SETTING GOALS, MAKING DECISIONS, AND ASSESSING OUTCOMES IN CONSERVATION PROGRAMS ADMINISTERED BY THE US DEPARTMENT OF AGRICULTURE--Peter F. Smith, Acting Director, Resource Economics and Social Sciences Division, Natural Resources Conservation Service, U.S. Department of Agriculture

INTRODUCTION

This paper focuses on the activities of the Natural Resources Conservation Service (NRCS), an agency of US Department of Agriculture. NRCS has about 12,000 employees in some 2,600 locations across the country. NRCS stresses partnerships with other units of government and the private sector as it helps land users enhance natural resources. Soil and Water Conservation Districts, which are locally led governmental institutions organized under State law, operate in nearly all the 3,000 counties in the US. They provide another 8,000 staff years of effort to further conservation and are key partners to NRCS.

NRCS provides assistance in natural resource enhancement to private landowners and units of government. It is primarily a technical agency, providing advice and conservation expertise in a wide range of disciplines including engineering, agronomy, wildlife biology and economics. It emphasizes an integrated natural resources planning approach based on ecosystems. In addition to its technical activities, NRCS administers financial assistance programs to provide incentives to farmers to adopt conservation systems. It also provides technical support for financial incentive programs administered by other Federal and state and local governments.

About 75 percent of the land in the US, excluding Alaska, is owned privately or by State and local governments and these owners have the responsibility for conservation on their land. The remained is owned by the Federal government. Non-Federal land comprises about 570 million hectares. The largest land uses are rangeland, 158 million hectares; forestland, 154 million hectares; cropland 146 million hectares; and pastureland, 42 million hectares.

In order to have a clear understanding of outcomes assessment, it is necessary to start with a common understanding of some terms. “Outcomes” are results, they are the “ends” or ultimate objectives of an activity. Improved recreational fishing is an outcome. “Outputs” are “means” to an end. Increased farmer adoption of nutrient management plans to reduce nutrient inputs to a body of water is an output. Outputs are steps toward obtaining outcomes. Historically, most US Federal agencies have measured outputs.

Outcomes assessment is rapidly becoming a driving force in the formulation and implementation of natural resource and other policies, programs and budgets in the US. After funds are appropriated, outcomes assessment becomes a key determinant of resource allocation to address natural resource problems.
The Government Performance and Results Act of 1994

Several factors are contributing to the increased emphasis on outcomes assessment. The major factor is the Government Performance and Results Act which was enacted in 1994 (GPRA). Briefly, this law requires Federal agencies to specify the outcomes they will accomplish with their programs and to link them to budget requests as budgets are formulated. Agencies are then held accountable for the outcomes they specified would achieved in the budget request.

GPRA requires Federal agencies to develop a five-year strategic plan, and update it annually. The strategic plan contains the overall agency goals and objectives, outcomes which will result from achieving them, strategies for achieving the goals and objectives, and performance measures to measure progress.

GPRA Goals

NRCS has two overall goals that reflect the partnership between people and the land. One goal deals with people and the other deals with natural resources. These goals are intended to contribute to three broad national outcomes:

--Sustainable, productive, and properous farms, ranches and communities;
--Healthy people; and a
--Healthy natural environment (land, water, air, wildlife, etc).

The first goal is “people” oriented and is intended to achieve a situation where individuals and their neighbors are working together as effective and willing stewards of the natural resources on their property and in their communities. Three objectives will support this goal:

--Strong, effective grassroots conservation partnerships;
--A diverse and well served customer base;
--Private landowners and their communities with the science based information they need to conserve natural resources.

The NRCS Strategic Plan establishes specific strategies for reaching all three of the objectives outlined above. For example, for the first objective, “strong, effective grassroots conservation partnerships” the following strategies are in place:

--Increase training of field staff;
--Broaden and strengthen the conservation partnership;
--Help to achieve consensus in the locally led process through sound science, sensible economics, appropriate technology, and current information.
Performance measures for these strategies include; by 1999, two weeks of technical training every year will be provided to field staff who provide technical assistance; and by 2002, financial and in-kind contributions by other Federal, state local and nongovernmental organizations will have doubled by 2002 from 1992 levels.

