

Registration of Pesticides Used To Produce Food

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Issue. Regulation of pesticide products by the Environmental Protection Agency (EPA) is governed by two statutes: the Federal Food, Drug, and Cosmetic Act (FFDCA), which establishes tolerances for pesticide residues on food and feeds, and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which regulates the sale and use of pesticides through its registration process to prevent unsafe health and environmental risks. Several issues have unified consumer interest groups, environmentalists, agribusiness, and farmers in calling for changes in the registration process, although solutions offered by each group differ significantly. These issues include (1) the application of the Delaney, or zero-risk, standard in judging the safety of pesticide products, (2) the different regulatory treatment received by old and new pesticide products, (3) the lengthy time lag and high costs associated with the registration process, (4) research and development (R&D) incentives to develop safer pesticides, and (5) the registration of pesticides for minor uses.

Context. EPA, in granting a pesticide registration, specifies how a pesticide may be used. The specification takes into consideration exposure levels for farmworkers and consumers (human health issues include cancer and other illnesses) as well as environmental damage and wildlife protection. One of the most contentious elements of FFDCA is the Delaney, or zero-risk, clause that prohibits use of a pesticide if there is scientific evidence that it causes cancer and concentrates in processed foods. Since 1988, the EPA has chosen to implement a *de minimis* risk standard that permits the use of a potentially carcinogenic pesticide product if the risk is negligible. Negligible risk is expressed in terms of probability that an individual will experience cancer from exposure to a substance over a lifetime. For example, accepting a risk estimate of one in a million indicates that one out of a million individuals exposed daily over a 70-year lifetime will develop cancer.

In 1988, Congress required the EPA to reregister pesticides registered before November 1984 to ensure compliance with current health and environmental risk standards. Advances in technology have generated problems with the registration process itself. New products are scrutinized more than older pesticides because regulators demand state-of-the-art testing. Over time, testing has increased scientists' ability to measure residues and the biological functions most affected. Improved testing techniques in conjunction with the zero-risk standard raises the possibility of a regulatory paradox: that a new and weakly carcinogenic pesticide product could be denied a registration, while pesticide products already registered and potentially posing higher health risks remain on the market, at least in the short term. Other consequences of the more data-intensive registration process revolve around the high cost imposed on pesticide manufacturers and time lag during which society cannot realize the benefits of possibly safer and more effective pesticides.

At Stake. The reregistration of pesticides will potentially have far-reaching, but currently unmeasured, effects on production and marketing systems as well as on the environment, worker safety, and food residues. These effects will be manifested in the cost, availability, and physical appearance of a wide variety of food products. The elimination of currently registered products or the introduction of new products could result in significant changes in the type, amount, and timing of pesticide applications as well as changes in producer and consumer costs. Benefits and costs from changing the registration process will not likely apply evenly throughout the agricultural sector. If farmers with the worst pest problems become much less productive and total agricultural production

declines, farmers with modest pest problems may benefit from commodity price increases. Consumers who are willing to trade off higher prices for less pesticide exposure may benefit at the expense of consumers who care only about prices. An industry that develops alternatives to pesticides may benefit at the expense of the pesticide industry.

Consumer and environmental groups supporting the implementation of the Delaney standard argue that the negative human health and environmental effects are still not clearly understood or accurately measured. The food and agribusiness sector supports negligible risk standards, arguing that existing standards are excessive given the level of risk and that the pesticides generate better quality food in larger quantities. And, some argue that imposing strict health and environmental standards on American producers hurts U.S. export competitiveness when farmers in competing nations are subject to less stringent controls.

Fruit, vegetable, and specialty crop producers argue that their productivity is especially at risk. Some predict that the zero-risk standard and registration process costs would force chemical manufacturers to drop registrations for fruits and vegetables, which are considered minor-use crops. Fruit and vegetable growers claim they have few good substitutes for existing chemicals. The increasing data demands for registration may create deterrents for chemical manufacturers to carry out R&D. If pesticide manufacturers consider the costs of registration to be fixed costs, a large fixed cost could make the business of developing low-volume products unprofitable.

