



Lean, Mean and Green . . .

Designing Farm Support Programs in a New Era

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Special Note: The figures presented in the published version of this report were of such a level of detail that we felt they could not be adequately reproduced here.

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Preface

This report is the first in a series of reports from the Henry A. Wallace Institute for Alternative Agriculture on Green Support Programs.

Green Support Programs, under which farm income support would be provided in return for farmers' provision of environmental protection, reflect a relatively new concept in agricultural policy. This first report provides an overview of the concept, delineates the various critical decisions that must be made in designing a Green Support Program, and explores the implications of and tradeoffs involved in making those decisions. By clearly defining the broad opportunities and limitations of Green Support Programs, it aims to inform the evolving debate about the concept and provide general guidance to those involved in designing, promoting, or evaluating programs that fall in this class.

Executive Summary

Green Support Programs (GSPs) would make environmental protection the principal basis for farm income support. A GSP is a voluntary program that provides direct monetary payments to farm operators or farmland owners in return for the provision of environmental benefits. What distinguishes GSPs from most traditional agricultural

conservation and environmental programs is that they would explicitly support participants' farm incomes at the same time they purchase environmental benefits.

GSPs promise numerous advantages over current mechanisms for farm income support. A GSP would provide farm income support without distorting commodity supplies or prices, be consistent with greater market orientation of agriculture, assist farmers in meeting the requirements of environmental regulation, and likely foster greater public support than traditional approaches now garner.

GSPs offer a wide range of options between traditional farm income support and standard environmental protection programs. The most critical decision in designing a GSP is the determination of the weights placed on each of its dual objectives — income support and environmental protection — as this, in turn, determines the universe of eligible beneficiaries.

Distribution of benefits from a GSP targeted mainly to environmental protection would vary according to what environmental problems are addressed. Because different environmental risks posed by agriculture are distributed differently across the country, getting specific about environmental quality means getting specific about the distribution of GSP benefits.

But, in general, the geographic areas in which environmental problems associated with agriculture are greatest do not correspond well to the current distribution of government support payments. This has two important implications:

- **A GSP targeted exclusively by environmental criteria would radically change the current distribution of farm income support.**
- **A GSP which replaced current farm income programs but was aimed at retaining current government support patterns would have diffuse, less concentrated environmental benefits.**

A GSP targeted mainly to support the income of impoverished, or small and moderately-sized family farms, could both redress the inequities of current income support distributions and yield some media-concentrated environmental benefits.

Still, a GSP linked with existing commodity programs could provide the basis for reform of income support programs. Despite problems with this linkage, adding an environmental dimension to current farm income support mechanisms could pave the way for gradual decoupling of income support from commodity-specific guarantees, with recoupling of payments to environmental objectives and eventual expansion of support to regions and producers of commodities that do not currently benefit from commodity programs.

With regard to the actions for which GSP eligible farmers would be rewarded, sustainable agriculture is best served by a flexible approach. Basing the designation of eligible actions on a total farm resource plan would be more likely to address site-specific environmental problems in the context of individual farms' unique resource and managerial situations than would the use of prescribed best management practices. This approach also maximizes the probability of achieving stable, farming systems-based solutions, and could generate rural economic growth if the private sector is enlisted to provide the services needed to make it successful. Tying this approach into a regional resource management plan would further empower producers and localities in voluntarily gaining environmental protection.

Since GSP payments are to provide income support, their levels and/or the actions justifying payment, must fluctuate with market conditions. GSP payment levels must exceed the private cost of taking environmental protection action. However, the extent to which the reward exceeds costs can vary over market conditions, either by: making the payment level greater for a given set of actions under poor market conditions; or by holding payment levels constant over all market conditions and raising the level of environmental protection required for that payment under thriving market conditions.

A Green Support Program could be funded from existing budgets, and could easily produce net budget savings. A logical source of GSP financing is the Commodity Credit Corporation, savings from which can be derived by

increasing the acreage flexibility under which current commodity programs operate. GSP funding from CCC would also reduce the funding requirements for conservation programs. As an alternative or supplement, GSP funding could come from savings realized through the consolidation of existing agricultural conservation and environmental quality programs. This would reduce the funding requirements for income support from CCC. The greatest possibility for net budget savings comes from a GSP that replaces commodity programs as a basis for farm income support.

Involving State and local governments in GSP design and implementation could strengthen the program's performance and provide the incentive for State-level contributions to funding. A system for making block grants to States which meet broad Federal guidelines for GSP implementation would save Federal money and empower States to assure that GSP payments meet local as well as national needs.

The time is ripe for thinking seriously about making Green Support Programs a major complement of the next generation of agricultural policies. Support for the malfunctioning and expensive set of current farm programs is waning while environmental protection intensifies as a public priority. As we show in this report, though significant trade-offs must be considered, a GSP can be designed to meet any number of specific objectives consistent with supporting the income of some group or groups of farmers and addressing one or many environmental problems associated with agriculture. The key to designing an appropriate GSP entails coming to grips with exactly what we want our next generation of farm programs to achieve. Given that knowledge, a GSP option probably exists to accomplish those objectives.

Green Support Programs would make environmental protection the principal basis for farm income support.

If the American public is going to continue to support the income of the nation's farmers (and polls suggest there is a lot of sympathy for this charge), shouldn't taxpayers be able to expect a positive, public benefit in return for their investment? This simple expectation, and the failure of traditional farm income programs to provide a valued public benefit in the modern world (see Box 1) have given rise to the concept of Green Support Programs.

A Green Support Program (GSP) is a voluntary program that provides direct monetary payments to farm operators or farmland owners in return for their provision of some sort of environmental benefit(s). Providing financial assistance to farmers who implement environmentally friendly practices is not, on its own, a new idea. Dating from the Great Depression, Federal agricultural policy has addressed environmental problems associated with agriculture through transfers of payments to farmers. The U.S. Department of Agriculture (USDA) currently manages more than a dozen different programs that provide subsidized loans, cost share payments, other partial remuneration, or land rental or easement payments to farmers who take specific resource conservation or environmental protection actions on the land they farm, or who agree to forego the right to cultivate environmentally vulnerable land temporarily, over a specific contract period, or into perpetuity.

