ENVIRONMENTAL ASPECTS OF THE 1995 FARM BILL

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It is time to move the focus of the Farm Bill away from erosion control and shift our attention to active soil organic matter and infiltration as the best way to continue to make environmental and economic progress. We are drawn to this conclusion after analysis of how erosion, agriculture's use of pesticides and fertilizers, the weather, and public policy have all left their mark on the nation's water resources and the public's perception of agriculture's contribution to environmental quality.

Aspects of the Farm Bill pertinent to the environment include cost-share, technical assistance, conservation compliance, CRP, a multitude of special programs and research. The real questions that must be dealt with are:

Can the Farm Bill meet the public's desires for affordable, abundant, high quality food, clean water, open space and wildlife?

How can programs be simplified?

How can conflicts between programs and other laws be reduced?

How can fiscal responsibility be maintained?

What scale should be used to address perceived problems?

Should the proposed legislative solutions be mandatory or voluntary?

Will the law address the real problems of soil compaction, deterioration and oxidation of active organic matter, animal nutrient management, and stream bank and stream bottom erosion, or will it continue to put Band-Aids on the problems' symptoms which are erosion, and pesticides and nutrients in the water column?

Will the law encourage the research that is still needed?

Will the law cause U.S. agriculture's share of the world market to increase or shrink?

Should conservation program funding be mandatory or discretionary?

What lessons could be learned from the Rural Clean Water Program?

Is it best to target problem areas or to deal broadly with all lands?

Background

Some of agriculture's early endeavors caused erosion which left visible gullies and whiter knobs of subsoil showing on the hills. This was something that farmers could see and understand. In other areas, silt choked some of the old fishing holes in the streams and covered fish spawning areas. Fishermen saw and understood it, but to a large degree this problem was out of sight and out of mind to most farmers. Also, legally, once silt reached the stream farmers no longer had control over water quality. Erosion and sediment were the visible, tangible evidence that something was wrong. In fact, it was wind borne dust from the Great Plains descending on the nation's capital that dramatized soil erosion and caused policy makers to authorize the first major soil and water conservation policies. Because it is so visible, this nation has focused a great deal of its attention on the problem of soil erosion over the last 60 years.

Farmers are sensitive to soil erosion and feel they have done a tremendous job of combating it. Indeed they have. According to the National Resources Inventory, farmers have reduced sheet and rill erosion on cultivated cropland from an average of 4.5 tons/acre/year in 1982 to 3.5 tons/acre/year in 1992. Cultivated cropland in the state of Tennessee used to erode at an average of 14.1 tons/acre/yr in 1982. With the technical assistance of many dedicated individuals, average erosion rates in Tennessee dropped to 9.3 tons/acre/year in 1992. These were voluntary efforts by farmers before the conservation compliance provisions of the 1985 Food Security Act really took effect. Now in

1995, the Natural Resources Conservation Service's status reviews on Tennessee's highly erodible land indicate the average is between 6 to 7 tons/acre/year, which is even lower than the rate required to be met in many conservation compliance plans. Farmers are moving rapidly to no-till which, in many cases, reduces erosion on highly erodible land to a greater degree than what the compliance plan calls for. In addition, they are also no-tilling the rest of the field that is not highly erodible, which means that the overall average is even lower than conservation compliance status reviews indicate. All totaled, this brings average erosion very close to the tolerable soil loss level "T." (Jerry Lee, State Conservationist, Tennessee, June 1995).

Focus groups conducted by the Conservation Technology Information Center (CTIC) as part of CTIC's Crop Residue Management Campaign found that farmers felt they were doing a good job of controlling soil erosion. Many farmers seemed to equate good soil conservation with environmental stewardship. Because they felt they were doing such a good job in controlling erosion, they could not understand why they were being accused of polluting the environment with pesticides and nutrients. This feeling seems to be the result of 60 years of intense national focus on soil erosion.