Alternatives. Several changes to the EPA's current registration process are being debated. Some consumer and environmental interest groups favor the Delaney clause in the registering of pesticide products even if meeting this standard disrupts current production practices. They believe that all cancer risk from synthetic chemical use on food products should be eliminated to protect consumer health and the environment. Many farm and pesticide interest groups favor replacing the Delaney zero-risk standard for pesticide residue with a *de minimis* or negligible risk standard. Using some form of a negligible risk standard would allow the EPA to concentrate on higher risk products which may potentially represent the greatest threat to health and environment and allow those products which pose a negligible risk to remain on the market. Some consumer groups oppose the negligible risk standard because it permits the use of pesticides with a known, albeit small, health risk. Government agencies have discussed, with no agreement so far, incentives for companies to develop lower risk pesticide products. Incentives proposed by the EPA include changing labeling standards to permit producers of lower risk products to indicate this in their advertising, streamlining the registration process for targeted products, waiving fees, reducing data needs, and giving higher priority to lower risk pesticide products. The USDA and pesticide producers favor changing the methodology used to estimate risk in establishing tolerance levels; instead of estimating pesticide risk to humans from laboratory tests, the EPA would use data measuring residues found on food products.

Agenda. A challenge by consumer groups to the EPA's application of the *de minimis* exception to the Delaney clause was upheld in the U.S. Court of Appeals in July 1992. A Justice Department petition to the Court of Appeals for a rehearing was denied in October 1992. This ruling could force the EPA to impose the Delaney standard in registration decisions. Doing that, EPA stated, would affect 35 chemicals used on 80 crops. Several alternative bills proposing changes in the existing registration process are pending before Congress.

Information Sources. National Academy Press, *Regulating Pesticides in Food: The Delaney Paradox*, Committee on Scientific and Regulatory Issues Underlying Pesticide Use Patterns and Agricultural Innovation, Board on Agriculture, National Research Council, 1987. Also, three Congressional Research Service publications: Donna U. Vogt, *The Delaney Clause: The Dilemma of Regulating Health Risk for Pesticide Residues*, 92-800 SPR, 1992; Vogt, *Proposed Changes to Policies Governing Pesticide Residues in Foods*, 92-179 SPR, 1992; and Jasper Womach, *Pesticide Policy Issues: Debating FIFRA in the 102d Congress*, IB91055, 1992.

Improving Water Quality through Policy Reform

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Issue. Agriculture is a major source of sediment, nutrients, salts, animal wastes, and pesticide residuals entering U.S. water supplies. These materials impair water quality in some areas of the country (see charts). Most other major sources of pollution are already controlled through regulation, so improvements in many areas will likely have to come by reducing agricultural discharges. Ideal policies would reduce agricultural pollution in a way that farmers and consumers alike view as equitable and efficient.

Context. The 1972 Federal Water Pollution Control Act outlined the goals for surface water quality. So far, the emphasis in this legislation and subsequent amendments has been on controlling pollution coming from clearly identified points (point sources). Agriculture and other nonpoint sources have been dealt with only as a secondary problem, largely through voluntary State management programs. However, programs must address agricultural pollution sources if national water quality goals are to be achieved. The 1990 Coastal Zone Act Reauthorization Amendments required technology-based management measures for farms in coastal zones. Agriculture's effect on ground water quality is addressed in Environmental Protection Agency's (EPA) Chemicals in Groundwater Strategy and in U.S. Department of Agriculture's (USDA) Water Quality Program. Some States also have programs for protecting water resources from agricultural pollution. Most Federal and State programs emphasize voluntary approaches. The 1985 and 1990 farm acts introduced USDA programs aimed at protecting or improving water quality. Such programs are likely to remain an important part of USDA's conservation activities. The issue becomes one of identifying which policy actions to pursue for achieving water quality goals.