The feature that distinguishes GSPs from most traditional agricultural conservation and environment programs is that they would explicitly aim to support participating farmers' incomes at the same time they purchase environmental benefits. This dual objective nature of the GSP makes it quite different from a standard, environmentally-oriented financial assistance program. For example, the current Water Quality Incentives Program, often referred to as a "green *payment* program," provides payments of up to \$3,500 per year for 3-5 years to farmers who implement a USDA-approved water quality management plan. But because this program's participants share the cost of implementing the plan, it provides no direct income safety net. The Conservation Compliance Program, which predicates eligibility for participation in traditional farm income support programs upon meeting minimum standards for soil conservation, might broadly meet the definition of a GSP. But in this case, environmental protection is a condition of, rather than the actual basis for, farm income support. The program that probably comes closest to a GSP is the Conservation Reserve Program (CRP) which offers annual rental income to farmers who place environmentally vulnerable land under protective grass or tree cover for a 10-year contract period. But, the CRP begins expiring in 1996 and...

Box 1**How Farm Income Support is Currently Provided**

Farm income support is routinely provided both indirectly, by actions like government purchases of surplus commodities, and through direct, income supplementing payments to farmers who voluntarily participate in commodity programs. Dairy farmers' incomes are supported through programs that support the price of milk. Producers of wheat, rice, rye, corn, barley, oats, sorghum, soybeans, peanuts, cotton, tobacco, and sugar can opt for income protection by taking out a nonrecourse loan from the government that can, if market conditions are poor, be paid back by forfeiting the produced commodity to the government for a guaranteed floor price (called the "loan rate"). Program participating producers of wheat, small grains, corn and other feed grains, cotton, and rice are eligible to receive "deficiency payments" that are equal to the difference between a government-set, guaranteed "target price" and the higher of either the commodity's market price or its "loan rate." In return for the price guarantee, these producers must agree to reduce their planted acreage of specified commodities by a percentage that the government sets in years when expected market conditions suggest that some brakes need to be applied to slow supply response to price guarantees.

Problems with Current Mechanisms for Farm Income Support

Commodity price support as a farm income safety net dates back to the 1930's when virtually all domestically produced commodities were also consumed in this country, so prices were domestically determined. Now that American agriculture is an integral part of the world economy, commodities' market prices are determined in a global setting. Thus, domestic price support is inconsistent with the new world order and can have the undesirable effect of reducing U.S. trade competitiveness, a problem "fixed" by costly export enhancement programs. Global relations also affect direct income payments since multilateral trade agreements have begun to limit the extent to which farmers can be subsidized through such mechanisms as deficiency payments.

Although commodity program participants have, in recent years, been granted increasing flexibility with regard to what they may plant on enrolled acreage, the system through which deficiency payments are made remains antagonistic to the use of dynamic, sustainable farming systems that respond to current market signals and future resource conservation needs.

Finally, the high cost (recently averaging around \$12 billion per year) and skewed distribution of commodity program payments are of special concern. Because income support payments are tied to certain commodities' production, they benefit a small percentage of all farmers. But, even among farm program participants, a full three-quarters of the farm program benefits go to the largest 15 percent of farms.

No other current program rewards environmental stewardship behavior through transfers that provide farm income guarantees.

Green Support Programs promise numerous advantages over current mechanisms for farm income support.

Green support programs, as a concept, appear to offer the potential for satisfying the objectives of multiple and diverse interest groups with one policy instrument. The unique advantages of GSPs include the following:

- **A GSP would provide farm income support without introducing the distortions in commodity prices that current farm programs engender.** Because a GSP would provide income rewards for stewardship behavior rather than influence income through the prices received for specific commodities, prices would be competitively determined through the marketplace and would not, as a result of government action, be higher than necessary for competitive advantage in global markets.
- **GSPs are unlikely to significantly shift any commodity's supply from that which would be determined by market forces.** Environmental protection can be achieved on the vast majority of agricultural lands without removing the land from production. GSPs that reward environmentally friendly practices on land in production would mostly be neutral with respect to supplies and production, though substantial GSP-induced increases in crop rotation might alter crop mixes and the location of production of some commodities. A GSP that rewarded the retirement of land deemed to be too environmentally vulnerable for cultivation or grazing would not be likely to have a significant aggregate effect on any one commodity's supply because the number of such highly vulnerable acres is fairly low, and they are widely scattered geographically.
- **GSPs are consistent with the trend, stimulated by multilateral trade agreements, toward a more market oriented agricultural sector.** Most forms of GSPs would appear to be legal under the provisions of the Uruguay Round of the GATT.
- **Since environmental protection is a high public priority, a GSP is likely to be seen as more socially acceptable (and thus less vulnerable to budget pressures) than current forms of farm income support.**
- **GSPs offer the possibility of providing financial assistance to farmers in meeting the requirements of environmental regulations, such as the Clean Water Act, that have or may have an impact on agriculture.**
- **A GSP, if properly designed, could help stimulate the demand for and development of new industries necessary to support an environmentally sustainable agriculture.**
- **GSPs offer big budget saving possibilities.** Although some GSP options could be very expensive, a GSP that contributes to both income support and environmental objectives should allow substantial, offsetting savings in other programs.

Given this promise, it is no wonder that historically antagonistic interest groups have found common ground in the concept of the GSP.

Designing a GSP to reap its potential advantages means making decisions on five sets of critical factors.

There is a multitude of different ways a green support program could be designed. Each potential design of a GSP would generate a unique outcome with respect to a host of program performance criteria. Thus, how a GSP is designed has important implications for who gains (and who might lose) from the program, the size, and permanence of gains and losses, the distribution of gains and losses across regions and different groups of people, the types of environmental problems alleviated, the degree to which environmental problems are addressed, the program's total cost, and federal budget expectations. The following critical design features will determine what any specific GSP looks like...and how it performs.

- **What is the GSP's main objective?** How are the dual objectives of the GSP — farm income support and environmental protection — weighed against one another? Which takes precedence?

- **Who will be eligible to participate?** Once the main objective is determined, it still becomes necessary to decide who, in a universe of potential program beneficiaries, will be eligible. How, if at all, is eligibility conditioned on participation in other farm programs? Is eligibility limited to certain farm types or regions of the country? Will farmers already using environmentally friendly practices be eligible for reward along with those who make changes in their practices?
- **What does it mean to be "green?"** What criteria will be used to identify the environmental basis for the transfer of green support payments? Once the environmental basis is identified, what action by farmers will be rewarded — meeting a standard, adopting a particular practice, or engaging in a management planning process?
- **How will the GSP be administered?** Which Federal agency will take the lead in GSP implementation? What will be the roles for State and/or local governments vis-a-vis the Federal government?
- **How and at what level will the GSP be funded?** What green support payment levels are sufficient to support farm income? What do these levels imply for the size of the program? From where will the funding come?