The second goal addresses natural resources: “A healthy and productive land that sustains food and fiber production, sustains functioning watersheds and natural systems, enhances the environment, and improves urban and rural landscapes.” Three objectives address this goal:

--Healthy and productive cropland sustaining U.S. agriculture and the environment
--Healthy watersheds providing clean and abundant water supplies for people and the environment;
--Healthy and productive grazing land sustaining U.S. agriculture and the environment;
--Healthy and productive wetlands sustaining watersheds and wildlife.

The NRCS Strategic Plan defines strategies to achieve all four of the objectives outlined above. For example, to attain “healthy and productive cropland.” Strategies used to achieve the healthy cropland objective include:

--Promote conservation planning and management approaches that improve soil quality;
--Intensify conservation on non-highly erodible cropland;
--Facilitate transitions to sustainable systems on highly erodible cropland.

Performance measures for these strategies include; by 2002, the acreage of non-highly erodible cropland eroding above the T (the soil loss tolerance rate) will be cut by one-third from 1992 levels; by 2002, the acreage of highly erodible cropland eroding above 2T will be cut by one-third from 1992 levels; and by 2002, 50 percent of all U.S. cropland will be managed with conservation systems that enhance soil quality.

SETTING GOALS

Some Basics

In the US, environmental goals and policies are articulated in several ways at several levels of government. Legislation provides the most important and powerful means. Legislation originates in the legislative branch and requires approval by the executive branch. It is subject to judicial review and enforcement. Major natural resource issues such as air and water quality, pesticide safety, wetlands protection, and endangered species are addressed through legislation at the National and State and sometimes the local level.
Presidential Executive Orders are policy statements of the Executive Branch which articulate goals for the behavior of Federal agencies in the context of present legislation. They are used to direct Federal agencies to emphasize certain priorities. For example, in the 1970’s an Executive Order was issued to direct Federal agencies to protect wetlands in carrying out Federal programs. Similarly, an Executive Order directs Federal Agencies to purchase goods and services from firms which are in compliance with environmental laws and regulations. State Governors issue Executive Orders setting policy to guide the behavior of State agencies.

Some Technical Aspects

In total, the NRCS strategic plan contains eight goals with supporting information similar to that provided for “healthy and productive cropland” example described above. Setting goals requires baseline data and information on resource conditions and the ability to measure or model resource conditions in the future to measure results of activities.

Several data sources serve as a foundation for setting conservation goals. A key data series is NRCS’s own National Resources Inventory (NRI) which collects data on natural resource conditions every five years on a scientific sample 800,000 points across the country. The first NRI was completed in 1982 and we are in the process of analyzing the 1997 data. Each of the points were visited during the 1982 NRI and a subsample is visited during successive inventories. Most data collection today is through the interpretation of aerial photographs and satellite images. The NRI most useful in understanding land use changes, changes in plant and water cover and soil erosion. The NRI is especially powerful because of the other data layers that can be used in its interpretation, such as soil survey information. For example, we are able to determine if the land most suitable for crops is being cropped, the potential to increase cropland, and marginal areas which may be suitable for conversion from cropland to other uses.

The NRI will be the primary data base used to measure our performance in reducing erosion as outlined above. Other key data sources are the US Census of Agriculture and of Population; and water and air quality information collected by the US Environmental Protection Agency (EPA), US Geological Survey (USGS) and State agencies.

Public Preferences at the Local Level

NRCS emphasizes a “bottom-up” approach to setting conservation goals. NRCS staff facilitate and provide natural resource and program information to local people through a “locally led process.” Soil and Water Conservation Districts lead the process and involve a broad range of local, state and Federal agencies and the private sector, as well as the public. The process reveals local natural resource problems and sources of assistance to address them from all sources, not just the USDA. An example of a locally led goal could be improving water quality such that a local water
body supports recreation. The process would then identify possible approaches to address the problem, which may include erosion control assistance from the NRCS or grants from EPA to improve riparian habitat.