At Stake. Who will bear the cost of cleaner water? Voluntary measures and stronger controls are the two most commonly considered approaches to reduce agricultural nonpoint source pollution. Most farm groups favor the voluntary approach, supported by research, education, technical assistance, and cost-sharing. This approach is appealing because the characteristics of agricultural pollution make it difficult, if not impossible, to identify individual or point sources of pollutants. In addition, it is difficult to predict the water quality benefits from adopting alternative management practices. Supporters of this approach believe that producers should not be forced to change practices and incur possible income losses unless conclusive evidence exists that their farm is a problem and that the actions taken will produce cleaner water. The voluntary approach would have minimal economic effects on producers, but would force water users to bear the costs of polluted water. This approach also implies that more progress towards meeting water quality goals would require increased controls on point sources, despite greater costs.

Environmental groups favor stronger controls on agriculture. Point-source pollution control policies have traditionally followed the "polluter pays" principle. Doing so would require that farmers bear some of the costs for their actions. Marginal costs for reducing most agricultural pollutants are lower than for a like reduction in pollution from point sources, economic analysis shows. Stronger actions might also be warranted since farmers already benefit from a number of commodity programs that can create incentives to increase chemical use and to produce crops by farming marginal land. Requiring farmers to alter their management practices will generally increase costs, especially for those growing input-intensive crops or those farming on marginal land. Some land may even be forced out of production. Consumer prices could rise and trade could suffer, particularly if other countries ignore the environmental costs of their agricultural systems.

Alternatives.

Continue current programs (status quo). Avoid further regulations under the Clean Water Act and continue to rely on volunteerism supported by publicly funded research, education, technical assistance, and cost-sharing. Adverse effects on producers are minimized under voluntary programs. However, there are no guarantees that voluntary changes in management necessary to improve water quality will occur, especially if those changes indicate lower incomes.

Shift more heavily towards compliance measures. USDA's commodity and other income-support programs offer payments contingent on farmers adopting environmentally sound management practices. Conservation compliance has already been adopted for the control of soil erosion. However, such an approach misses nonprogram crops. And, such incentives have declined recently and could decline further because of proposed trade agreements which limit support payments and possible budget-saving cuts in commodity program expenditures.

Introduce environmental taxes under the Clean Water Act. Input fees or taxes have been suggested as a way to reduce chemical use. Several States have taxes on nitrogen fertilizer. Taxes could reduce the amount applied, with the revenue to be used for research or refunded to those who adopt nutrient management strategies. Taxes based on potential environmental effects could also be applied to certain management practices.

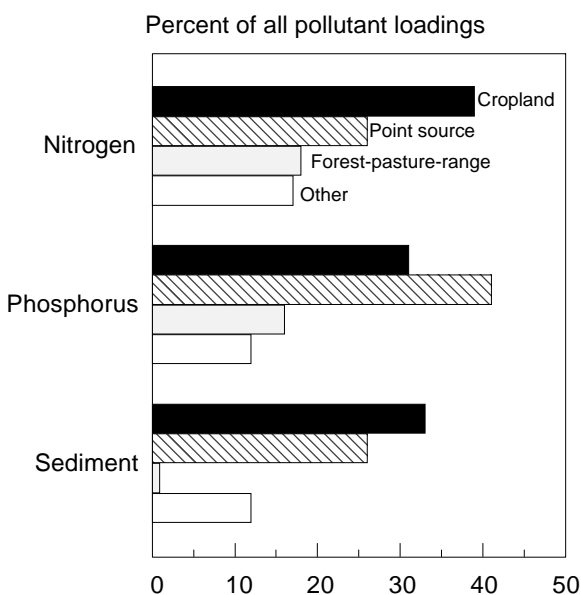
Adopt the Coastal Zone Management Act (CZMA) strategy. The CZMA calls for a technology-based approach in which States identify a list of approved best management practices (BMP's). States can use voluntary or regulatory means to see that appropriate practices are adopted. USDA and EPA cooperated in identifying the approved BMP's. This strategy has not yet been implemented, so it is unclear how successful it might be. Enforcement may be particularly difficult.