In the sections that follow, the implications of alternative specifications of these design features are discussed with an eye toward highlighting the tradeoffs inherent in their selection.

The spectrum of GSP options lies between traditional farm income support and standard environmental protection programs.

The GSP concept attempts to reconcile the facts that many forms of environmental regulation create income losses for farmers, and that the mechanisms of traditional farm income programs can discourage the adoption of environmentally sustainable farming systems. A GSP is a hybrid program, neither a pure environmental protection program nor a pure farm income support program, but operating somewhere within a wide range between the two (see Figure 1).

The range of GSP options falls within two bounds. One (represented by point A in Figure 1) gives priority to environmental protection in meeting the option's dual objectives.

A GSP which places maximum weight on the achievement of an environmental objective would be targeted to priority areas where environmental risk is greatest, and would provide income support to the owners or operators of vulnerable agricultural land within that area.

The other bound (represented by point B in Figure 1) gives priority to farm income support in meeting the option's dual objectives.

A GSP which places maximum weight on the achievement of a farm income support objective would target benefits to a particular group or groups of farmers requiring income support, and would derive environmental benefits tailored to the operating conditions and locations of the targeted group's land.

The options falling within these bounds would balance environmental protection and farm income support objectives more evenly.

It is worth noting that Green Support Programs are neither likely to function as well in achieving an environmental objective as would a purely environmental protection program, nor meet farm income support goals as precisely as a well targeted and efficient (but currently nonexistent) farm income support program might do. But economic efficiency

is not the main goal of a GSP. The motivation for examining GSPs is an attempt to create common ground across powerful interests in the political economy of U.S. agriculture.

The success of any GSP in this context depends upon where it falls in the spectrum of GSP options and, therefore, the extent to which it can meet the objectives of interests concerned with both environmental protection and farm income support. This, in turn, is a function of the degree of overlap between environmental problems associated with agriculture and farm financial dependence on government support.

Distribution of benefits from a GSP targeted mainly to environmental protection would vary according to which environmental problems are addressed.

Conventional agricultural production can contribute to several types of environmental problems: impairment of surface and groundwater quality, loss of wildlife habitat, soil productivity loss, and pesticide exposure among them. A GSP can be designed to address any one specific or some combination of targeted environmental problems. However, not all types of problems are found in a given area or are of the same intensity of concern. Regional variation reflects not only differences in soils, climate, and geography, but also the tremendous diversity found in enterprise types and mix, production practices, and producer objectives and abilities.

Because both the type and intensity of environmental problems caused by agriculture are distributed differently across the country, getting specific about environmental quality means getting specific about the distribution of GSP benefits.

For example, potential sediment production weighted by watershed population affected by sedimentation, an indicator of the surface water quality costs associated with soil loss, is concentrated along the Appalachian mountains from northern Georgia to eastern Pennsylvania and into western New Jersey, around the St. Louis area of Missouri, and along the lake plain near Chicago (Figure 2). A GSP targeted toward surface water quality using potential sediment production as the targeting criteria would thus concentrate income supporting program benefits in these same regions.

Contrast this with potential nitrate leaching (weighted by the size of affected watershed populations), a groundwater quality indicator which concentrates in Southern New England, eastern Pennsylvania, New Jersey, Long Island, the Carolina and Gulf coastal plain, scattered areas around Lake Michigan, the Phoenix-Tucson area of Arizona, and California's southern Central Valley (Figure 3). A GSP targeted by this indicator would distribute program benefits in a distinctly different pattern, and to different producers of some different commodities, than would one targeted by potential sediment production.

Concentrating GSP payments to priority farms in the regions where a specific environmental problem is greatest increases the possibility that the program will achieve a significant resolution of that environmental problem. This also represents the most cost-effective way, among GSP options, to obtain environmental protection. The largest tradeoff to consider in this case is the fact that the more finely or specifically the environmental objective of a GSP is targeted, the more limited the distribution of GSP benefits will be, either geographically, or among certain farm types.

See Ralph E. Heimlich's paper, "Targeting Green Support Payments: The Geographic Interface Between Agriculture and the Environment," in our companion report, "Designing Green Support Programs," (Policy Studies Program Report No. 4), for description and mapping of 11 different environmental indicators associated with agriculture in the U.S.

In general, the geographic areas in which environmental problems associated with agriculture are greatest do not correspond well to the current distribution of government support payments.

When the range of potential environmental consequences associated with agriculture is considered (see Box 2), it appears that agroenvironmental protection is needed most in some or all areas of Long Island, eastern Pennsylvania and New Jersey, eastern North Carolina, Florida and Alabama, along the Chicago lake plain, in the Mississippi Delta region of Missouri, Tennessee, Arkansas, Louisiana and Mississippi, in Southern Texas, in the south part of California's Central Valley, and in south central Arizona (Figure 4).

Box 2

The composite Environmental Benefits Index (EBI) is the sum of 11 individual EBIs equally weighted. Included in the composite are the indices for potential: soil productivity loss, sediment production, air quality, pesticide exposure, wildlife habitat improvement, nitrogen runoff, nitrate leaching, filter strips, pesticide leaching, flood peak reduction, and endangered species habitat. Where appropriate, individual indicators are weighted by affected population in order to proxy the costs of potential environmental damage. These indices are spatial indicators that geographically locate the potential for specific types of environmental damages. The EBIs measure potential environmental problems and, for the most part, do not reflect any direct measurement of environmental harm created by agricultural production. Furthermore, the EBIs are based on data available at the national level that may not capture some site specific environmental problems. See "Targeting Green Support Payments: The Geographic Interface Between Agriculture and the Environment," by Ralph E. Heimlich in "Designing Green Support Programs," our Policy Studies Program Report No. 4.

On the other hand, the current distribution of total farm program payments (through commodity, conservation, and disaster programs) is concentrated in parts of the midwest, the northern and central plains, eastern Washington and Oregon, the Mississippi Delta, the Texas panhandle and coast, Arizona, and California's Central Valley (Figure 5). There are certainly possibilities for high environmental impact in some areas where total farm program payments are now concentrated, but they are limited.

