interrelate and complement ongoing work outside of USDA. The Midwest was chosen as the site of the first regional project because it is an extensively farmed area overlying potentially vulnerable aquifers. The Corn Belt Initiative is primarily a research effort that will attempt to determine the extent and causes of groundwater contamination, and develop new agricultural practices that protect both groundwater and profitability. In addition to the research, technical assistance with soil and topographical information will be provided by SCS. A data base will be developed to aid in the storage and dissemination of data. USDA's efforts will also be coordinated with USGS' Midcontinent Initiative, which covers a similar geographical area (but examines the area below the soil or root zone) and EPA's ongoing survey of pesticides in groundwater. Finally, the results of the Corn Belt Initiative will be made available to researchers and producers in other areas of the country and serve as a model for similar initiatives in other areas of the country.

Other USDA agencies involved in the Department's Water Quality Initiative include ASCS, which will provide cost-sharing funds for some projects, and the Animal and Plant Health Inspection Service, which will utilize nonchemical pest control methods. The Forest Service will have a minor research role. USDA will continue ongoing work related to water quality, such as integrated pest management and LISA research, although these efforts are not included in the initiative.

Staffing for USDA's Water Quality Efforts

The nine agencies with water quality funding in fiscal year 1990 account for more than two-thirds of the Department's total staffing.[1] Most of the staff of these nine agencies are employed by the Forest Service, which has a small role in the Department's water quality activities. USDA could not, however, estimate how much staff time is devoted to water quality activities because of the multiple goals of its programs.

To get some perspective about staff assigned to water quality programs or activities, we asked the nine agencies with designated water quality spending to estimate the number of their staff working on water quality programs. Although all these agencies provided us with estimates of their water quality staffing levels, they used different methods to derive their estimates; therefore, the numbers cannot be accurately added together or compared with each other. These estimates, and the Department's total staffing levels, are shown in table III.1.

[1]Of the 10 agencies participating in USDA's Water Quality Initiative in fiscal year 1990, 9 are to receive funding.

Table III.1: Staffing of USDA Agencies With Water Quality Efforts, Estimated for Fiscal Year 1989

Agency	Total staff years	Water quality staff estimate	Methods used[a]
Agricultural Research Service	8,200	170	3,5
Cooperative State Research Service	167	[b]	2
Extension Service	171	163[c]	1
National Agricultural Library	202	1	4
Agricultural Stabilization and Conservation Service	3,295	1,649	4
Forest Service	40,913	237	1,2
Soil Conservation Service	13,954	343[d]	5
Animal and Plant Health Inspection Service	5,633	227	3
Economic Research Service	792	7	2,5
Total of agencies with water quality efforts	**73,327**	•	•
Total USDA	**109,567**	•	•

[a]The following methods were used: (1) dividing the agency's water quality funding by the estimated cost of supporting a staff member; (2) dividing the agency's water quality funding by the estimated cost of supporting a scientist and related support staff; (3) assuming that the percentage of the agency's staff working on water quality would be proportional to the percentage of its total budget devoted to water quality; (4) estimating staffing levels for conservation efforts, including water quality; and (5) estimating the agency's water quality staff on a project-by-project basis and factoring in headquarters and administrative support.

[b]The latest staffing data available for the Cooperative State Research Service were for fiscal year 1987.

[c]The Extension Service estimate refers to all staff funded through its budget, including state and local staff who are partially funded using federal money.

[d]Only SCS was able to provide an actual count of all of its staff working on water quality issues.

[e]Data not available.

Sources: USDA Fiscal Year 1991 Budget Summary and agency officials.

USDA's Low-Input Sustainable Agriculture Program

Concerns about the environment and farmers' dependence on machine and chemical inputs led the Congress to include a program to research and disseminate information on alternative farming practices in the Food Security Act of 1985. Following the first appropriation for such a program in fiscal year 1988, USDA issued a policy statement supporting such alternative agricultural programs. USDA's Low-Input Sustainable Agriculture (LISA) program began operation in fiscal year 1988, offering grants for research and education on alternative agricultural practices.