In fact, the goals in the NRCS strategic plan were developed through a locally led process. The local goals were then assembled at the State and regional levels into a national strategic plan which includes local, State, regional and national goals.

**Public Preferences at the National Level**

Local goal setting takes place in a framework of national (and State) preferences as contained in national (and State) legislation. The focus here is on national legislation. Since NRCS is a Federal agency, its policies and programs implement this legislation. Goals applying to agriculture and its performance in protecting natural resources arise in both agricultural and nonagricultural legislation.

Important goals for agriculture are also set in laws administered by the US Environmental Protection Agency (EPA) and the US Department of the Interior (DOI). For example, EPA administers the Clean Water Act. This law has a goal of attaining water of sufficient quality to support fishing and swimming in all waters in the US. Tens of billions of dollars have been invested in controlling point sources of pollution since the 1960’s and great progress has been made in cleaning up pollution from them. A remaining source of water pollution is from nonpoint sources and agriculture is a significant contributor to this problem. A major Clean Water Initiative was announced by the President this February to address nonpoint sources involving EPA, the USDA, other Federal agencies and the States. Many agricultural natural resource conservation programs are important water quality improvement tools and are being focused at addressing water quality problems. This approach is consistent with a key theme of the Clean Water Initiative, to make the programs operated by different agencies work together to attain water quality improvement outcomes.

Another example is the Endangered Species Act, which is administered by DOI. This law protects threatened and endangered species and their habitat. Some state laws also protect endangered species within a state. Since agriculture is the dominant land use in the US, the great majority of endangered species live at least part of their life cycle on or near farmland, including range land and woodland. Endangered species protection, a national goal, has become an outcome area for locally led conservation efforts.

**Conflict Resolution**

Goals set at the local level through a “bottom up process” are not always consistent with “top down” National goals. Resolution occurs through a planning process in which many interests are brought to the table, usually by a local conservation district. All conflicts may not be resolved but participation and gaining a better understanding
of where differences exist often leads to compromise situations. NRCS plays a key role in facilitating a broad base of participation.

MAKING DECISIONS

Decision making in USDA conservation programs is aimed at meeting goals and achieving outcomes. With the desired outcomes in mind, criteria are established for choosing among alternative means to attain them. In many decision making situations, decision making criteria are established to avoid damage to natural resources, such as endangered species or wetlands. Using natural resource values as constraints on behavior has been a traditional approach.

Two fairly new conservation programs reverse this traditional approach. The Conservation Reserve Program (CRP) and the Environmental Quality Incentives Program (EQIP) are designed so that decisions are made to benefit important resources rather than to minimize damage to them. They are positive resource conservation programs. In fact, the criteria used in decision making on them are really used for ex ante performance evaluation. This section examines the CRP and how resource protection criteria in the CRP are used to reach desired outcomes.

The Conservation Reserve Program

The CRP is a land retirement program which was authorized by the 1985 Food Security Act. Through the CRP, landowners enter into 10 year rental agreements with the Federal Government to convert cropland to a conserving use (15 years for land converted to trees). The annual cost of the CRP is about $2 billion. Up to 15 million hectares of land can be taken out of production through the CRP. Presently, there are about 12.5 million acres enrolled in the CRP. Over the twelve year life of the CRP, it has evolved from an erosion control and production adjustment program to an outcome oriented natural resources conservation program.

Landowners compete for CRP contracts in order to obtain the 10 year rental payments. The competition is based on the environmental benefits which will be produced by a contract and the rental rate the landowner is willing to accept for the contract. The USDA has been directed by Congress to maximize environmental benefits per dollar spent.

An Environmental Benefits Index (EBI) is the basis for evaluating contract offers. It is used to rank and classify land offered for enrollment. The EBI embodies the key variables and their weights which form a basis for measuring the environmental performance of the CRP. The EBI is reviewed and modified if necessary on a continuing basis. The EBI used for the last CRP sign up, the sixteenth is discussed below.

