Part 1

Introduction

NRCS policy is that economic effects of alternative actions should be provided to NRCS customers in order for them to make informed resource decisions. Cost information should be used as a part of analyzing and evaluating the economic effects of conservation systems. The purpose of the Cost Data Section is to provide guidance to NRCS personnel in the development and use of cost data and cost lists, and provide state average cost data.

The initial phase of evaluation the effectiveness of conservation measures is the collection, analysis, and use of current information on costs and prices. Economic data is used by our customers in making informed natural resource decisions. Cost information is used in the analysis of alternative plans as well as evaluation of alternatives. Cost data is used to develop cost lists and estimates of costs for conservation practices. Cost data is updated annually.

Basic Principles

An understanding of a few basic economic principles and concepts is useful in appreciating how and why farmers react to changes in economic conditions. Many economic principles are only a formal organization of basic common sense that can help the conservation planner provide economically feasible and cost effective alternatives to clients. Clients make decisions on the allocation of land, capital and labor inputs. Each one of these inputs has a cost associated with it. The implementation of a conservation practice alters the input mix and the costs of production. The conservation planner needs to be prepared to discuss the resource changes and costs necessary to successfully install, operate and maintain the conservation alternative that is being recommended.

The benefits of conservation occur both on site and off site. Farmers do not generally account for pollution's (runoff sediment, nutrients, chemicals or pathogens) cost to others (off site) when making their production decisions. The costs of production with conservation is often compared to only the on site benefits. The government provides incentives or cost share to producers to influence them to alter production processes to reduce pollution effects off site.

The human considerations should be included early in the planning process. Follow the guidelines in the National Planning Procedures Handbook (NPPH) 600.11 (h) Social and Economic Considerations. The NPPH provides information on the inventory methods and data sources for economic and social considerations in the planning process. NPPH 600.46 Working with Individuals and Groups provides guidance on understanding and working with clients and stakeholders.

With and without conditions

The generally acceptable basis for computing effects of conservation measures is the with and without approach. Effects are measured as the differences expected with the measures installed with those expected from using the resource without measures. Generally, in evaluations of resource management systems, net returns can be used as the appropriate comparison of how profits are changed with conservation installed.

Planning horizons should be based on the useful life of the conservation practices. Time frame may also depend on how quickly an individual wants to recover his investment. In some cases you need to use the financial life (loan repayment period) which can be much shorter than the economic life (physical useful life) of the improvement.

The National Economics Handbook provides procedures and instructions on application of economic methods/tools to compare conservation systems. These evaluations are not intended to be used as an analysis of the farm business. A farmer desiring farm management assistance should be referred to Cooperative Extension or other farm management assistance providers.

Definitions of Economic Terms

- **Amortization:** The process of calculation to take a lump sum and put it into periodic payments (principal and interest).
- **Average Annual Benefits:** Average annual benefits are the amortized stream of benefits

expected over the life of the conservation practice or system.

- **Average Annual Costs:** Average annual costs are the sum of the amortization of the installation cost over their expected life and the annual operation and maintenance costs.
- **Benefit Cost Ratio:** The benefit to cost ratio (benefits divided by costs) is one of several ways to determine the economic worth of a conservation measure. A ratio of 1 or greater means benefits exceed costs. The benefits and costs must be from a common time basis, usually converted to average annual values through the use of amortization or discounting.
- **Breakeven Point:** Breakeven point is where the benefits equal the costs.
- **Depreciation:** Depreciation is an asset's loss in value due to wear, age and obsolescence. Depreciation is an accounting and financial concept used in the allocation of an asset's cost over its productive life. Several methods can be used to determine depreciation. Depreciation is taken into account when determining the useful life of conservation practices.
- **Discounting:** Discounting is a technique for translating values from one time period to another in order to express the values in consistent terms. Costs and benefits frequently paid and received at different points over the course of sometimes long time horizons. In the evaluation process discounting is used to describe future effects in terms of present day values. Discounting is accomplished by multiplying future values by discounting factors that reflect both amount of time between present and future and the degree of value (interest rate).
- **Economic Life:** The effective economic life is determined using expected deterioration, obsolescence, depreciation, changing needs and improvements in technology.
- **Economies of Size:** Economies of size is a long-term concept about the average total cost per unit of production as the farm increases in size. As the farm increases in size the long-term average cost decreases. Reasons are as the farm increases in size they can achieve more complete utilization of labor and machinery, the ability to increase capacity, and to purchase inputs at a lower price because they buy a larger volume. Economies of size and economies of scale are sometimes used interchangeably in every day usage but they have slightly different meanings when used by an economist. Economies of size simply means more output by the increase of one or more inputs. An example of economies of size would be adding more land while farming it with increased time and not adding or increasing machinery. Economies of scale refers to increase in output when all inputs are increased by the same proportion.
- **Financial Life:** The time frame equal to the time to repay a loan or time frame that financing of production is expected to take place.
- **Installation Costs:** Installation costs are expenditures for initial construction of resource improvement. These costs include engineering services, land rights, etc.
- **Life Span (Years):** The life span is the physical useful life of the practice. It should reflect the number of years the practice is expected to accomplish the conservation objective assuming normal maintenance and repair are applied. At the end of this time the practice is no longer serving its original purpose in using or conserving the resource and, therefore, a new capital investment will be needed to replace the practice. For annual practices the life span year is 1. In cost data NRCS usually uses economic life for life span.
- **Operation and Maintenance Cost (O&M):** These represent the annual cost based on the value of materials, equipment and services needed to operate the resource improvement, and to make repairs necessary to maintain the practice in sound operating conditions during its life span (useful life). For annual practices that require no maintenance the O&M is zero. The O&M should be the average amount of money expended annually to maintain the function of the practice for the expected life. This is often expressed as a percentage of installation costs.
- **Opportunity Cost:** The value of something based on the value of another opportunity forgone to acquire it. Nearly every input or resource used has an alternative use. Opportunity cost is used to place a value on "what might have been." Opportunity cost

can be defined in either of two ways: the income that would have been received if the resource had been used in its most profitable alternative use or the value of the product not produced because the resource was used for some other purpose.