LISA offers research and education grants to develop and encourage the use of farming practices that substitute management skills for the use of some purchased inputs such as agricultural chemicals. Through fiscal year 1989, the program had funded 80 projects on a wide range of topics. USDA did not request funding for the LISA program for fiscal years 1989 or 1990. Further, the LISA program is not included in the Department's Water Quality Initiative, even though the program shares the initiative's focus on agricultural chemical management.

LISA Program Offers Research and Education Grants

There is no commonly accepted definition of sustainable, or alternative, agriculture, but there is some agreement that in order for a farming practice to be sustainable in the long run, as well as the short term, it needs to balance a number of sometimes competing needs, including (1) consumer and farmer health, (2) natural resource conservation, (3) farmer profitability, (4) environmental protection, and (5) demand for agricultural products.

Low-input generally refers to farming systems that rely less on purchased products, such as chemical fertilizers and pesticides, and more on resources such as labor, scientific information, and improved management. The LISA concept is not the same as organic farming, however. Although farming without the use of any manufactured chemicals can be part of a LISA system, the prudent use of chemicals is also consistent with the goals of LISA. In contrast, conventional agriculture utilizes systems that achieve high yields through specialization and the increased use of purchased products such as fertilizers and pesticides.

The LISA program is administered on three levels. Policy development and program coordination are the responsibility of the USDA Research and Education Committee, Subcommittee on Alternative Farming Systems, which is made up of representatives from 14 USDA agencies and offices. The Cooperative State Research Service has organized and

directed the national program, with the participation of other USDA agencies, notably the Extension Service, which provides educational assistance, and the National Agricultural Library, which operates the Alternative Farming Systems Information Center. Grant selection and administration in each of four regions is the responsibility of a host institution in that region. Table IV.1 lists the regions and their host institutions. Grant proposals are reviewed by regional technical committees and approved by administrative councils made up of representatives from research, extension, and private sector organizations in each region.

Table IV.1: LISA Program Regions and Host Institutions

Region	Host institution	States
Northeast	University of Vermont	Conn., Del., Me., Md., Mass., N.H., N.J., N.Y., Pa., R.I., Vt., W.Va.
North Central	University of Nebraska	Ill., Ind., Ia., Ks., Mich., Minn., Mo., Nebr., N.Dak., Oh., S.Dak., Wisc.
Southern	University of Georgia	Ala., Ark., Fla., Ga., Ky., La., Miss., N.Car., Okla., S.Car., Tenn., Tex., Va., P.Rico, V.I.
Western	University of California	Ariz., Cal., Col., Hi., Ida., Mont., N.Mex., Nev., Ore., Ut., Wash., Wyo., U.S. Protectorates (American Samoa, Guam, Micronesia, Marianas)