The formula for the EBI involves summing point values for six environmental factors and a cost factor. The total number of points obtained is used to choose among
The variables in the formula and the points associated with them are the basis for performance and outcome measures for the CRP.

**The Wildlife Factor--N1--Maximum weight=100 points.** This factor evaluates the expected wildlife benefits of the offer. It is composed of six subfactors which determine the quality of the wildlife habitat to be produced and the improvements expected over the existing situation for wildlife habitat on the land in question. The following formula is used to calculate the wildlife factor:

\[ N1 = \frac{N1a}{50} \times (N1a+N1b+N1c+N1d+N1e+N1f) \]

The subfactors are:

1. **Wildlife cover benefits--N1a--0 to 50 points.** This subfactor evaluates the cover existing or to be established on the offered land. It is the most critical factor impacting wildlife benefits. Planting mixtures are assigned points based on their wildlife conservation benefits with the better cover types being awarded the highest scores. For example, planting of one or two species of an introduced grass species is worth 10 points. Planting a mixed stand (minimum 4 species) of at least three native grasses and at least one shrub, forb, or legume best suited for wildlife in an area or any native prairie restoration mix of 5 or more species is worth 50 points.

2. **Endangered species--N1b--0 to 15 points.** This factor rewards landowners for furthering a desired outcome, endangered species protection. Zero points are awarded where no listed or candidate species is benefited and 15 where a the cover provides habitat best suited to a listed or candidate species.

3. **Proximity to water--N1c--0 to 15 points.** Easy access to water increases the value of wildlife habitat. Fifteen points are assigned if the land is within .25 mile from a permanent water body and 0 points if it is more than a mile from such a water body.

4. **Adjacent protected areas--N1d--0 to 15 points.** Land in the CRP has greater wildlife habitat value if it is adjacent to areas managed by Federal or State governments or other entities to benefit wildlife. Land within .25 mile of such an area receives 15 points and 0 if it is more than a mile from such an area.

5. **Contract size--N1e--0, 2, or 5 points.** In general, larger contiguous blocks of habitat provide greater benefits than smaller areas. Points are awarded based on how the offer relates to the average size of a contract within a State.

6. **Restored wetland to upland percentage--N1f--0, 1, 5, or 10 points.** This factor rewards those offers which restore wetlands as well as uplands. Offers with the appropriate percentage of restored wetlands relative to uplands to provide optimum nesting habitat for waterfowl receive maximum points.
**The Water Quality Factor--N2--0 to 100 points.** Improving water quality is a high priority national goal in the US. This factor evaluates the potential impacts that CRP may have on both surface and ground water quality. It includes four subfactors.

1. Location points--N2a. This subfactor incorporates State designations of water areas requiring water quality improvement. Offers with more than 51 percent of the area in a designated water quality area receive 30 points.

2. Ground water quality benefits--N2b. This factor evaluates the leachability of soils for pesticides and nutrients. Point scores are based on the soils offered for enrollment into the program.

3. Surface water quality benefits--N2c. This factor evaluates the amount of sediment that may be delivered into streams or other water bodies and the population that may be impacted. Points are awarded on a site specific basis and are determined by inherent water erosion, distance to the water resource, and the county in which the offer is located.

4. Wetland benefits points--N2d. This factor evaluates the water quality improvements associated with wetlands. If 10 percent of more of the offer is cropped wetlands, 10 points are added.

**The Erosion Factor--N3--0-100 points.**

Erosion has been a traditional problem addressed by the CRP program. It is the only truly on-site factor considered in the EBI and is intended to help maintain the long-term productivity of the land for future generations. An original concept about the CRP was that it would would be an option for farmers who farmed highly erodible land which could not be farmed and still meet conservation compliance requirements. The erosion factor is based on the inherent potential erodibility of the land using the Erodibility Index (EI). A weighted average EI is calculated for each offer.

**The Enduring Benefits Factor--N4--0-50 points**

This factor awards points to offers where the conservation measures installed are likely to remain in place beyond the contract period. Applicants may increase their score by offering practices likely to remain in place after contract expiration. For example, new hardwood tree plantings are awarded 50 points while native grass seeding is awarded 10 points.

