Pesticide Use Trends and Issues in the United States

Craig Osteen

Pesticides have been used in U.S. agriculture since the late 1800s, but their use grew dramatically from the late 1940s to the early 1980s and then stabilized. The development and growing use of synthetic organic pesticides have been an integral part of a technological revolution in U.S. agriculture that increased productivity by 2.2 times between 1947 and 1988 (USDA, 1990). Growth in pesticide use has created many controversies about potential effects of pesticides on food safety, groundwater quality, worker safety, and wildlife mortality. The controversies reflect two major ideas: (1) using more pesticides is not necessarily a panacea for pest control, and (2) undesirable health or environmental effects of using some pesticides may outweigh their production benefits. Today, many people fear the risks of unknown or poorly understood hazards and are impatient with the U.S. Environmental Protection Agency's (USEPA) slow and deliberate resolution of pesticide controversies. There are also people arguing for a policy of limiting or reducing the overall level of pesticide use, which is a different approach than restricting or banning individual pesticides.

This paper discusses major pesticide use trends in the United States, pesticide regulatory policy with a focus on balancing risks and benefits, and several current policy issues. Important topics include (1) the effects of such factors as pesticide productivity, farm programs, and pesticide regulations on use; (2) the effects of increased pesticide use on productivity and pest losses; (3) the effects of changing attitudes toward pesticides on regulatory policy; and (4) a major shortcoming in the regulatory process for balancing risks and benefits.

1The author is an agricultural economist with the Resource and Technology Division, ERS, USDA, Washington, D.C. The views presented are those of the author and do not represent the official views of any agency or organization.
Effective chemical control of agricultural pests originated in the late 1800s (Klassen and Schwartz, 1985). Paris green (copper acetoarsenite) was developed in the United States in the 1870s to combat the potato beetle, and Bordeaux mixture (quicklime and copper sulfate) was developed in France in the 1880s to control disease in grape culture. Prior to World War II, arsenicals, sulfur compounds, and oils were commonly used. However, the development of synthetic organic materials, such as 2,4-D and DDT, during World War II heralded the modern age of chemical pesticides.

Aggregate Trends

Synthetic organic pesticide use grew rapidly from the late 1940s to the early 1980s before stabilizing. USEPA (1990) estimates that agricultural pesticide use grew from 320 million pounds active ingredient (a.i.) in 1964 to 880 million pounds a.i. in 1982 but fell to 845 million pounds a.i. in 1988 (Fig. 12.1). There was rapid growth during the 1960s and 1970s, but by the late 1970s markets for pesticides became saturated, and growth slowed. Pesticide use since 1980 has been heavily influenced by crop acreage, and reduced crop acreage helped to stabilize pesticide use after 1982.

U.S. Department of Agriculture (USDA) pesticide surveys show that use on major field crops (corn, cotton, soybeans, sorghum, rice, tobacco,