Agenda. Two pieces of prospective legislation can have a significant effect on agriculture's role in meeting national water quality goals. The Clean Water Act is up for reauthorization in 1993; preliminary work on major issues has been in progress for the past year. The 1995 farm bill debate will offer another forum for debate and, ultimately, legislative provisions.

Information Sources. Bulletins from the Environmental Protection Agency: *Water Quality Inventory, Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Pesticides in Well Water Survey, and Chemicals in Ground Water Strategy.*

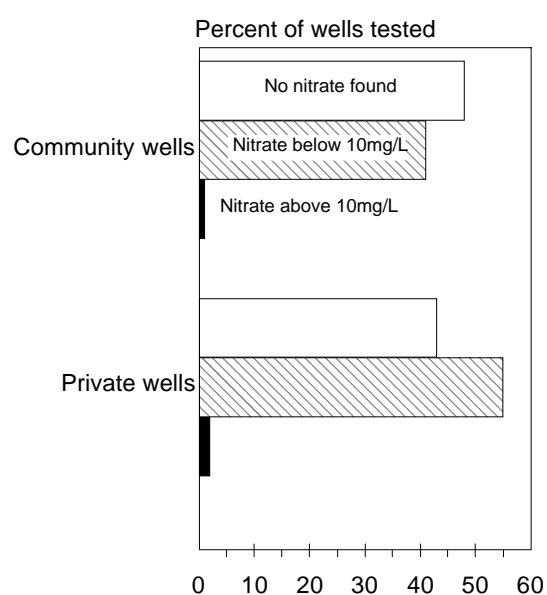
Sources of surface water pollution

Runoff from agricultural land is the single largest source of the Nation's surface water pollution.



Nitrates in U.S. drinking water wells

The nitrate levels in most wells are below 10 milligrams per liter, which does not pose a human health risk.



Endangered Species Preservation and Western Water Allocation

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Issue. Many endangered, threatened, and declining species depend on riverine ecosystems that have been altered by development of surface water supply systems to provide irrigation water in the Western United States. Conflicts arise from the mutual dependence of fish and agriculture on over-allocated western river systems. Activities to protect fish species could reallocate irrigation water for habitat improvement, thus potentially imposing financial losses on agricultural producers.

Context. Early applications of the Federal Endangered Species Act (ESA) involved "yes or no" decisions on proposed development projects. In contrast, the current generation of ESA actions, such as those for the spotted owl and sockeye salmon in the Pacific Northwest, involve integrating species preservation activities into existing regional economies. Recovery plans have been approved for only 56 percent of the 731 species officially listed as threatened or endangered under the ESA. Another 4,784 plant and animal species have been designated as candidates for protection.

Of 93 fish species listed as threatened or endangered, 67 are found only in western rivers, many of which have been developed for irrigation or hydropower. Surface water supply systems can harm fish in several ways. Dams block access to spawning grounds, alter timing and temperature of river flows, and create slack water in reservoirs that increases juvenile fish mortality. Diversions reduce the water volume remaining in rivers. Unscreened diversions and power-generating turbines create physical hazards. And, irrigation return flows can carry toxic chemicals and elements.

More than 50 percent of western irrigated lands, 21 million acres, rely on surface water from western rivers. Almost half of these receive water from projects developed by the Bureau of Reclamation (Reclamation). Under the ESA, Federal agencies are obligated to assist in endangered species conservation. Producers who depend on federally operated Reclamation projects, therefore, may be particularly vulnerable to water supply interruptions or reductions for fish conservation.

At Stake. Society places a high value on preserving those species threatened with extinction. However, recovery plans for endangered species increasingly must be reconciled with existing uses of land and water resources. Efforts to protect the large and growing number of endangered fish species in western rivers may affect agricultural economies that rely on low-cost, plentiful surface water supplies. Protection measures may reduce the quantity of water diverted for irrigation, increase power costs, and increase capital costs for diversion screens, fish ladders, and intake pumps.