If GSPs are to provide farm income support, a more relevant distribution to compare with environmental risk is regional dependence on farm programs as a source of income. Figure 6 illustrates the areas in which total farm program payments make up a large portion of gross farm income, and thus indicates which regions might be most vulnerable to a change in the basis for farm program payments. Though even more limited, and somewhat scattered, there are some areas where there is both high dependence on farm programs and a high potential for environmental problems (Figure 7).

These spatial comparisons underscore the facts that:

- **Targeting GSP payments by the current distribution of farm program payments, or dependence on those payments, would mean a sacrifice of improvement in environmental quality, as measured against the distribution that would garner highest expected environmental benefits.**
- **On the other hand, targeting by the main objective of environmental protection would limit greatly the extent to which GSPs could offer an alternative to current farm income support measures, at least in areas where that support has historically been greatest and most important.**

A GSP's dual objectives could be imbedded in one another. For example, a GSP could be targeted either towards farms that now receive farm program payments and whose land contributes significantly to potential environmental

problems, or towards farms in areas of high environmental risk that currently receive some form of government support. Such dually targeted programs, though, would beg the question of how farm income support would be achieved on farms or in areas that do not present high potential for environmental improvement as measured by the composite environmental benefits index.

Distribution of benefits from a GSP targeted mainly by income support objectives will vary depending on what criteria are used to define eligibility.

Including income support as an objective of a GSP requires establishing the eligibility criteria for that support. Alternative farm income support objectives might include, among others, such things as: maintaining the existing distribution of farm income support, alleviating poverty among farm families, supporting small to mid-size farms, or improving the viability of low-resource farms. Choosing the eligibility criteria for income support is an important decision in designing a GSP because alternative eligibility criteria resulting from the stated income objective generate different regional and farm size/type distributions of program benefits. Furthermore, different criteria could be more or less compatible with environmental objectives.

The existing distribution of income support, based on production volume, is skewed toward larger, wealthier farms. While farms with annual sales in excess of \$250,000 represent only 5% of all farms, they receive 28% of all government payments (Table 1). The 70% of farms that generate sales of less than \$40,000 receive only 18% of all government payments.

Table 1: Distribution of Government Farm Program Payments by Gross Farm Sales Category

	TOTAL	LESS THAN \$39,000	\$40,000- \$99,999	\$100,000- \$250,000	\$25,000 +
SHARE OF TOTAL PAYMENTS	100%	18%	25%	29%	28%
NUMBER OF FARMS	680,916	300,845	177,096	137,294	65,681
REPORTING RECEIVING PAYMENTS DISTRIBUTION OF REPORTING FARMS (%)	100%	44%	26%	20%	10%
PERCENT OF TOTAL FARMS	100%	70%	15%	10%	5%

A GSP targeted by an income support criterion unrelated to volume of production would probably change the regional distribution and type of farm receiving payments, though the nature of that change is difficult to estimate. For example, if income support payments were targeted to small to mid-size farms (defined as those with sales of less than \$100,000), or to farms whose income or solvency situation is not favorable, data on the regional distribution of these farm types (Table 2) suggests some redistribution of government benefits away from the Northern Plains, Lake States, and Pacific regions, and more benefits distributed in Appalachia. While the Corn Belt and Southern Plains would continue to capture a large portion of benefits, it is probable (but not possible to estimate from available data) that benefits would shift within those regions from relatively larger to relatively smaller farms.

Table 2: Regional Breakdown of Farms by Gross Sales Category, Net Farm Income/Solvency Class, and Government Payments

Source: Structural and Financial Characteristics of U.S. Farms, 1991: 16th Annual Family Farm Report to Congress, USDA, Economic Research Service, Agriculture and Rural Economy Division.

REGIONAL BREAKDOWN

	U.S. TOTAL NUMBER	NORTH EAST	LAKE STATES	CORN BELT	NORTHERN PLAINS	APPALACHIAN	SOUTH EAST	DELTA	SOUTH PLAINS	MOUNTAIN	PACIFIC
NUMBER OF FARMS	2,099,900	146,000	221,000	436,000	193,000	303,000	156,500	114,000	255,000	118,400	157,000
% OF TOTAL FARMS	100%	7%	11%	21%	9%	14%	7%	5%	12%	6%	7%

PERCENT OF TOTAL FARMS BY GROSS SALES CLASS

\$0-\$99,999	1,775,203	7%	10%	20%	8%	16%	8%	5%	13%	6%	7%
\$100,000-\$249,999	214,779	9%	16%	27%	14%	6%	5%	5%	7%	5%	6%
\$250,000+	109,918	7%	10%	23%	12%	6%	7%	7%	7%	6%	15%

PERCENT OF FARMS BY NET FARM INCOME/SOLVENCY CLASS

FAVORABLE	1,220,293	6%	10%	22%	9%	16%	8%	5%	11%	5%	6%
NOT FAVORABLE ⁽¹⁾	879,607	8%	11%	18%	9%	12%	7%	5%	14%	6%	9%

GOVERNMENT FARM PROGRAM PAYMENTS

DISTRIBUTION (%)	100%	2%	11%	23%	25%	2%	3%	6%	12%	9%	8%
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Note: Percentages may not sum to 100 percent due to rounding.

⁽¹⁾ Category includes marginal solvency, marginal income, and vulnerable.

A GSP targeted by some kind of farm size or farm income criterion could also distribute environmental quality-related income supporting payments to producers of agricultural products currently excluded from direct government support (e.g., vegetables, fruits, nuts, berries, nursery and greenhouse crops, livestock, poultry, and dairy), resulting in a different mix of farm types than under the existing farm program structure.

The degree of overlap between the distribution of eligible participants under alternative income criteria and the distribution of agroenvironmental problems is difficult to predict. The great diversity found in U.S. farming systems and the complexity of their interaction with the environment make generalization risky. The overlap will be greater, if, as some hypothesize, small and low resource farmers are less able to invest management time and scarce operating capital to adopt environmentally friendly practices and technologies than their larger counterparts. If this is the case, big environmental gains could come from a GSP targeted to small or resource constrained farms. If, however, as others hypothesize, good stewardship practices are more likely to be found on small farms with strong community ties than on large commercial farm enterprises, the overlap could be slight.

