

The Farm Bill and the Environment

by

Terry A. DeBiase and David Zilberman

The debate surrounding the integration of environmental and natural resource conservation considerations within the Farm Bill has been the research focus for agricultural economists at the University of California, working in collaboration with a multidisciplinary team of scientists from various universities and agencies. Research findings were presented in June, 2001 at a recent Washington, D.C. conference entitled "The Farm Bill and the Environment." The conference is part of an ongoing dialogue between university scientists and policymakers that aims to improve policy making and make policy research more useful and relevant.

A new farm bill is ratified approximately every four years and includes farm income support legislation, commodity storage policies, and programs for agricultural resource conservation. According to Senator Pat Roberts from Kansas, commodity programs are supposed to provide a safety net to farmers, and cheap, abundant and safe food to consumers, while improving the quality of the environment. He expects that Congress will allocate \$20 billion annually over the next four years and foresees an expansion of funding to meet environmental objectives of approximately \$4 billion annually.

The design of environmental provisions in the Farm Bill is an intellectual challenge. It must be conceived within an overall framework that balances the well being of farmers and their desire for more freedom and flexibility with consumers' interest in affordable and safe food, and environmental quality objectives. These concerns must also be reconciled with constraints imposed by domestic and especially international agreements and political will. The design of the Farm Bill is primarily constrained by the World Trade Organization and international trade agreements that require a shift from agricultural transfers that increase farm supply toward payments for providing environmental amenities.

Agriculture-Environment Interaction

The collaborative research consists of several elements: natural scientists identify environmental issues that can be addressed and opportunities that can be captured by policy intervention; agricultural economists investigate the effectiveness of alternative incentives and other policy interventions in modifying producer behavior towards greener practices; and agricultural economists and other policy scientists investigate how to effectively incorporate and integrate environmental provisions with other elements of farm bill legislation.

Ecologists and other natural scientists suggest that agriculture can provide several types of environmental services:

- slowing and containing processes which contribute to the deterioration of natural resources and environmental quality. Such processes include soil erosion and a depletion of water resources, water contamination problems including hypoxia, water logging problems in the West, and the loss of wildlife resources and habitat (especially aquatic wildlife);
- reducing emissions and sequestration of greenhouse gases;
- releasing resources such as water and land for restoration and enhancement of environmental amenities including wetlands, storm buffers, and wildlife habitat and endangered species; and
- maintaining and improving rural landscapes.

Agricultural practices have become more environmentally friendly over the last 20 years as farmers have adopted integrated pest management, no- and low-tillage, and similar practices. On the other hand, water depletion problems have increased. Urban sprawl and industrial development have led to the loss of prime agricultural land and the reduction of amenities associated with open space. Although the rate of decline in wetland acreage in

FARM BILL-continued on page 4



Cover crops are planted between tree rows in California orchards for nitrogen fixation, weed control, improved soil tilth and reduced soil erosion.

the United States has slowed in recent years, there has been a definite decline in wetland quality. The challenge remains to reduce agricultural impacts on natural resources and protect and restore wetlands and other ecosystems.

The key ingredient in the design of effective environmental policies is the quantitative knowledge of the relationship between activities and their impact on the environment. Indeed, improvements in technology enhance environmental policy making. For example, a crucial element for an effective environmental conservation program is the establishment of quantifiable objectives and measures of performance. The use of spatial data to assess agricultural productivity and to develop environmental indicators is an essential element in the design of effective land purchasing programs. While there are many environmental databases relating to agriculture, most of the data is not appropriate for solving policy problems. Further research is still needed to better interpret existing data and develop new data resources.

The increased capacity to identify relationships between production activities and environmental impacts has significant consequences. Policy research suggests that growing public concern for environmental amenities impacted by agricultural pollution could lead to restrictions on agricultural practices. As past experience suggests, major groups may use the legal system to require enforcement of environmental legislation, such as the Clean

Water Act. Animal waste problems have become subject to scrutiny, and the expansion of concentrated livestock operations has been restricted. For example, the expansion of hog operations in North Carolina has been banned. In response to concerns about environmental quality, dairy farmers in California have been forced to modify their waste management practices. Enforcement of the Clean Water Act under court order has imposed restrictions on subjected livestock operations to meet total maximum daily loads to surface water bodies. An inadequate response to environmental concerns may

induce tougher measures that restrict livestock and agriculture production. However, proactive efforts to reduce environmental impacts and implement sustainable practices will receive growing support. Farmers already engaged in environmentally sound practices such as integrated pest management and use of cover crops should use this to their advantage.

Agricultural economists have compiled evidence that policy actions and incentives, as well as regulation, have led to an improvement in environmental quality and can induce farmers to significantly increase the environmental amenities that agriculture provides. Financial incentives to modify agricultural operations should be incorporated in the design of future agricultural policies to achieve sustainability through improvements in environmental quality. Farmers have responded to financial incentives as demonstrated by the continuous adoption of more efficient irrigation practices in California in response to growing water scarcity. Market conditions and farm policies that increase the profitability of no-till practices have led to their adoption throughout the Midwest. There are many other examples of green payments that have increased the adoption rate of environmentally-friendly technologies, and simulations predict that adoption rates will significantly increase with small increases in payments.

Earlier policies aimed at improving environmental quality by relying on voluntary participation

in programs in response to inducements. While these programs have been largely successful, there are areas where much improvement is needed. Policy scientists have found that voluntary programs are more effective when threats of punishment or denial of benefits are exercised if certain environmental objectives are not met. Some policy analysts suggest that we are witnessing the increased use of the "stick behind a carrot" approach that aims to induce both collective action and individual initiative to improve environmental quality. Environmental agencies may be prodded to apply the "stick" through legal channels, while commodity programs provide the "carrot."