The national value of crop production on wholly irrigated farms averaged \$529 per acre in 1987, more than six times greater than the \$83 per-acre average for nonirrigated farms. Crops produced on the 9.2 million acres irrigated with Reclamation water in 1990 were valued at \$9.6 billion. While Reclamation will continue to provide water for irrigation, reductions in the quantity of water supplied may result in reduced irrigated acreage, reduced yields, and changes in crop mix. These, in turn, would likely reduce the net value of output.

Two examples indicate the potential effect of ESA listings on irrigated agriculture. Snake River sockeye and chinook salmon in the Pacific Northwest and Sacramento River chinook salmon in California were recently listed as threatened or endangered. Although formal recovery plans are not yet in place for

these species, conservation activities are underway and the range of potential recovery measures has been identified. Both examples involve modification of historical norms for river management, but with significant differences. Salmon protection in the Northwest likely will leave irrigation supplies intact, although irrigation costs would rise with a regionwide increase in power costs due to protection efforts. In contrast, many California irrigators are almost certain to face reduced water supplies in most years. Since 1987, Reclamation has modified Central Valley Project (CVP) operations for salmon protection. Reserving a portion of drought-reduced CVP supplies in 1992 for salmon further reduced water allotments to many farmers.

Alternatives.

ESA implementation. The ESA requires the Federal Government to issue regulations as necessary to conserve endangered species, and authorizes purchases of land and water resources to accomplish this goal. Further, the ESA requirement of Federal agency cooperation poses an important constraint on Reclamation project operations. In its 1992 *Strategic Plan*, Reclamation recently defined "conservation and enhancement of fish and wildlife resources" as one of 25 critical program elements, and stated that it will, "Pursue innovative and cost-effective approaches for... recovering and managing threatened and endangered species associated with Reclamation projects."

ESA reform. Two modifications to the ESA are being considered: (1) introducing an economic test to supplement the current biological test for official listing of a species and (2) expanding the focus of the law from individual species to a broader ecosystem perspective. Either modification could alter the allocation of water between agriculture and endangered species.

Legislative reform. Two existing approaches provide alternatives to relying solely on the ESA to protect species. In the Columbia River Basin, the Northwest Power Act (1980) mandated that fish and wildlife be treated equally with hydropower and other river uses. An interstate commission was created to implement the mandate. This approach, creating systemwide river management institutions, could be adopted for other western rivers. Reforming water allocation rules for Reclamation projects gives a second, project-by-project approach. For instance, the Central Valley Project Improvement Act (1992) expands CVP purposes to include fish and wildlife restoration and protection, and dedicates 1 million acre-feet of water to accomplish this. It also includes three provisions for encouraging irrigation water conservation: deregulation of water markets, subsidies for conservation investments, and increasing block rate structures for water prices.

USDA water conservation program development. Proactive measures, such as voluntary water conservation, may avert more stringent measures that could be imposed through the ESA. Current farm programs provide some alternatives. The 1985 and 1990 farm acts created new incentives for reducing soil erosion and wetland conversion through the Conservation and Wetlands Reserve Programs. A similar program could permanently retire western water rights to make water available for ecosystem protection in regions with protected fish species. Further, USDA programs, such as the Agricultural Conservation Program, provide Federal cost sharing of investments for irrigation water conservation. It may be possible to address the issue of endangered species in western rivers through these programs.

Agenda. Continued implementation of the ESA requires designation of critical habitat and development of recovery plans for many formally listed species. Over 100 western fish species designated as candidates for listing also require consideration. In addition, Congress must soon consider ESA reauthorization. A program to address species conservation could be developed in the 1995 farm act or incorporated into existing USDA water conservation programs.