A GSP linked with existing commodity programs could preserve income support distribution patterns, but would have diffuse, less concentrated environmental benefits.

One way to mitigate the income redistribution impacts of a GSP which replaces commodity programs as the primary means of farm income support and/or strictly uses environmental quality indicators to target program benefits, is to consider coupling the GSP with existing commodity programs. A GSP coupled with commodity programs would provide an environmental bonus from the public expenditures made in support of farm income through commodity programs.

Examples of "coupled" GSP possibilities include options under which commodity program participants who use environmental criteria for determining which land to set aside under acreage reduction programs would get a bonus payment in addition to their deficiency payment. Another approach is to base the size of a participant's deficiency payment on the extent to which environmentally beneficial practices, plans, or processes have been implemented by the farm operator.

The decision to couple a GSP to existing commodity programs limits the types and extent to which environmental problems can be addressed because the geographic overlap between areas with high commodity program payments and areas with the highest composite environmental indicator are limited (Figure 8).

Coupling also raises an important question about whether the incentives structure generated by commodity programs is compatible with the incentives generated by a GSP. Existing commodity programs have been demonstrated to encourage monocultural production, discourage the use of beneficial crop rotations, and intensify the use of nonland inputs — including pesticides, fertilizers, and water. Layering a GSP on top of this incentive structure will require green payments to meet or exceed the levels of conflicting incentives provided by commodity payments. This, in effect, raises the ante required to make alternative agricultural practices attractive to farmers and makes acquiring the environmental benefits of a GSP more expensive.

Another problem with the coupling concept is that it makes environmental achievement, of whatever degree, a function of the attractiveness of commodity program benefits. In years when the world market for program commodities is strong, and market prices are high, there may be little motivation for commodity program participation. These are the same years, however, when environmental protection is most critical. Furthermore, the long-term fate of commodity programs is uncertain. Should they be substantially reduced or eliminated in the future, for budgetary or political reasons, the benefits of any GSP coupled to them will also be reduced or eliminated.

Still, a short-term linkage of GSPs with commodity programs might provide the stimulus needed for long-term farm program reform. Such a linkage could allow the gradual decoupling of income support from commodity-specific price guarantees, with recoupling of payments to environmental objectives and eventual expansion of income support to regions and producers of commodities that do not now benefit from commodity programs.

For additional detail on the compatibility between commodity programs and green support programs, and a thoughtful analysis of the program coupling concept, see C. Ford Runge's paper, "Designing Green Support: Incentive Compatibility and the Commodity Programs," in our companion report, "Designing Green Farm Support Programs" (Policy Studies Program Report No. 4).

Sustainable agriculture is best served by a flexible GSP.

Given a determination of who will be eligible for a GSP, based on the environmental and farm income support objectives the program is to achieve, there still remains the question of exactly what actions by farmers will be rewarded under the program.

Eligibility to receive GSP payments can be associated with a number of different practices or processes, designated by any one or a combination of three approaches (see Box 3).

The use of Best Management Practices (BMPs) gives farmers a concrete idea of what would be required for receipt of payment under a GSP, and BMPs may be easier to administer and monitor than approaches which allow individualized adaptation to address environmental needs. However, sole reliance on BMPs can stifle innovation and dampen the demand for technical change because it rewards only those practices included on an official list. Furthermore, BMPs can easily evolve into a cookbook-like, "one-solution-fits-all" approach which does not adequately take potential participants' unique and individual resource situations and managerial capabilities into account.

The use of total farm resource planning as a tool for the choice of rewardable actions has the advantages of facilitating systems approaches and site-specific solutions to environmental protection at the farm level. Total farm resource planning is far more likely than is the designation of BMPs to include actions that modify production systems across the farm enterprise (like crop rotations) in the mix of actions justifying receipt of a GSP payment. Total farm resource planning is a complex process with which most farmers will need some technical assistance. If that technical assistance can come from certified individuals in the private sector, this approach may also generate economic growth in information and service sectors of the rural economy. However, because the range of individualized solutions that result from the process is virtually boundless, administration of a GSP based on total farm resource planning could be more difficult to implement and monitor as well as more costly than less flexible approaches.

A regional management plan can provide the specific goals to be achieved through implementation of total farm resource planning within an ecosystem, while preserving the flexibility that individual farmers have in meeting regional goals. Participation in a regional planning process is the most difficult approach to implement from an administrative point of view because it must involve intergovernmental cooperation and incorporate multi-sectoral environmental quality goals. Nevertheless, it has the greatest potential for achieving a concentrated environmental benefit and would do much to encourage local, State, and regional investment in a Federal GSP.

For a comprehensive overview of technologies contributing to GSP objectives and the factors influencing their voluntary adoption by farmers, see Sandra S. Batie's paper, "Designing A Successful Voluntary Green Support Program: What Do We Know?" in our companion report, "Designing Green Support Programs" (Policy Studies Program Report No. 4).

Since GSP payments are to provide income support, their levels and/or the actions justifying payment, must fluctuate with market conditions.

The income support objective of any GSP option can only be met if the levels of payment received for approved, environmentally friendly actions exceed, by an appropriate amount, the participants' costs of taking action. That income-supporting payment, then, becomes a function of the private producer's cost of environmental protection. Because private costs vary across potentially rewardable practices, and can change over time (see Box 4), matching

payment levels with farm-specific sets of practices is no easy administrative task. It is essential, however, if those payments are also to provide income support.

Box 3

Rewardable Practices

The many types of environmentally beneficial actions that could be rewarded under a GSP fall into four general categories:

- **Actions that modify production practices at the field level.** This would include such things as the adoption of conservation tillage or integrated pest management practices. Actions in this category would generally create environmentally beneficial shifts in the mix of nonland inputs used in production.
- **Actions that modify production systems across the farming enterprise.** This would include the adoption of crop rotational schemes that promote soil quality and reduce the need for environmentally risky fertilizer or pesticide applications. Actions in this category would generally result in modifications in the mix of outputs as well as inputs.
- **Land-based actions.** This includes land retirement for environmental benefit, restoration of cultivated land to former, environmentally valuable uses (e.g., wetlands), and conversion of small land parcels to conservation or environmental protection uses, such as wind shelterbelts, wildlife refuge (e.g., hedgerows), or riparian filterstrips.
- **Structural modifications.** This includes the construction of structures, such as manure storage facilities or sediment catchment basins, that facilitate environmental management, as well as actions like well head protection which assure that existing structures do not create environmental risk.

