

# Pest Management in U.S. Agriculture

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## Introduction

Pesticides, along with fertilizers and new hybrid seeds, have enabled American farmers to achieve unparalleled increases in land productivity over the last 40 years (Fahnestock). Despite pesticides' positive effects, as evidenced by the willingness of U.S. farmers to spend \$8.5 billion on pesticides in 1996 (USDA, 1998a), their potential hazard to human health and the environment is of concern (Cooper and Loomis, Hallberg, Mott, Harper and Zilberman). The discovery of Alar residues on Northwest apples, residues of banned pesticides (EBD and DBCP) in Florida groundwater, and detection of many pesticides in the ground and surface water in several States have heightened this public concern (Huang et al.)

Many of the techniques or practices collectively referred to as Integrated Pest Management (IPM) were designed to address some of the health and environmental concerns of pesticide use and the problem of pest resistance to pesticides. In general terms, IPM has been defined as "a management approach that encourages natural control of pest populations by anticipating pest problems and preventing pests from reaching economically damaging levels. All appropriate techniques are used such as enhancing natural enemies, planting pest-resistant crops, adapting cultural management, and using pesticides judiciously" (USDA, 1993b).

In 1993, the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA),

and the Environmental Protection Agency (EPA) pledged to work together to reduce pesticide use and associated health and environmental risks, and set the goal of "developing and implementing IPM programs for 75 percent of the total crop acreage" by the year 2000 (Browner et al.). Information is critical to designing policies to help achieve that goal. First, the baseline conditions need to be understood: which pest management practices are being used, on which crops, and in which regions. Then policies can be targeted to the circumstances that most warrant attention. The second critical use for information is to identify the factors that affect the decision to adopt preferred practices or techniques. Some barriers to adoption can be overcome through demonstration, education, or additional research, while others might be reduced with only a financial incentive. Effective policy design is based on both types of information — status reports and adoption analyses.

While USDA, land-grant universities, and the private sector have helped develop IPM techniques, many institutions have played an active role in encouraging IPM adoption. They include USDA, other government agencies, land-grant universities, agricultural extension services, private consultants, consumer groups, and environmental organizations. Since 1993, several activities have been undertaken to assess the use of pest management techniques and to encourage the use of alternative techniques when appropriate. A 1994 report examined the

extent of IPM use (Vandeman et al.). Although the report faced difficulties related to the measurement of IPM and data comparability, it presented the first estimates regarding the extent of IPM use based on nationwide survey data. USDA and the private sector initiated an effort to develop a measure of IPM adoption acceptable to the stakeholders (USDA, 1997b). In addition, USDA launched a series of new surveys to improve the data-gathering process. The Agricultural Resource Management Study (ARMS) surveys are designed to link the resources used in agricultural production to technologies (including pest management practices) and farm financial/economic conditions. The ARMS survey data can be used to assess the use of pest management practices and to link that use with yields, other management techniques, and chemical use for selected field crops. Similar surveys are conducted for selected fruits and vegetables in alternate years. The strength of these survey data is that they allow the determination of the important factors influencing the adoption of particular practices. Although they were not designed to characterize U.S. produc-

tion as a whole, these surveys do provide information on the extent of adoption of pest management for most major crops.<sup>1</sup> The first ARMS survey was conducted between June 1996 and April 1997.

This report's main objective is to present recent survey results on the extent of adoption of pest management practices by growers of major field crops (based on the 1996 ARMS) and selected fruits and vegetables. Other reports will follow as the results of more recent ARMS surveys become available and as some of the definitional issues become more settled. In addition, the results of the empirical analysis of the factors influencing the adoption of pest management practices will be published separately.

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<sup>1</sup>USDA's National Agricultural Statistics Service (NASS) Fall Area Survey also gives aggregate information for particular pest management practices on selected crops (USDA, 1998b).