Information Sources. Information on western irrigated agriculture: U.S. Dept. of Commerce, Bur. of the Census, *Farm and Ranch Irrigation Survey (1988)*, AC87-RW-1, May 1990. Information on the Reclamation program: U.S. Dept. of the Interior, Bur. of Reclamation, *1990 Summary Statistics*, 1991 or *Reclamation's Strategic Plan*, June 1992. Two reports describe ESA implementation: U.S. Dept. of the Interior, U.S. Fish and Wildlife Serv., *Report to Congress: Endangered and Threatened Species Recovery Program*, 1990, and U.S. Dept. of Commerce, National Marine Fisheries Serv., *Endangered Species Act Biennial Report: Status of Recovery Program, FY 1989-1991*, 1991.

Wetlands Protection Policy

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Issue. The many public benefits of wetlands include providing wildlife habitats and outdoor recreation; controlling pollution, soil erosion, and floods; and preserving the ecosystem. Recognition of these public benefits since the 1970's has reversed Federal policy from support of wetlands conversions to wetlands protection. The conflict between the objectives of conservation programs and private property rights will strongly influence the direction and content of future policies.

Wetlands protection policy has several specific issues to resolve. (1) Delineation and categorization: what lands are wetlands and therefore subject to regulation, and should different regulations apply to different quality levels of wetlands? (2) Scope: what land-use activities on wetlands should be regulated? (3) Compensation and acquisition: should landowners who are subject to regulations be compensated, and to what extent should the Federal Government protect wetlands by direct purchase or by easements (formal agreements to pay landowners for use restrictions)? (4) Restoration and mitigation: are wetlands restoration projects ecologically and economically feasible, and should a system be established for trading wetlands losses in one area with restorations elsewhere?

Context. The area now covering the 48 contiguous United States contained about 215 million acres of wetlands at the time of colonization, according to the best available estimates. About 80 million acres of privately owned wetlands and 12.5 million acres of federally owned wetlands are left today. Hence, about 57 percent of wetlands have been converted to other uses. Shifts into agricultural uses have accounted for the majority of conversions.

Three major laws have been passed to control wetlands conversions. Section 404 of the 1972 Clean Water Act requires permits for discharging dredge and fill materials upon wetlands. The Swampbuster provision of the 1985 Food Security Act established that any farmer who converts wetlands loses eligibility for price and income support payments, crop insurance, and related Federal assistance to farms. The Wetlands Reserve Program, passed under the 1990 farm act but not yet fully funded, calls for the restoration of up to 1 million acres of wetlands that were converted to cropland before 1985; permanent easements are to be placed on the restored wetlands. Under the reserve's pilot program, easement contracts covering 50,000 acres cost an average of \$923 per acre.

Attempts to reform the implementation of Section 404 have grown into a lengthy public controversy. A 1989 wetlands delineation manual used by Federal agencies substantially increased the amount of land subject to regulations. Landowner complaints resulted in a revised 1991 manual, which substantially reduced the amount of regulated land. Because Section 404 is embedded in the Clean Water Act (which is currently up for reauthorization by Congress), the delay in achieving acceptable reforms in wetlands regulations is hampering implementation of other environmental policies.

Despite the efforts to protect wetlands under Section 404 and Swampbuster, critics have argued that the rate of wetlands conversion is still unacceptably high. They point out that Section 404 does not necessarily prohibit wetlands drainage and that Swampbuster does not work as a conversion disincentive since the recipients of farm program benefits do not own the majority of wetlands.

At Stake. The delineation controversy underscores the primary challenge to wetlands protection policy: reconciling the competing interests of those who can financially benefit by draining and planting or developing wetlands, such as farmers and urban developers, and those who benefit from the preservation of wetlands, such as environmentalists, the local community, or the Nation as a whole. The "taking clause" of the Fifth Amendment to the U.S. Constitution asserts that landowners cannot have their land taken away without just compensation. Any wetlands protection policy must choose some balance between public interests in wetland benefits and private property rights. Given fiscal problems at the Federal, State, and local levels of government, court decisions requiring full compensation could seriously threaten wetlands protection efforts.