Approaches to Choosing Rewardable Practices

The selection of actions, from any one or all of these categories, as the basis for payments under a GSP can derive from any one of three strategies:

- **Designation of "Best Management Practices" (BMPs).** This would consist of a prescribed set of practices that provides a farmer with a menu of choices to address a specific problem.
- **Use of total farm resource management plans as the basis for approved actions' choice.** This would require farmers to develop a resource management plan for the whole farm, which takes into consideration the myriad ways different farm enterprises, physical characteristics, and management decisions interact to create one or more environmental consequences.
- **Participation in a regional or watershed management process** where all stakeholders, farmers and nonfarmers alike, in a watershed, flyway, or other environmentally defined region are involved in the design and implementation of a comprehensive pollution prevention or resource conservation scheme that takes all sources of environmental risk into consideration. The selection of rewardable field or farm-level actions would then be based on alternative actions' contributions to the quality of the regionally managed resource.

Categories of Practices' Profitability

A total farm resource plan should be able to demonstrate, for any given farm under any given market conditions, how the full range of environmentally beneficial actions sorts out under the following 3 categories of profitability:

- **Practices and farming systems that have environmental benefits and are economically profitable, or at least not unprofitable, for the farmer to adopt, but have not been adopted due to lack of information or uncertainty.** For most farmers and market conditions, practices such as soil testing and conservation tillage would fall under this category. These are practices for which GSP incentive payments over a limited period of time would be warranted under all market conditions.
- **Practices and farming systems that have environmental benefits but are profitable at the farm level only after substantial initial investment costs have been incurred.** Manure storage technology might be an example in this category. These are practices which make the most sense for inclusion in the set of requirements for GSP payments under very good market conditions, since this is when the greatest amount of investment behavior takes place in the absence of a GSP scheme.
- **Practices that are environmentally beneficial but are not profitable from the farmer's perspective to adopt.** This would include, for most farmers and market conditions, the retirement of land for conservation or environmental purposes. These actions require long term or continuous GSP payment in order to preserve their environmental benefits. They can be used to substitute as GSP requirements for participants' generally profitable practices after the maximum, limited time that profitable practices justify GSP payment has expired. They also provide a set of practices from which additions to participants' requirements can be drawn under improving market conditions.

Flexibility in the GSP implementation scheme is critical because the practices, systems, or actions that fall into each of these categories will vary from one site or one farm to another. Furthermore, as market conditions change, the profitability of some actions, practices, or systems on a given site or farm can change sufficiently to shift it between two of the categories defined above. A practical GSP implementation plan could annually categorize feasible practices, actions, or systems for each participant into such categories, and then utilize a rule-of-thumb regarding market conditions to specify which actions would warrant GSP payment in that year.

Furthermore, the GSP reward, above and beyond rewarded actions' costs, will have to do more to supplement income when markets are poor, commodity prices are low, or interest rates or other costs are high, than when market conditions are good. A fluctuating, market-driven reward can be achieved through either one or a combination of two approaches:

- **The basic requirements for a GSP can be held constant, with payment levels rising during poor market conditions, above those received under good market conditions, or...**
- **A GSP payment level can be held constant, with requirements for receiving the reward changing from implementation of low-cost actions under poor market conditions to these plus higher cost actions under good market conditions.**

For example, GSP participants may, under all market conditions, be required to implement the conservation tillage, crop rotation, and pest management systems that total farm resource plans suggest are appropriate in order to receive income supporting payments that, under poor market conditions greatly exceed any loss of net returns these actions involve, and under good market conditions barely cover the impact of the actions. Or, if the payment level is held constant under all market conditions, participants might be required under increasingly favorable market conditions to

build structures that enhance environmental protection, set aside vulnerable lands, or implement higher cost environmentally friendly measures in addition to the base actions.

The case in which payments are held constant but requirements vary under alternative market conditions has two advantages. It makes projection of the Federal agricultural budget, currently a high-risk venture, much more certain. And, unlike current programs that, because of varying land set aside and compliance procedures, make environmental threat more likely under good than poor market conditions, this option would buy more environmental protection when times are good than when they are bad. To realize this advantage, however, participants would likely have to enter into a contract agreeing to comply with a known, but varying, set of rewardable practices if market conditions vary over a multi-year contract period.

The case where rewarded practices are fixed and payment levels vary with market conditions would not require a contract to retain participation during good market years. But it would not have the advantage of greater environmental protection during periods when commodity market signals make the environment most vulnerable.

In either case, the reward system would stimulate technological innovation since adopters of new environmental protection technology would realize a greater income bonus from their GSP reward.

A broad based Green Support Program could be funded from existing budgets, and could easily produce net budget savings, but not without changes in other programs.

Given that the outlook for the agriculture budget suggests no significant increase in appropriations, and the possibility of budget cuts, one may presume that no sizeable GSP is feasible unless it is funded: (a) as a result of modifications, cuts in, or elimination of other agriculture programs; and/or (b) through sources outside of Federal agricultural appropriations.

One logical source of funding for a GSP is the Commodity Credit Corporation (CCC), the nondiscretionary fund from which current commodity programs are financed (see Box 5). An attractive feature of CCC money is that it is not subject to annual appropriations, and thus can (and does) fluctuate according to market conditions. Its entitlement-like, year-to-year stability is also important given the sometimes significant time lags between implementing an environmentally sustainable practice, and deriving the environmental benefit. For example, elimination of some chemicals from a watershed can take 10-15 years after they are no longer being used.

CCC funds could be made available to finance a GSP by reducing the level of commodity-specific payment now received under commodity programs and using the savings for the GSP. One way to do this would be to increase the flexibility with which commodity program participants decide which crops to plant on their program base acreage. This saves CCC funds when nonprogram commodities are voluntarily planted on program acreage, thus eliminating that acreage from the payment pool, or when commodity programs limit the proportion of a participants' program base acreage on which payment will be made and allow the producer to plant any crop on nonpayment acres. The more flexibility that is granted (or imposed), the more CCC savings are possible. Full flexibility (under a commodity program option called "normal crop acreage") has especially good potential for saving CCC funds that could be diverted to a GSP. Added flexibility also has the advantage of reducing any counterincentives that continuing commodity programs might present to a GSP.