**Air Quality Benefits From Reduced Wind Erosion--N5--0-35 points**

This is another factor which awards points for addressing off-site damages. It is composed of three subfactors and the total points are a summation of those for the subfactors.
1. Wind erosion impacts--N5a--0-25 points. Points are assigned based on the potential wind erosion and the size of the human population impacted. Land with towns and cities downwind has is assigned higher point values.

2. Wind erosion soils list--N5b--0-5 points. Point values are assigned on the basis of a list of soils that are susceptible to wind erosion and contribute significantly to non-attainment of air quality standards. These soils have a dominant component of volcanic or organic material. If at least 51 percent of the soils in the offer are comprised of these soils the offer is awarded 5 points.

3. Air quality zones--N5c--0-5 points. This factor recognizes awards 5 points to offers when at least 51 percent of the offer is located in an area contributing to non-attainment of of air quality standards or impacting Class 1 air quality zones such as National Parks.

State or National Conservation Priority Areas--N6--0-25 points

This factor awards points to offers which will address improve resource condition in designated conservation priority areas. These include air and water quality and wildlife areas. It is a mechanism for incorporating the locally led conservation process which. In order for points to be awarded, at least 51 percent of the of the offer must be located in the priority area and the offer must be consistent with the goals of the priority area. The test for consistency is that at least 40 percent of the possible points for the issue of concern in a priority area (water quality, for example) must be obtained in for that issue as a rating factor.

Cost--N7--total points are determined after each signup ends

The cost factor is consists of three elements. The first provides 10 points if no government cost share is requested to establish the conservation practice. The second provides one additional EBI point for every whole dollar below the maximum acceptable rental rate (MAR), not to exceed 15 points. (The MAR is a limit set on CRP rental rates in each county as determined by soil productivity.) This provides some score advantage to offerers with relatively low bids.

The third factor provides more points for eligible offers submitted for rental rates lower than the calculated maximum payment rate. The decision on how to weight this factor is made after the sign up. This decision takes into account the number of acres offered and the funding available to use in the CRP as well as market and other information.

The CRP program EBI described above is a major example of how decisions are made to achieve conservation outcomes. It can be characterized as “top-down” driven program, based on overall, national resource conservation priorities (although these priorities were developed through a locally led process in the past and are generally reflected in Federal legislation. In addition, CRP land is set aside from
agricultural production, making the attainment of outcomes through ex ante decision making more certain.

The Environmental Quality Incentives Program (EQIP)

EQIP is another major resource conservation program which differs in several respects from the CRP. It is a cost share program (about $200 million is available annually) for the implementation of conservation practices on land that remains in production. In addition, specific resource concerns and priorities for addressing them are set at the local level within a state, regional and national context. It is more of a “bottom-up” program as specific outcomes and weights to be assigned to them are determined at the local level. Federal funds allocated to EQIP projects are expended on the basis of maximum environmental benefits per dollar spent. Space does not permit a detailed discussion of EQIP, or several other specific outcome oriented programs, such as the Wetlands Reserve Program or the Wildlife Habitat Improvement Program.

MEASURING PERFORMANCE

Introduction

A key point which flows from the previous section is the importance having a set of goals and making decisions to progress toward those goals. A number of practical performance measurement methods are used by NRCS to measure progress.

The Political Process

The political process is a highly effective means to measure performance. Feedback from the local level to members of Congress is a powerful mechanism for measuring customers’ satisfaction with conservation programs. For the CRP for example, feedback takes several forms. First, there are landowners who are unsuccessful in bidding for contracts. They express concern about the variables used in the EBI and their weights when they fail to attain enough points to qualify for a contract. Where there is substance to their arguments, they have resulted in some modifications to the EBI to help refine and improve the EBI as a measure to judge p.

Other feedback to the Congress comes from those who benefit from the conservation programs. These include environmental, fish and wildlife interests who generally support the programs and who provide information on how they are benefitted by them through improved fish and wildlife habitat and populations and resulting improvements in success at bird watching, fishing and hunting.