Unfortunately, this focus on soil conservation has essentially put a Band-Aid on the sore to stanch the most visible bleeding (gullies), but allowed the wound to continue to ooze underneath (sheet and rill erosion). The oozing continues because the Band-Aids of terraces, waterways, contouring, and strip cropping continue to allow the soil to move down slope within defined areas and do little or nothing to curtail the real man-induced causes of soil erosion, namely tillage and soil compaction. Although various forms of conservation tillage being practiced by farmers do a lot to further reduce erosion that might occur between the structures, they do not totally eliminate erosion.

While the nation focused on erosion symptoms on cropland, very real problems of soil compaction due to tillage pans and heavy axle loads, oxidation of active organic matter due to tillage, and stream bank and stream bottom erosion were out of sight and out of mind, and therefore did not receive the research and attention they deserved. The magnitudes of these problems have only recently begun to be documented.

Wheel track compaction was found to produce disproportionately larger amounts of sediment and runoff than non-wheel tracked areas. After finding that compaction reduced alfalfa yields 40 percent, corn yields 15 to 25 bushels per acre and that 60 to 90 percent of the surface of most fields is impacted by a wheel track, the American Farm Bureau Federation launched a major educational campaign called "Farm Partners, Have You Hugged Your Soil Lately?" in 1984. The National Research Council's report *Soil and Water Quality An Agenda for Agriculture*, (1993) noted that 25 to 60 percent of the sediment in some streams in the Midwest came from stream bank and stream bottom erosion. More recently, Reicosky and Lindstrom (1995) found that moldboard plowing wheat stubble caused a loss of more than 3,600 pounds of organic matter per acre in just 19 days. That loss was greater than the amount of carbon the previous wheat crop had been able to store in its stalks and roots.

Also, while removal of proteins and carbohydrates through grain and food crops was well recognized as a problem, the solution of trying to replace them with "white bread," (the cellulose in the remaining stalks and leaves), and a "vitamin pill" of commercial N,P and K fertilizers did not totally compensate for everything that was removed, (DeLuca, 1995). Too often, the "white bread" was buried by moldboard plowing and oxidized much faster than the next crop could replace it, (Reicosky, 1995).

Meanwhile, pesticides were being used in increasing amounts and some of them ultimately moved away from their intended targets into the streams, lakes and ground water (Porterfield et al., 1995). However, unless the water turned green from algal growth spawned by excess nutrients or there was an obvious fish kill, these problems were largely out of sight and out of mind, too.

Agricultural Environmental Facts and Trends

It is useful to summarize some of the recent trends in pesticide and fertilizer use, and water quality. They all indicate that agriculture is working to reduce the amount of inputs applied and increasing the efficiency of use of those inputs that are applied.

- Total pounds of active ingredients of crop protection chemicals used on corn, soybeans, wheat, and sorghum was down 24 percent between 1982 and 1992. For these crops, insecticide use was down 50 percent and herbicide use was down 21 percent. Source: Agricultural Resources and Environmental Indicators. 1995. USDA ERS Agricultural Handbook Number 705. p 90.

- Integrated Pest Management (IPM) reduced insecticide use on cotton by 74 percent over a six year period from

1976 to 1982. During that time, planted acreage declined only 2.5 percent and average cotton yields increased by 27 percent. Source: USDA.

- Nitrogen-use efficiency of U.S. corn grain (based on a five year rolling average) is up 21 percent from 1980 to 1993. Sources: USDA and Potash and Phosphate Institute.

- Since 1986, Farm Bureau's Cooperative Well Water Testing Program has assisted over 58,000 farm families in 24 states to test their well water fornitrate in the past few years. As of January 1995, Heidelberg College's Water Quality Laboratory in Tiffin, Ohio has tested 42,983 of those samples. Only 3.9 percent of those samples were above the Safe Drinking Water Act standard of 10 parts per million (ppm) nitrate-nitrogen. Over 84 percent of the wells fell below 3 ppm, which is generally considered to be within natural background levels. Sources: AFBF and Heidelberg College.

- Erosion on 36.5 million acres of Conservation Reserve Program land is down 90 percent to around 1 ton/ac/yr. (Most soils naturally regenerate at rates of 2 to 12 tons/ac/yr.) Source: SWCS 1992.