Taking the CCC route without also cutting the aggregate incomes of commodity program participants would require either that the GSP be coupled with commodity programs or, if decoupled, targeted specifically to regions and farm types that currently receive commodity program benefits. Even in these cases, the distribution of summed program benefits would not be likely to match that which is seen under current programs. With a portion of current benefits transferred through a GSP, commodity program participants who were ineligible for the GSP due to lack of appropriate environmental benefit of GSP participation, or who were unwilling or unable to implement the practices

rewarded under a GSP, would be the net losers under such arrangements. Balancing those individuals' losses, of course, would be net gains to those commodity program participants who, by virtue of luck or enthusiasm for the GSP, were able to collect green support payments that were larger than the value of commodity program payments foregone.

Box 5

The Costs of Government Farm Programs

Source: Economic Research Service, USDA, various sources

CCC net outlays over recent years have varied from a high of \$25.8 billion in 1986, to a low of \$6.5 billion in 1990, averaging about \$14 billion a year over the period 1985-1994. Agricultural conservation program spending by the USDA has risen consistently from \$1 billion in 1985 to \$3.4 billion in 1993.

Farm program costs in 1993 illustrate the magnitude of funds now devoted to programs that address one or both of a GSP's stated objectives.

CCC Net Outlays by Function, 1993 (in millions of dollars):

Price support loans	2,065
Direct payments (deficiency, diversion, disaster, other)	9,143
Crop disaster	872
Emergency assistance	72
Net purchases of surplus commodities	525
Producer storage payments	9
Processing, storage, and transportation	136
Operating expenses	6
Interest expenditure	129
Export programs	2,193
All other	897

USDA Conservation and Water Quality Expenditures, 1993 (in millions of dollars):

Technical assistance and extension	813
Cost-sharing for practice installation	355
Project conservation costs	166
Conservation data and research	276
Rental and easement payments	1,794

Another potential source of agricultural funding for a wide scale GSP is the myriad of separate and individual USDA conservation and environmental programs. If the funding for some or all of those current "green" programs was merged into a new GSP "pot" the potential would exist for substantial administrative cost savings (one or a few rather than a dozen programs to administrate), to offset the higher per unit costs of buying environmental benefits in an income supporting context. Similar amounts of environmental quality should be achievable at a constant cost, with the bonus of income support that could reduce CCC outlays.

In either case, the potential for net budget savings is large. This expectation derives from the simple fact that if some CCC funds contribute to conservation and environmental objectives through a GSP and/or some conservation funds contribute to income support objectives, savings in the complemented program(s) ought to be realized. The

greatest possibility for large net budget savings would be realized by a GSP that replaced eliminated commodity programs as a basis for farm income support and also precluded the need for many of the broader based conservation cost-share programs now in place for environmental protection.

The roles of the Federal and State governments will be critical in determining GSP feasibility.

Potential exists for partial funding of a sizeable GSP from outside the Federal budget. States could be required to cost-share GSP payments to eligible landowners or farm operators within their borders. The political feasibility of such a Federal-State partnership hinges on two factors: (a) the design of a GSP that complements State environmental objectives to an extent sufficient to allow for savings in existing State environmental program costs; and (b) the inclusion of State governments in GSP planning and decision making processes.

There are three general models for Federal-State interaction in the implementation of a GSP: Federal control; a Federal-State partnership; and State control under Federal guidelines. Each has different advantages and disadvantages and different implications for budget sharing.

A Federally controlled GSP would operate in much the same manner as do current Federal agricultural conservation programs. Federal agencies would set GSP eligibility criteria, determine the rules by which the practices that justify payment to eligible individuals are selected, set the payment schedule, and monitor and enforce compliance with program rules. States would participate only to the extent that they have related programs that would benefit through linkage with the Federal GSP. The advantage of this model is that it can most easily meet Federal priorities for income support and/or environmental protection. In addition, variation of payment rates, or of the practices required for GSP payment, as expected agricultural market conditions vary, would be most effectively handled at the national level. The disadvantage of this model is that it requires substantial investment of Federal funds and personnel for program management and administration, and provides little incentive for State cost-sharing.

Federal-State partnerships can take many forms, though most would be expected to involve some fiscal contribution of the States to GSP implementation, and some release of control over program decision making by the Federal government. One such scheme might allow each State to select the environmental problems and priority areas in which those problems occur as the principal means of targeting GSP payment distribution, but rely on Federal agencies to select, by income support criteria, the eligible agricultural landowners or farm operators whose problems may influence the State-selected environmental indicator(s) in State-selected areas. Rewardable practices and payment schedules could be jointly determined by the Federal and State governments, and monitoring, enforcement, and program management could be shared across levels of government. In return for the discretion granted States in this arrangement, it might be required that any State choosing to participate in the GSP would have to supply a specified, significant share of program funding. A big advantage of such a partnership would be reduced Federal budget exposure. Another advantage is the opportunity the partnership provides for the GSP to address State priorities, though this comes at a loss in the chances that a national environmental protection priority will be uniformly addressed across States. Two additional disadvantages are apparent. One is the unwieldy nature (and high associated cost) of intergovernmental program administration. The other is the fact that if some States choose not to participate, because of resource constraints or lack of will, Federal resources would still be required to provide equitable farm income support and adequate agroenvironmental protection by some other means.

A GSP controlled by the States under broad Federal guidelines could be implemented under a system of block grants by the Federal government to the States. Such grants, the levels of which could be determined by a formula that captures the expected contribution of each State to federal farm income and environmental protection priorities, would obligate every State to implement a Green Support Program. Each State, however, would be free to design that program in whatever manner it wished, so long as it adhered to some Federally-mandated minimum standards and general rules for achieving farm income support and environmental protection goals. The result would be 50 distinct and separate GSPs of different sizes, different degrees of cofunding from State environmental and welfare budgets, and

different rules and regulations; but all would contribute to the nationally determined objective of supporting farm income through the purchase of environmental protection.