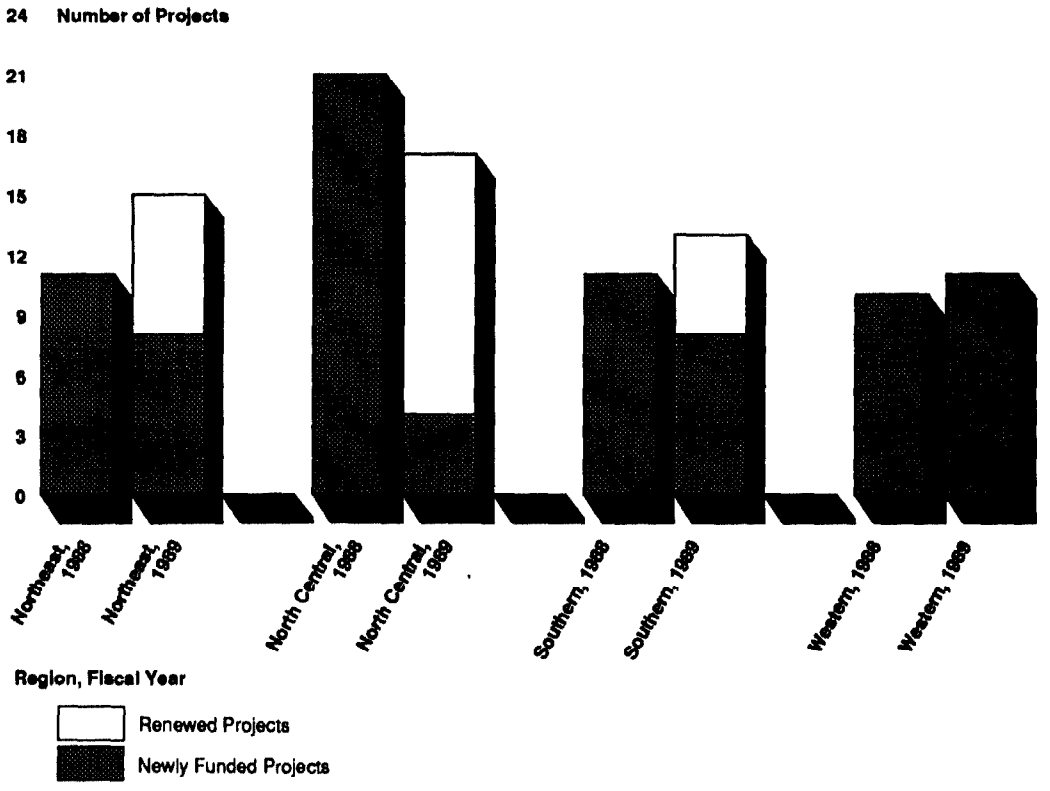
LISA Funding Has Been Modest

Although USDA policy officially encourages research and education programs on alternative farming practices, the LISA program has received modest funding and support. After an initial appropriation of $3.9 million for fiscal year 1988, USDA's next two budgets proposed the elimination of funding for the LISA program. Instead, the Congress increased its appropriation for the program to $4.45 million for both fiscal years 1989 and 1990. In its fiscal year 1991 budget, the Department requested that LISA funding be continued at current levels.

The $8.35 million appropriated for the first 2 years of the program ($3.9 million in fiscal year 1988 and $4.45 million in fiscal year 1989) supported a total of 80 projects, ranging in size from $2,000 to $255,000. Figure IV.1 shows the number of approved projects by region and year. In fiscal years 1988 and 1989, a total of 802 proposals were received by the 4 host institutions, of which 221 were judged by the review committees to be acceptable in terms of relevance, methodology, and plans for

making the findings readily usable to farmers. In both years, more proposals were judged acceptable than could be supported with existing allocations: in fiscal year 1988, 61 percent of the proposals judged acceptable were not funded; in fiscal year 1989, 38 percent of the proposals judged acceptable were not funded. Additional money would have made it possible to fund these projects and to increase the number of years of support provided to long-term projects.

Figure IV.1: Approved USDA LISA Projects by Region, Fiscal Years 1988 and 1989



Note: Four of the 53 projects approved in fiscal year 1988 were later merged with similar projects, leaving a total of 49 for the year.

Each region was allocated an equal portion of the available grant funds and each distributed the funds on the basis of regional and national priorities. Each received $836,000 in fiscal year 1988 and $975,000 in fiscal year 1989.

The LISA projects that have been funded to date are designed to meet both long-term and immediate needs. Most of the funded projects are long-term studies requiring several years to produce valid results, e.g., the development of alternative cropping systems. Other grants were awarded to make current information more accessible to farmers. For example, some of these short-term, 1-year grants have funded the production of video tapes demonstrating alternative farming practices. USDA had not yet evaluated the progress or results of any of these projects at the time of our review.

Because regions were permitted to fund projects to meet their own goals, the subjects addressed by these projects vary. The grants awarded in each region include projects that address major crop and livestock systems of that region: (1) dairy, fruit, and vegetables in the Northeast; (2) grain, cattle, and swine in the North Central region; (3) fruits, grain, and poultry in the South; and (4) grain, vegetables, and cattle in the West.

In addition, each region funded projects to meet national goals of evaluating the general productivity and profitability of low-input systems, as well as educational projects to make information more accessible.

Complete Information on Program Results Is Not Yet Available

Although some information on LISA results is available, the program has not yet produced enough information to convince a significant number of farmers to adopt low-input practices. According to USDA field staff, the widespread introduction of low-input methods will take time because Extension Service agents are reluctant to advise farmers to use such practices without sound economic and scientific backing. Farm organization officials also stated that enough evidence does not yet exist to convince most farmers to change their current methods.

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