- The government's conservation compliance requirements for 135 million acres of highly erodible land will reduce erosion an additional 5 tons/ac/yr, or 50 to 60 percent compared to levels existing in 1990 when compliance began. However, voluntary erosion control efforts before 1990 had already produced 14.1 tons/ac/yr of erosion control on highly erodible land, or 2.75 times more erosion control than all the efforts of conservation compliance will produce. Sources: SWCS and AFBF 1992.

- Crop residue management (CRM) leaves at least 15 percent of the soil surface covered with old stalks and leaves which dissipate raindrop impact and wind erosion. Various forms of CRM are now used on 61 percent of all planted acres. No-till soybean acreage rose dramatically from 2.2 million acres in 1989 to 13.8 million acres in 1994. No-till is one form of CRM and can reduce erosion by 90 percent. Favorable yields and reduced costs have keyed CRM's rapid growth. Source: CTIC 1994.

- The National Resources Inventory found the average sheet and rill erosion on all cropland fell from 4.1 tons per acre per year in 1982 to 3.1 tons per acre per year in 1992. The average rate of wind erosion cropland fell from 3.3 tons per acre per year to 2.5 tons per acre per year over the same period. These rates are well within most soils' natural ability to sustain productivity. Source: 1992 NRI, USDA SCS.

- Wetlands drainage due to agriculture averaged only 29,000 acres per year between 1987 and 1991. (That's down from 157,000 acres per year between 1974 and 1983, and is about one-fourteenth of the annual loss estimate of 398,000 acres per year for the period 1954 to 1974.) And, that does not count the restoration of over 400,000 acres of wetlands during the last five years via the Conservation Reserve Program, Wetlands Reserve Program and other private programs. Meanwhile, urban drainage of wetlands now accounts for over 54 percent of wetland losses each year. Source: 1992 NRI, USDA SCS & Agricultural Handbook # 705.

Trends in Stream Water Quality in U.S.[1]

Trends in traditional indicators provide evidence of improvement in stream water quality during the decade of the 1980s when the economy and population showed significant growth.

The scientific assessment of national water-quality from 1980 to 1989 by USGS indicates:

(1) The National Water Quality Inventory (State 305(b) reports) is severely flawed and scientifically invalid. EPA's inventory cannot be used to summarize water quality conditions and trends.

(2) Dissolved-oxygen concentrations changed little from 1980 to 1989, but streams in urban areas showed slight improvement in dissolved-oxygen conditions, possibly reflecting improvements in point-source controls. Among the four land-use types (agriculture, forest, range and urban) the average concentration of dissolved oxygen was lowest at stations in urban areas.

(3) Nitrate concentrations and yields remained nearly constant nationally, but they declined in a number of streams draining agricultural areas where nitrate levels have been historically high.

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[1]"Stream Water Quality in the Conterminous United States--Status and Trends of Selected Indicators During the 1980s," by Richard A. Smith, Richard B. Alexander, and Kenneth J. Lanfear, U.S. Geological Survey, 1993.

(4) Total-phosphorus yields decreased slightly in all land-use classes. Decreases in total-phosphorus yield were greatest in the agricultural and range land-use areas.

(5) Suspended-sediment concentrations and yields decreased slightly in most of the country, and the quantity of suspended sediment transported to coastal segments decreased or remained the same in all but the North Atlantic region. The steepest declines occurred in areas dominated by range and agricultural land.

(6) Concentrations of the toxic elements arsenic, cadmium, and lead and the organic compounds chlordane, dieldrin, DDT, toxaphene, and total PCB's all declined significantly.

(7) Trends suggest that control of point and nonpoint sources of fecal coliform bacteria improved over the course of the decade.

(8) Downward trends of dissolved solids were especially common in the central part of the country, the Pacific Northwest, and far southwestern United States, whereas upward trends were most common in drainage to the Gulf of Mexico and Atlantic Ocean.

(9) Sampling for herbicides in the Mississippi River and its major tributaries showed that alachlor and atrazine occasionally exceeded EPA drinking-water criteria and that substantial quantities of these herbicides are transported by major rivers over long distances.