A big advantage of the block grant system is that it eliminates the need for all but an oversight function from the Federal level, and thus could provide Federal budget cost savings equal to most of the administrative, managerial, and personnel costs associated with Federal control of agricultural conservation and farm income support programs. The block grants to the States would need to cover little more than the direct costs of the transfers to be made to landowners and farm operators within the States. States would cover the bulk of GSP administration costs, and would be free (and likely) to gain economies in program administration by merging or linking State programs with the GSP. The disadvantages of State control of GSPs through a block grant system are related to the high degree of State-to-State variation in GSPs that would result. This could be particularly problematic if such variation were to accelerate structural changes in the agricultural sector. For example, the location of consolidated and vertically integrated food industries now appears to be influenced by States' rigor in legislating and enforcing environmental regulations. If a system of diverse, State-controlled GSPs accentuates differences among States in approaching agroenvironmental problems, it might reinforce the trend towards relocation of increasingly industrialized agricultural activity.

Each desired, primary function of a GSP has unique implications for the manner in which a particular program option is best designed.

Different interest groups advocating or considering the implementation of a GSP have different objectives. And, certain GSP design features are more important than others for the achievement of particular objectives. Following is a summary of some of the main objectives various groups may want to see achieved by a GSP, and an indication of how a GSP's design could contribute to those objectives' achievement.

- **To maximize resolution of high priority environmental problems associated with agriculture...** Utilize a targeting mechanism that strictly limits program participation to those regions most vulnerable to environmental risks, and, within those regions, to farm types or locations that both require some farm income support and currently contribute to the targeted environmental problem(s). (Major trade-off: loss of ability to fully meet farm income support objectives with the GSP)
- **To spatially concentrate GSP environmental benefits within a watershed, flyway, or other natural unit...** Design the GSP payment structure to reward practices that directly contribute to a broader regional plan for resource enhancement. (Major trade-off: administrative difficulty)
- **To assure environmental equity...** Make farmers who already implement the practices, plans, or processes required for GSP payments eligible for the GSP along with those who would have to make farm management changes in order to qualify for payments. (Major trade-off: higher program costs or more limited program coverage than for a GSP that only rewards new stewardship behavior)
- **To geographically distribute program benefits in a uniform fashion, or to target specific regions for the distribution of program benefits...** Apportion program funds by region or State rather than by environmental criteria. Then, determine what environmental gains are possible within each of those regions or States. Devise separate rules and regulations for each region or State, accordingly. State and local participation in (or control of) planning and implementation would also be useful. (Major trade-off: loss of ability to uniformly address national environmental protection priorities with the GSP)

- **To support sustainable agriculture...** Retain flexibility in the designation of practices which qualify eligible individuals for GSP payment, perhaps by utilizing total farm resource planning as the basis for qualification. Design the GSP so that payments favor implementation of systems approaches to the reduction of environmental risk. Also, replace commodity programs which discourage crop and enterprise diversity with a GSP as the mechanism for farm income support. (Major trade-off: loss of government benefit streams to some current commodity program participants who might not be eligible for, or who would receive reduced payment levels through the GSP)
- **To support certain socioeconomic categories of farms...** Identify the major environmental risks associated with the targeted farm types and/or the regions in which those categories of farms operate. Then, design the GSP to reward specifically those practices, plans, or processes that would reduce the identified environmental risks. If the targeted farm types are regionally concentrated, limit GSP eligibility to the region(s) in which they are found. (Major trade-off: loss of ability to target national environmental priorities)
- **To stimulate rural economic development...** Devise a public-private partnership to provide the various services (e.g., information bases, technical assistance, certification of plans, compliance verification, or coordination of watershed plans) that a GSP would require (Major trade-off: some loss of Federal control over program implementation)
- **To stimulate innovation in the agricultural sector...** Avoid the use of rigid sets of prescribed practices as the basis for GSP payments, allowing, instead, a dynamic process for the identification of alternative solutions to targeted environmental problems. (Major trade-off: administrative and accountability difficulties)
- **To assist farmers in meeting the requirements of environmental regulations...** Design the GSP so that payments are made to support farmers' implementation of specific practices required by law, or of practices that reflect appropriate private response to mandated environmental standards. (Major trade-off: loss of ability to support the income of farmers who are not subject to or affected by specific environmental regulations)
- **To minimize the burdens of participation on farmers...** Allow farmers to participate in the identification of targeted environmental problems and alternative, subsidized solutions. Keep eligibility criteria and program rules and regulations simple. (Major trade-off: some loss of administrative control)
- **To minimize budgetary exposure...** Develop a public-private partnership for the provision of services needed to implement the GSP And, either: restrict GSP eligibility by designating very specific environmental and farm income criteria to limit program size; or transfer funds from other existing agriculture programs to cover a larger GSP's cost. (Major trade-off: fallout from reduction, modification, or elimination of existing programs)
- **To achieve net Federal budget savings...** Treat the GSP as a replacement for existing farm income support and agricultural conservation programs, reaping the savings that come from the administrative consolidation of separate programs (Major trade-off: changes in government program payment distribution resulting from elimination of existing programs); and/or make block grants for State-level implementation of a GSP that follows Federal guidelines (Major trade-off: loss of Federal control to meet national priorities).

Conclusions

As we have shown, a Green Support Program can take many shapes and sizes. It can favor the achievement of environmental objectives over income support, income support objectives over environmental protection, or balance the two objectives evenly. It can be small, focusing only on areas where income support and environmental protection

are both critical needs; or large, transforming the very basis for income transfers to farmers nationwide. It can maintain current agricultural funding levels, or reduce budget exposure. It can be a complement to current programs, or a substitute for some or all components of traditional agricultural support programs. Depending upon how it is designed, a GSP can accomplish, encourage, complement, or discourage any number of desirable outcomes.

The key to designing a successful GSP rests with a clear articulation of the national policy goals one wishes the program to meet. As long as goals are known, and the priorities among dual objectives are clear, a GSP can be designed specifically to achieve those goals and objectives.

Policy goal setting in the context of a modern, globalized agricultural economy is critical, not only in designing a specific GSP but in determining the roles a GSP could or should play in the ideal mix of agricultural, environmental, and economic policies. The forces driving for general policy reform — a liberalizing international trade environment, broadening of environmental concerns associated with agriculture, increasingly tight budget constraints, and ever more apparent shortcomings of current commodity program approaches — all bolster the conceptual basis for GSPs as a principal agricultural policy tool. Knowing which size and shape of GSP is most appropriate, though, means wrestling with *exactly* what we want our next generation of farm programs to achieve.

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