Although this information is often very site specific and qualitative, it provides an important measure of performance as it can be a key factor in programmatic support in the Congress.
Progress Reporting System

NRCS operates a progress reporting system to help measure performance and outcomes. In the first section of this paper, it was noted that NRCS has two overall goals in its strategic plan, focused at achieving three outcomes and they are the focus of the progress reporting system. The system is an automated record keeping system which tracks technical and financial assistance which provided to landowners. For example, data on feet of terraces planned and any cost sharing arrangements are entered in landowners’ record. This data can be aggregated at different levels, local, state, regional and national.

There are many problems with this system. First, it measures outputs, not outcomes. Feet of terraces may be intended to improve water quality by keeping sediment out of water. However, measuring feet of terraces does not directly tie to water quality improvement. To move from outputs to outcomes, models which can simulate the effects of the outputs on outcomes are used.

The National Resources Inventory (NRI)

The most effective means to measure outcomes is through monitoring of physical and biological conditions. The NRI, briefly described earlier in this paper, is the main outcome measure used by NRCS. It has statistical reliability at the state level and below the state level in most states. In addition, beginning in 1996, annual, “mini” NRI’s were instituted to collect data with national level statistical reliability on key variables. For example, there was concern that the 1996 Farm Bill’s Freedom to Farm provisions could result in farmers’ abandoning some conservation practices and subsequent increases in soil erosion. The first “mini” NRI found that this concern was not warranted.

Monitoring Conducted by Other Federal and State Agencies

NRCS relies on data collected by other agencies to help measure performance and outcome attainment. Other sources of data have become more important as the Congress has broaded NRCS’s responsibilities to areas such as water and air quality. NRCS does not have adequate numbers of trained staff members or the technology needed to monitor outcomes in these areas.

The EPA, as the principal Federal environmental regulatory agency, works with the States to monitor water quality. Every two years, States are required to report to EPA, which in turn reports to the Congress, on the status, conditions and trends in water quality. These reports include data on the types of pollution present in waters and their source. Because of the large geographical expanse of agricultural land use, agriculture has been identified as a key source of nonpoint source pollution. Agricultural nonpoint sources are viewed as one of the remaining significant challenges to attaining fishable and swimable waters in many areas of the US. A recent Presidential Clean Water Action Plan calls for closer cooperation among
Federal Agencies in assessing and monitoring water quality and in taking steps to address nonpoint and point sources of pollution.
SUMMARY

This paper has described how the GPRA of 1994, along with other forces, has driven NRCS to be more performance and outcomes oriented. Such an orientation requires that goals be set to serve as a basis of measurement. There is an emphasis on locally led conservation and locally set goals, but these must be generated in the context of regional and national requirements which may either constrain or support the locally led objectives. Goal conflicts must be resolved at the local level to attain local buy in to goals.

Outcome assessment requires decisions to be made that are in concert with the agreed upon goals. The EBI, used in the CRP program, is an effective framework for making and documenting decisions at the local level. The EBI includes natural resource values which the public has decided are important and provides a technically based and transparent means of evaluating them, permitting a comparison of one proposal to another.

LOOKING AHEAD TO THE FUTURE

Trends toward reduced Federal budgets and taxpayer demands for value from government expenditures will continue. These trends will lead toward more emphasis on accountability and outcomes measurement. Goals will continue to be set at the local, regional and national levels with the emphasis on the local level.

NRCS is continuously reviewing and improving its tools for making decisions and assessing outcomes. We have major initiatives underway to improve the EBI and to develop a more generic “Conservation Benefits Index” or “CBI” to use in applying economic logic to decision making at the farm level. The CBI will be applicable to all NRCS programs, and perhaps conservation programs carried out by other USDA agencies and other organizations. In addition to providing decision support, it will improve accountability, as it will help NRCS staff to better account for the benefits of conservation work and improve communications as the system will make the information about benefits more concrete. The CBI should be completed by the mid 1999.