Discussion of Key Questions

Can the Farm Bill meet the public's desires for cheap, abundant, high quality food, clean water, open space and wildlife? Yes, it could, but no, it probably will not; at least not in a cost-efficient manner. It is nearly impossible to do so since there are 536 individuals who must agree on a policy before it becomes the law of the land. Many are lawyers and few understand, or for that matter, even care about agriculture. Compromise seldom produces the best or most efficient solutions.

As evidence, look at the Conservation Reserve Program (CRP) that was authorized under the 1985 Farm Bill. Today, the CRP provides about $2 billion per year to protect 36.4 million acres (about 1/10 of the nation's cropland) land from erosion. While the CRP had seven listed goals, the only two goals that were close to being fully implemented were commodity supply control and erosion control. The same $2 billion per year could be spent much more efficiently and provide water quality benefits and erosion control on nearly **all** the cropland rather than just one-tenth of it.

Think about this: 75 percent of the current annual CRP funding was equivalent to one-half of all the property taxes paid on the 448 million acres that USDA identified as cropland in the United States in 1990. Property taxes are a very big issue to most farmers. Providing farmers with a credit equivalent to half their property tax could be a huge incentive to reduce erosion and improve water quality in many states.. A pilot program in Pepin County, Wisconsin, showed just how effective this approach could be. For a $3 per acre credit on their property taxes, twice as many farmers developed a conservation plan for their farm than ever had before, and countywide soil erosion was cut in half. It happened in two short years.

A Conservation Credit Program similar to Pepin County's would cost about $1.5 billion per year which would leave $500 million per year for land retirement programs for land that's really environmentally sensitive or for wildlife. For a mere $60 million per year the government could rent 480,000 potholes, 1.44 million acres of adjacent uplands and put a Hen House in each of those potholes in the prairie pothole area of North and South Dakota to produce ducks. By putting a Hen House in each pothole, 80 to 90 percent of the mother ducks could successfully hatch a brood, rather than the 5 to 15 percent that are able to do so today. That would be 75 percent less costly than the CRP program is today in those two states and we'd probably have just as many if not more ducks. As Cecil Bell chairman of General Mills so aptly pointed out in an open letter to fellow outdoors-people a few years back, "**All you need to know about habitat is that the farmer owns the duck factory. If this isn't reflected in management then there is no management**."

That would still leave $440 million to spread around the rest of the country for other wildlife or environmentally sensitive land.

A Conservation Credit Program as described here has three major stumbling blocks to overcome. First, local taxing authorities could lose a big portion of their income if the program was conducted locally. Secondly, it is not common practice for the federal government to subsidize local property taxes. And third, there is the issue of fairness of differential property tax rates. All of these could be overcome by changing it to a federal income tax credit, or

finding some other innovative way to allow the federal government to finance the program.

One thing is clear from the Pepin County example, the psychological advantages of a property tax credit are disproportionately powerful compared to most all other methods of encouraging conservation. It is also ironic that this tax money is often used for cleaning sediment out of road ditches and waterways. In a way, it is money that shouldn't be going to the government in the first place. If some way could be worked out to finance conservation credits, it would be a dynamite program that would reward good conservation and the long-term maintenance of the practices.

How can programs by simplified?

Farmers are potentially faced with over a dozen different environmental programs in which they could participate, (for example Conservation Reserve Program, Water Quality Incentive Program, the Great Plains Program, Conservation Compliance, etc.). Each one has its own paperwork. And, as some farmers have found, elements of one may conflict with requirements of another. Farm Bureau believes it would make sense to have one piece of paper instead of twelve. This should not be confused with having the government developing a whole farm plan which mandates all aspects of your farm operation from livestock to crops; farmers will not stand for that. We have endorsed combining all the specific programs and including their functions under one cost-share and technical assistance program similar to the current Agricultural Conservation Program (ACP).

Farm Bureau policy consistently has called for voluntary, incentive-based programs, coupled with adequate technical assistance and education, as the key to dealing with site specific problems. The Conservation Reserve Program is a prime example of incentives being great enough and red-tape being reduced to the point that farmers were willing to participate. In other words, it was a farmer friendly program. At the other end of the spectrum, the Endangered Species Act is just the opposite, to the point of being so farmer unfriendly, that it is counterproductive to its goals.

How can conflicts between programs and other laws be reduced?