Alternatives. To resolve the delineation question, modifications of the 1987 manual have been suggested as a compromise between the environmentalists' preference (the 1989 manual) and the property rights advocates' preference (the 1991 manual). Categorizing wetlands by quality and applying regulations commensurate with that quality could help to deflate the controversy regarding what lands should be subject to regulations. Furthermore, quality measures could guide the public's willingness to pay for protection, if compensation to property owners becomes necessary.

Easement contracts provide lump-sum or yearly payments to landowners who relinquish the right to plant or develop their wetlands. Alternatively, some Federal agencies, such as the Department of the Interior's Fish and Wildlife Service, directly acquire land. If compensation becomes the norm, substantial increases in the funding of land and easement purchases, such as those designated by the Wetlands Reserve Program, will be required to sustain wetlands protection efforts.

As recent proposals have suggested, the scope of Section 404 could be extended to regulate wetlands drainage and similarly harmful activities. Because ordinary agricultural practices would be exempt, the burden of the proposals falls mostly on developers, not farmers.

The concept of mitigation banking, a formal system for exchanging wetlands restorations and losses, could be used to implement a "no-net-loss" principle that intends to be both pro-environmental and pro-growth. When a wetland is lost to development, its equivalent could be restored elsewhere. This mechanism could protect against violating the taking clause while shifting the costs of conservation onto developers and landowners: an individual retains the right to convert a wetland but must replace it with a restoration in recognition of the public costs of the private decision. The ecological value of restored wetlands, however, does not necessarily match the value of natural wetlands.

Agenda. A series of recent executive and legislative initiatives has outlined reforms to wetlands regulation. The Bush administration's Comprehensive Wetlands Plan, the Hayes-Ridge bill (HR 1330), the Edwards bill (HR 4255), and the proposed DeFazio bill have a number of similarities, such as recommending that States become more involved in enforcing Federal wetlands protection laws. These initiatives become background for a new Congress and a new administration.

Information Sources. M. Carey, R. Heimlich, and R. Brazee: *A Permanent Wetland Reserve*, AIB-610, U.S. Dept. Agr., Econ. Res. Serv., Aug. 1990; U.S. General Accounting Office: *Wetlands Overview: Federal and State Policies, Legislation, and Programs*, GAO/RCED-92-79FS, Nov. 1991.

Environmental Concerns Associated With Livestock, Dairy, and Poultry Production

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Issue. The major water pollution control law, the 1987 revision of the 1972 Federal Water Pollution Control Act, expires in 1993. The reauthorization debates will consider water pollution attributed to surface runoff or seepage into ground water from agricultural activities, particularly livestock, dairy, and poultry production.

Elements of the debate include (1) defining the extent of pollution from livestock, dairy, and poultry production, (2) identifying technical solutions, (3) evaluating control alternatives, and (4) analyzing the costs and benefits of alternatives and their effects on the regional and international competitiveness of U.S. producers.

Context. A 1969 U.S. Department of Agriculture (USDA), Office of Science and Technology, report identified animal wastes from confined feeding operations as a major agricultural pollution problem. Since then, there have been large public expenditures on technology development, and demonstration and cost-sharing programs to reduce water pollution from livestock, dairy, and poultry production. The 1990 farm act authorized new water quality programs.

Public concerns over the contamination of streams and ground water from livestock, dairy, and poultry wastes is renewing interest in producer regulation. Of particular concern are degradation of streams from nitrogen, phosphorus, and pathogens and pollution of ground water from nitrogen. Environmental concerns are also expanding to include air quality problems associated with ammonia, methane, and odors, and other problems such as dust, insects, rodents, noise, and degradation of aesthetics. Earlier policies focused on controlling point source pollution from large cattle feedlots and other large livestock production facilities through the National Pollutant Discharge Elimination System (NPDES). Renewed interest and pressures are now focused on the control of nonpoint source pollution and associated effects on groundwater quality. One source of nonpoint pollution is runoff from agricultural land, including areas on which animal wastes are spread.