Understanding the relationship between farmers' behavior and the impacts on the environment has led to an increased appreciation of the heterogeneity of agriculture. All farmers are not alike and there are differences in practices, environmental conditions, and objectives across regions. A lack of consideration for farmers' situations and constraints is the major reason for failed policies. An efficient policy in economic terms is one that aims to maximize an overall social welfare that considers the well-being of producers, consumers, taxpayers and the environment, given the constraints imposed by behavioral patterns and the natural environment.

Policy studies suggest that it is crucial to establish well-defined and quantifiable policy objectives that take into account the complexity of the environment. Instead of emphasizing one objective, such as improvement in water quality, it may be more effective to also consider improvements in the health of an ecosystem, improved wildlife habitat, and/or the ability of the landscape to buffer the impacts of extreme weather conditions. There is a growing understanding of biophysical and socioeconomic processes that relate agricultural activities to environmental phenomena, and this knowledge should be communicated to the public and incorporated in environmental decision making.

Another important principle is an emphasis on flexibility in establishing environmental priorities and criteria, and whenever possible, the reliance on local institutions in the formulation and implementation of policy. New environmental policies in agri-



Pheromone traps are used to monitor pest outbreaks in integrated pest management programs. The goal of monitoring is to improve the timing and reduce the number of pesticide applications.

Photo by UC IPM

culture may consist of grants to states where the federal agency is responsible for supervision and assessment of the use of the funds. Thus, flexibility at the local level should come with greater accountability for how funds are expended. This plan is consistent with another policy finding that indicates successful implementation of policies requires an effective system of monitoring and enforcement. New policies will be unsuccessful if failure to fulfill obligations is not detected and penalized. Therefore, the design of new programs should incorporate a system of liability and accountability.

Monitoring and evaluation systems should be designed to prohibit conflict of interest. To achieve this objective, a great share of monitoring and technical assistance activities should be relegated to the private sector. Public sector institutions such as the land-grant system, cooperative extension and the Natural Resource Conservation Service should concentrate on the generation and dissemination of knowledge and certification of third-party technical providers, as well as general program design. They should work with institutions and agents in the private sector who will be responsible for the day-to-day provision of monitoring and technical assistance.

Policy researchers have discovered that there are

FARM BILL—continued on page 6

three main difficulties in designing an effective conservation program. First, these policies should not exclusively concentrate on providing incentives to correct undesirable behavior. By only providing support to "bad players" for changing their ways, policies may misfire by preventing incentives for conscientious farmers and limiting appropriate knowledge and inclination. Conservation programs should also emphasize acknowledging and providing support to good land stewards who are already engaged in environmentally-friendly activities. Second, geographic areas where environmental benefits can be most effectively provided are not necessarily the areas where there is political pressure to provide support. One of the challenges in the design of environmental programs is to overcome political pressure and allocate resources to locations where they will maximize environmental benefits. Finally, because of the nature of ecological processes, considerable time lags exist between the implementation of conservation practices and the measurable outcomes. While it is more desirable to reward measurable outcomes, payments have traditionally been based on activities rather than results. Improvements in technology may lead to an increased emphasis on result-based compensation, but even in the foreseeable future, a majority of the rewards will be based on activities.

Implications for California

The increased emphasis on environmental aspects of the Farm Bill bodes well for California. California farmers have gained less from federal commodity programs than farmers in the Great Plains and Mississippi Delta regions. In the past, 36 percent of landowners have received 90 percent of the money from support programs. Major commodities (rice, cotton and wheat) have been relatively large recipients of the support program, while other agricultural products (fruit and specialty crops, pork, poultry and cattle) have received less support. The existing patterns of support payments reflect the political power of certain commodity groups and states and also aim to keep farmers on the land in regions where profitability of agricultural products may be marginal. Regions where conservation funds may have higher returns have not been supported in the past. Thus, effective conservation programs may reallocate funding to farmers who have not benefited from previous programs. There

is significant potential for enhancing environmental amenities on farmland and rangeland in California, and California agriculture may reap additional conservation funding as a result.

In summary, the environmental provisions of the Farm Bill must be conceived within an overall framework that takes into account such factors as the food abundance and the economic well-being of agriculture, and constraints imposed by domestic and international agreements. Several policy analysts advocate integrated farm policies to address these issues. Conservation and other farm policies that encourage farmers to provide environmental amenities have excellent potential. However, their success depends on complementary efforts to establish effective mechanisms that ensure compliance through monitoring and enforcement. The enhancement of the provision of environmental amenities by agriculture may necessitate divisions of responsibility between federal and state agencies, and increased involvement of local constituencies in establishing priorities for resource conservation, monitoring and knowledge accumulation. We are entering an era where the Farm Bill is becoming a major piece of both agricultural and environmental policy, and the research programs of economists and policy scientists should be modified accordingly.

Terry A. DeBiase is a graduate student in the Department of Environment, Policy and Management at UC Berkeley. He can be reached by telephone at (510)643-3263 or by e-mail at tdebiase@nature.berkeley.edu. David Zilberman is a professor of agricultural and resource economics at UC Berkeley with interests in agricultural, water and environmental policy design, the economics of technological change and the agricultural resource base. David can be reached by phone at (510) 642-6570 or by e-mail at zilber@are.berkeley.edu.