One example of conflicting laws involves the requirement under the Clean Water Act to land apply sludge or manure via injection into the soil. However, doing this on highly erodible land could cause a farmer to be in violation of his or her conservation compliance plan under the Farm Bill. The compliance plans often require a certain percentage of the soil surface to be covered with crop residues. The residue absorbs the impact of falling raindrops and acts as a miniature dam to hold the soil in place. Injecting the sludge or manure disturbs the soil surface and buries some of the crop residue. Thus, while complying with the Clean Water Act it may put the farmer in jeopardy of losing eligibility for all USDA program benefits because there may not be enough crop residue left to meet the requirements of a conservation compliance plan.

Also, if a farmer's conservation efforts attract an endangered species, all his farming efforts may simply be shut down or severely curtailed. Farm Bureau would prefer that farmers be exempted from the other environmental laws if they are following an approved conservation plan. However, this is not a likely possibility under the Farm Bill. It would take an amendment to the other laws as well.

How can fiscal responsibility be maintained?

Farm Bureau feels that the government must live within its means and budget just like every citizen must. Since conservation programs are discretionary expenditures and a small portion of the overall U.S. budget, they are easy targets to cut. However, most all the citizens benefit in one way or another from these conservation efforts and there is still much work to be done. Discretionary programs have already taken significant cuts over the last few years. It is time for Congress revise the mandatory programs that make up the bulk of the U.S. budget.

What scale will be used to address perceived environmental problems?

Currently, all federal agencies are promoting the concept of "ecosystem" management. However, ecosystem management is an unacceptable way to deal with environmental problems. The major failing of the concept is that there is no commonly accepted meaning of the term. As a result, a particular point in the landscape could literally be part of dozens of ecosystems, each one perceived as needing different, and probably conflicting, management schemes. Watersheds at least have definable boundaries. Even though they overlap political boundaries, these obstacles have a reasonable chance of being overcome. It should be up to local people working together to determine the appropriate size watershed for their efforts. The smaller the watershed unit, the better the chances are that problems can be solved. However, the smaller the watershed the more difficult it is to find funding.

Should the proposed legislative solutions be mandatory or voluntary?

Mandatory solutions work when there is an identifiable point where pollution enters the environment, and where costs of pollution control can be passed on to the public through higher product prices. Notice, I said they work, I did not say they work well. Agriculture does not fit either category.

Most industrial point sources are enclosed under a roof and are thus immune to rainfall runoff. However, agricultural pollutants can arise from, or be moved from, any part of the landscape. It should be remembered that most agricultural pollution of surface water occurs during large rainfall events that produce runoff. Mandating zero pollution from agricultural nonpoint sources as is the goal of the Clean Water Act is not physically or economically possible, and the Farm Bill will be a better bill if it does not follow the lead of the Clean Water Act in this respect. For economic reasons, most soil and water conservation practices are designed to protect against rainfalls that occur once every ten years. Livestock manure holding facilities are designed to withstand 25-yr, 24-hour storms. Neither farmers nor the rest of the public can afford to spend the money to protect the land from 16 inches of rain falling in 24 hours. Assuming you could put up a cheap pole barn with a tin roof at a cost of $10 per square foot to protect the nation's 330 million acres of cultivated cropland, it would cost 143 trillion dollars. Of course, that begs the question of how to get light and water to the plants farmers are trying to grow.

Will Compaction, Oxidation, Nutrients and Stream Bank Erosion be addressed?

Will the law address the real problems of soil compaction, deterioration and oxidation of active organic matter complexes, animal nutrient management, and stream bank and stream bottom erosion, or will it continue to put Band-Aids on the problems' symptoms which are erosion, and pesticides and nutrients in the water column? It is not likely that soil compaction and oxidation of active organic matter will be addressed directly by the law, even though they are basic problems that really need to be solved. However, Senate and House leaders have made it clear that management of livestock nutrients will be addressed in the cost-share and technical assistance programs. Stream bank and bottom erosion is legally the purview of the state since the stream banks and stream bottoms are not privately owned. Therefore, the Farm Bill will probably not address these problems directly. Incentives for riparian zones next to the stream could, however, be part of the legislative effort.