Differences in environmental regulations among States and countries, combined with diverse inherent natural resources, affect the regional and international competitive position of U.S. producers. The legislative challenge is to find ways to reduce the adverse environmental effects of livestock, dairy, and poultry production while maintaining both equity and competitiveness within domestic and international markets.

At Stake. Current regulations to control point source pollution are generally based on standards. Nonpoint source control programs are developed by States, are primarily voluntary, and are designed to support "designated uses." Coastal zone management regulations under consideration for control of both point and nonpoint source pollution are focusing on technology. Environmental requirements imposed on the livestock, dairy, and poultry industries will directly affect the economic viability and international competitiveness of these industries. There are ways to control the runoff from animal confinement sites as well as nonpoint sources at acceptable levels and solve other environmental problems. However, such controls impose costs on producers and eventually on consumers. Increased pollution control costs may force some producers to reduce or cease their production, or relocate to areas with less environmental stress. Such costs need to be evaluated in conjunction with benefits.

Liberalization of trade and investment through international agreements will reduce constraints on moving livestock products across national borders. The competitiveness of producers in such open markets may be affected when they compete with producers from countries with different environmental regulations or conditions.

Debate continues over the severity of nonpoint pollution associated with livestock and poultry. The Environmental Protection Agency (EPA) estimates that animal agriculture contributes about one-third to one-half of the nonpoint surface water pollution in the United States, primarily from improper land application of wastes from confinement sites and from grazing. This estimate, however, is not universally accepted. Neither the results of long-term technical research nor an adequate data base are available to definitively link specific agricultural activities and control measures with measured levels of water pollution.

Alternatives. Policy options to address environmental problems associated with livestock, dairy, and poultry production range from largely voluntary programs, which link farmers with technical and financial assistance to solve problems, to strict regulatory programs, where compliance with standards is required, with or without regard to cost.

It will be difficult to assess the effectiveness and enforceability of new standards and their potential effects on the location, size, and competitiveness of livestock, dairy, and poultry operations without compliance cost estimates and information to predict the effectiveness of proposed practices on water quality. Completed USDA, EPA, and other studies of livestock and poultry and water quality issues offer a wealth of information on technical and policy options, but little on effectiveness. Broad application of successful options identified can serve as a beginning point for action. Further studies are needed on the following:

- (1) The costs and benefits of alternative handling and utilization technologies for reducing point source pollution from livestock, dairy, and poultry enterprises of varying size and in different geographic regions.
- (2) The nature and extent of nonpoint source pollution associated with animal agriculture nationwide and the total cost of reducing nonpoint source pollution to meet current and proposed discharge standards.
- (3) Enumeration and analysis of the waste-control policies and practices in other countries to determine their cost-effectiveness, and their effects on the competitive position of U.S. producers.

Agenda. The agenda for solving environmental problems associated with animal agriculture includes arriving at a consensus of the scope, severity, and location of the problem; identifying options for solving the problems; and then identifying the interregional and international impacts of controls or management options on producers, consumers, and society. While it has authority to deal with nonpoint source pollution under Section 319 of the 1987 Clean Water Act, EPA has chosen to allow States to pursue voluntary compliance. Congress could seek more stringent controls to deal with the perceived failures of the nonpoint source pollution control programs when the Clean Water Act is amended in 1993. Much of the responsibility for administering the Federal regulations has been transferred to the States and they may set standards higher than the Federal standards.

Information Sources. A.S. Malik, B.A. Larson, and M. Ribaldo, *Agricultural Nonpoint Source Pollution and Economic Incentive Policies: Issues in the Reauthorization of the Clean Water Act*, AGE-9229, U.S. Dept. Agr., Econ. Res. Serv., Nov. 1992. American Society of Agricultural Engineers, *National Livestock, Poultry, and Aquaculture Waste Management*, Proceedings of the National Workshop, July 1991. Other research and planning reports are available from other USDA agencies such as the Cooperative Extension Service, the Soil Conservation Service, the Agricultural Research Service, and the Agricultural Stabilization and Conservation Service and also the EPA.