Will the law encourage the research that is still needed?

Research is the key to any further technological or economic advancements. Soybeans were the success story of the late 1980s and early 1990s. Herbicide use on soybeans declined 49 percent to 67.5 million pounds of active ingredients. Insecticide use on soybeans dropped 97% and other pesticide use completely disappeared. This was made possible by research that improved planting equipment for no-till applications and the introduction of at least ten new herbicides that could be sprayed on after the crop had emerged. Their rates of application were measured in ounces instead of pounds per acre. Total production of soybeans remained steady at 2.2 billion bushels despite a decrease of 11.5 million planted acres. Research does little good by itself, unless it makes economic sense to farmers. In the case of soybeans, it generally reduced costs and increased yields while at the same time controlling soil erosion. It was a win-win situation, but it wouldn't have happened without research, both private and public.

Research at the land grant institutions also was responsible for developing the late spring nitrogen test. Nitrogen fertilizer use in Iowa has declined from 145 lbs/ac to 114 lbs/ac within a few short years with no noticeable decline in yields. It wouldn't have happened without research. Farm Bureau feels research is important enough that it should be a mandatory budget item rather than a discretionary item.

The late spring nitrogen test is an example of research that allows farmers to treat fields with more precision. With the advent of reliable on-the-go yield monitors and availability of Global Positioning System signals, farmers will have increased opportunities to fine-tune their management of inputs, possibly square meter by square meter. This is a case where the technology has leaped ahead of the understanding of how it can be applied in the field. Research is needed to develop more and better sensors that can monitor soil and crop conditions on-the-go, and to connect them to controlling valves and equipment that can instantaneously change the level of seed, fertilizer or pesticides need to match the conditions.

Important research needs to be done to develop knowledge based systems so farmers can interpret the meaning of all the gigabytes of information that these computerized systems will produce. It is important that the Farm Bill provide adequate resources so this research can occur. Beyond that, the Farm Bill should not be the vehicle to provide incentive payments to get farmers to try specific technologies. The Extension Service could, and probably should, take some role in educating farmers about this technology. But ultimately, the marketplace

will sort out what works best in the field based on whether it makes farmers more profitable.

Will the law cause U.S. agriculture's share of the world market to increase or shrink?

Farmers are price takers, not price setters. Any increase in farmers' costs because of added regulations will only translate into an easier time for competition in other countries to erode U.S. farmers' share of the world market. Conservation compliance and any other regulations under the Farm Bill ought to meet two simple litmus tests; one, it must be better for the environment and two, it must improve the farmer's net income. If it doesn't do the latter, the practice should not be required. If a required practice reduces a farmer's net income, but is essential to protect the environment, then consideration should be given to replacing the reduction in income with public funds. The only sustainable farm is a profitable one.

What are the lessons learned from the Rural Clean Water Program?

Some 20 projects were conducted over the course of a ten-year period from 1980 to 1990. A number of key lessons were learned from that program including: 1) voluntary incentives work, 2) there is a significant lag time between the time good management practices are installed and any improvement in water quality (often 10 to 20 years), 3)livestock waste management needs cost-share assistance, 4) erosion is still a major water quality problem, 5) funds for water quality programs should be authorized up-front, and 6) education is very important (AFBF, 1992).

Partly as a result of the Rural Clean Water Program it has become evident that controlling pollution from livestock manure is very costly and the costs are largely unrecoverable as long as we deal with it in a containment mode. As a result, more attention is being paid to how cost-share funds and technical assistance can be directed to livestock needs in the 1995 Farm Bill.

With proper incentives, the Farm Bill has a much greater chance of producing water quality improvement than any other law. The Rural Clean Water Program of the 1980s concluded that voluntary, incentive-based programs were a better way to bring about water quality improvements from agriculture than were end of the pipe regulations prescribed by the Clean Water Act for point sources.

Targeting vs. A Broad-based Assistance Approach

Current conventional wisdom seems to target critical areas because resources are scarce. For erosion control and stream bank stabilization this makes some sense, but care must be exercised in determining the size of the area that really needs to be treated. The U.S. General Accounting Office suggests that targeting six million acres of "filter strips" adjacent to streams would be a better use of funds than the current CRP, (GAO, 1995). While this would probably stabilize the stream bank, it also eats into some of the farmer's best cropland. Assuming the filter strips were 100 feet wide on both sides of the stream, it would take out more than 24 acres of farmland per mile of stream. Others have proposed buffer strips of 50 meters on each side of a stream which would take out 40 acres per mile of stream. Both of these are extreme measures. Research in Iowa indicates a buffer strip 15 to 25 feet wide would be adequate for water quality purposes in much of the Midwest, (Licht, 1993). In any case, rental rates for these areas should be based on the average cash rent basis for cropland in the area plus 50 percent. The extra 50 percent would compensate for the fact that the streamside land is more productive than average. It would also help compensate for increased difficulty in maneuvering machinery, wildlife damage to crops and domestic animals and for wildlife and birds spreading weed seeds into the cropland.

Targeting may have some clear applications, but from a water quality standpoint, every acre contributes some level of pollutants to the environment. Every acre that has been cultivated for crop production has lost 40 to 60 percent , or more, of its original organic matter content. This makes every acre more susceptible to erosion and also increases the risk farmers encounter in growing a crop during periods of drought or excess moisture. Long-term we are better off to work on improving active organic matter, infiltration and internal drainage of every acre to reduce government exposure to emergency drought and wet weather losses than pouring all the resources into a few targeted areas to stop erosion.

Pilot Program for Improving Active Organic Matter and Infiltration--

It is time to refocus farmers' attention onto soil quality and the organic "glues" that hold soil aggregates together and allow them to resist erosive and compactive forces. The easiest and most visible elements for a farmer to focus on are soil active organic matter content and infiltration rates. This shift in focus may not be all that difficult to achieve. Farmers in Wisconsin ranked organic matter as the number one descriptive term when asked how they would recognize a healthy soil (Romig, et al. 1995).

Soil quality is a key factor in determining how much soil erosion occurs, and how much, if any, of the applied

pesticides escape offsite. The key soil characteristics that would benefit most from improvement on every acre of land are active organic matter content and infiltration rates. These can be changed rather dramatically within a few years (Reicosky et al, 1995).

Farm Bureau has recommended that the conservation title of the next Farm Bill include a pilot program to allow states to provide a graduated incentive for improved soil organic matter content and infiltration rates, (Mitchell, 1995). Improvement in these two parameters will complement each other. The more active organic matter a soil has, the better it will hold and degrade chemicals before they can leach to groundwater. Infiltration will improve because the additional organic matter complexes will not allow the soil surface to seal over as fast during rainfall and runoff events. The faster water infiltrates the less chance it will have of contacting and carrying with it any chemicals that remain in the top layer of soil.

For each incremental improvement in active organic matter content that can be documented by soil tests, farmers could be offered a set, per acre incentive. For each incremental improvement in infiltration rates that can be documented, farmers and ranchers could be offered an additional per acre incentive. There should be no criteria set forth as to how a farmer or rancher attains each increment of improvement other than the general criteria that it should not violate conservation compliance plans. Once the top level of improvement is reached, then the per acre incentive should be converted to a federal income tax credit so that the farmer or rancher will be encouraged to maintain these soil improvements over the long-term.

One potential problem with this incentive is that it would be tempting for the farmer to use tillage to increase the infiltration rate. Tillage, particularly moldboard plowing, would oxidize the organic matter, thus defeating the effort to raise the soil's active organic matter content. To alleviate this potential problem incentives to improve infiltration rates could be made contingent on documenting increases in active organic matter.

Grazing Lands Conservation Initiative

One unfortunate aspect of focusing so much of the Natural Resource Conservation Services' (NRCS) attention on America's 440 million acres of cropland over the last decade has been that personnel, funding and technical assistance have been virtually unavailable for the other 600+ million acres of privately owned pasture, hay and rangeland. In fact, based on the 1992 NRI, the nationwide average sheet and rill erosion on rangeland was unchanged from 1982, remaining steady at 1.2 tons per acre per year, and wind erosion on rangeland had only declined 0.3 ton per acre per year. These numbers contrast sharply with the reductions obtained on cropland of 1.0 t/a/yr and 0.8 t/a/yr respectively for sheet and rill erosion and wind erosion. These lands have tremendous potential for storing carbon, providing habitat for wildlife and reducing wind and water erosion, as well as providing nutritious forage for grazing livestock.

Farm Bureau is supporting the establishment of a voluntary Private Grazing Lands Conservation Initiative that would yield beneficial changes to privately owned grazing lands and contribute to our nation's supply of food and fiber and improve water supplies, water quality, recreation, air quality, wildlife and soil quality (AFBF, 1995).

Biosolids on agricultural lands and set asides--

The opportunity to spread biosolids (sewage sludge, manure and compost) on CRP land was never fully investigated. "Clean" biosolids would have dramatically improved tree growth, boosted organic matter production and improved the nutrient content, particularly micro-nutrients, of many soils (Mitchell, 1995). This, in turn, would have boosted the richness and diversity of the plant food chain, which would have increased the production of insects and low-level herbivores such as mice and moles, and manifested itself in larger numbers of other wildlife.

Summary and Conclusions

Surface water quality is improving, but lag time between implementation of best management practices and water quality improvements can be considerable as was learned in the Rural Clean Water Program.

Groundwater quality is not the national crisis that some would like to make it out to be. Farm Bureau's Well Water Testing Program and EPA's National Pesticide Survey have borne this out. There are localized groundwater problems, but these can be dealt with effectively if lawmakers provide proper incentives and allow local people the latitude needed to produce innovative, efficient local solutions to the problems.

Heavy-handed command and control regulations will result in farmers and ranchers doing only the minimum required to meet the law. If farmers and ranchers are asked to do things for the benefit of the public, but the costs are large and unrecoverable, very little progress will

likely occur. However, properly fashioned voluntary incentives will cause them to want to go beyond the letter of the law to produce an abundance of clean water, open space and wildlife that the public seems to want.

Where good research has been coupled with improved economics at the farm level, and the practices have been not overly difficult to implement, farmers have made dramatic strides in reducing pesticide use and improving efficiencies

of the pesticides that are used. Soybeans and cotton are classic examples of this successful combination.

The Farm Bill, and every other piece of legislation that affects the environment, should take in to account agriculture's past successes and the progress that will occur even if no changes are made to existing legislation. As noted above, agriculture has made considerable progress over the last 15 years in reducing input use, increasing efficiency of input use and controlling erosion. Yet, it has been proven over and over again that long lag times exist between implementing a conservation practice and demonstrating improvement in water quality. Since a large portion of the conservation compliance plans on highly erodible cropland were installed in 1993 and 1994, it is likely that water quality will continue to improve for a number of years even if no additional laws are passed.

Point source pollution is much more controllable than nonpoint source pollution. Weather is the dominant uncontrollable factor in agricultural nonpoint source pollution. The cost of completely preventing rainfall erosion on cultivated cropland would be well in excess of 143 trillion dollars. The cost of obtaining the Clean Water Act's goal of zero discharge of pollution is something that neither farmers nor the public can afford. It would be unwise for the 1995 Farm Bill to incorporate a goal similar to the Clean Water Act's zero discharge goal. A Farm Bill providing $2 billion per year in voluntary programs is a lot of money, but if the incentives are properly designed, more conservation progress can be made within 5 years than have been made in the past 60 years. Also, to put that amount of money in perspective, it would take more than 100 years to spend as much as what EPA regulations cost industry every two years. Industries' efforts can make the air and water a little cleaner, but farmers' conservation efforts can provide habitat for wildlife, aesthetically pleasing landscapes, fishing and hunting opportunities, as well as improving air and water quality.

Farm Bureau supports continuing the Conservation Reserve Program, increased cost-share assistance for manure management structures, increased technical assistance for private grazing lands, tax credits and new pilot programs to increase active soil matter and infiltration and the use of clean boisolids.

Given well designed voluntary programs with adequate incentives farmers will continue to strive for improving efficiency of input use, and for excellence in conservation so long as it make good economic sense. Public support for incentives and research into new practices that improve both the environment and the farmers' bottom line is a win-win situation for everyone.

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