

---

United States  
Department of  
Agriculture

Natural  
**Resources**  
Conservation  
Service

---

Part **610**  
National  
Economics  
Handbook

---

**Chapter 4**

---

**Conservation Effects For  
Decisionmaking: A Frame-  
work For Economic Evalua-  
tion**

---

# Chapter 4

# Conservation Effects For Decisionmaking: A Frame- work For Economic Evalua- tion

---

<b>Contents:</b>	<b>610.0400</b>	<b>Introduction</b>	<b>4-1</b>	
		(a) Purpose and scope .....	4 1	
		(b) The planning process .....	4 1	
		(c) Collecting and recording information .....	4 1	
		(d) The framework .....	4-1	
	<hr/>			
	<b>610.0401</b>	<b>Steps in the CED process</b>	<b>4-2</b>	
		(a) Benchmark .....	4-2	
		(b) Alternatives .....	4 2	
		(c) Impacts .....	4-3	
		(d) Values .....	4-3	
	<hr/>			
	<b>610.0402</b>	<b>Comparison of the NRCS planning process and CED</b>	<b>4-3</b>	
	<hr/>			
	<b>610.040</b>	<b>Case studies.</b>	<b>4-</b>	
	(a) What to record .....	4-6		
	(b) Format choice .....	4-6		
	(c) Procedure .....	4-6		
	(d) Types of case studies .....	4-7		
	(e) Hierarchy of analysis .....	4-7		
<hr/>				
<b>Figure</b>	<b>Figure 4-1</b>	<b>CED decisionmaking process</b>	<b>4-1</b>	
<hr/>				
<b>Table</b>	<b>Table 4-1</b>	<b>Conservation Planning versus CED Process</b>	<b>4-4</b>	

---



**610.0400 Introduction**

**(a) Purpose and scope**

Conservation Effects for Decisionmaking (CED) enables NRCS planners to display and evaluate the effects of various conservation options available to the land user.

The CED process can be used to assist land users with their conservation decisions by

- Providing a framework in which to organize and present information that facilitates comparison of the positive (gains) and negative (losses) effects of a conservation option.
- Permitting consideration of all physical, sociological, and economic values pertinent to the evaluation.
- Encouraging the employment of analytical tools at appropriate levels of sophistication to provide information.
- Capitalizing on the knowledge and experience of our agency professionals and clients to foster interaction throughout the decisionmaking process.

**(b) The planning process**

The CED process is completely consistent with the planning process outlined in the National Planning Procedures Handbook. CED is not a new system, but a method of thought organization. It provides a way to evaluate the continuum of all alternatives available to the land user, and is intended to make conservation planning and application easier and more efficient.

**(c) Collecting and recording information**

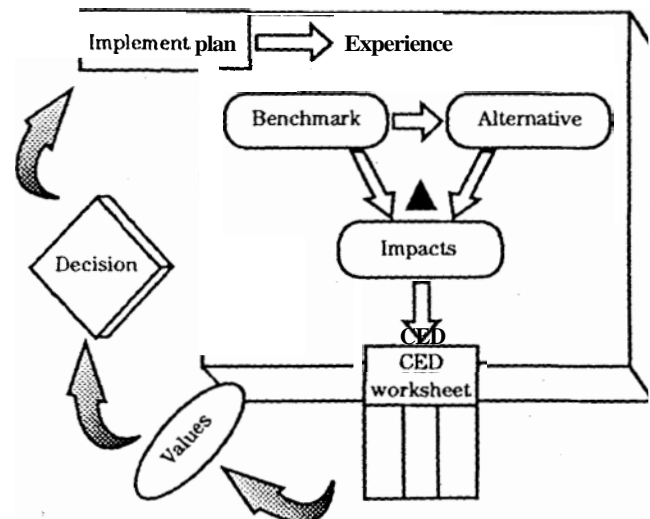
The collecting and recording of effects information for the CED process is not a new approach; it has been the major thrust of conservation management systems (CMS), and of planning in general. The CED idea emerged from a national economic application work group. It links the planning process with economic

input and emphasizes the end objective. The identification of the expected effects from applied conservation allows decisions to be made and actions to be taken. The CED framework is applicable to all NRCS programs and planning situations. Consequently, it is also the theme and organizational tool for this handbook, which has an explanation of the steps in the process of evaluation, a diagram of the decisionmaking process, and examples of evaluation approaches. Case studies have been included in appendix B from each of the four Technical Center Regions. Subsequent chapters explain the various economic principles, tools, and techniques available for use if one wishes to carry evaluations to a more detailed level of analysis.

**(d) The framework**

The CED framework has information from many disciplines combined, so that a comprehensive and effective evaluation can be made. For more guidance on how to carry out a CED analysis, consult with you state office about CED training, the CED Training Manual, and the CED Workbook. The workbook contains step-by-step instructions and explanation of each step of the process. Lessons and questions are provided for self study. Always keep in mind that economics is just one of the many tools available to help NRCS do a better job and to help the land user make more informed decisions. Figure 4-1 is a chart presented to graphically explain the CED decisionmaking process.

**Figure 4-1 CED decisionmaking process**



## 610.0401 Steps in the CED process

### (a) Benchmark

Field office level planning efforts should always first identify the benchmark condition. The planner and land user work together to develop a picture of existing conditions, trends, problems, opportunities, and objectives. The assistance provided is based upon soil, water, and other natural and cultural resource information. The description of benchmark conditions could include:

- Other inventories and evaluations
- Description of current crops, farming practices, livestock type and condition, and available equipment
- Consideration of sociological and economic characteristics

Planning objectives and the complexity of each situation determine the level of detail necessary for inventories and evaluations.

The objectives of the land user will usually affect the kind and amount of information gathered and evaluated. However, the formulation of planning objectives requires that the objectives of society as well as those of the land user be considered. The planning process should also identify opportunities. This creates a broader view that goes beyond the search for resource problems to recognize where resource enhancements may be achieved. For example, if a given area does not have a significant soil resource problem onsite, opportunities may still exist to make on-farm improvements that could increase efficiency and profitability, while at the same time reducing negative water or air quality effects offsite.

### (b) Alternatives

Alternatives that meet both individual and societal objectives need to be considered after a picture of the benchmark situation and expected future trends are

developed. The CMS (Conservation Management System) formulation process will normally be used to develop alternatives that provide a desirable view of the future.

Proposed alternatives enable planners to develop a picture of the conditions that could exist on the farm or ranch with conservation treatment. Alternatives represent the world of possibilities, a vision of what could be, based on predictive models, professional judgment, and experience with the expected effects of each action or set of actions considered. They are the different options that are proposed to deal with current and future problems or issues arising from the existing situation.

An alternative is generally a Resource Management System (RMS), but could also be an Acceptable Management System (AMS), or Alternative Conservation System (ACS) for plans developed for the 1985 Food Security Act. It could be a single practice or simply an adjustment to present farming operations. Proposed alternatives must be consistent with Sections III and IV of the Field Office Technical Guide (FOTG), and must also be within the approval authority of the planner. Apart from the FOTG, the experience and knowledge of the planner and decisionmaker are the main sources of information used for selection.

To achieve a specific alternative, certain steps or actions need to be taken. Examples of actions include a change in cropping sequence, land use, time of seeding, tillage or timing of cultivation, structural improvements to the farm, or simply lowering the speed of a single tillage operation. Each individual has a different experience base which can be increased by on-the-job training, specialized training courses, field trials, or the use of models. A useful learning experience for planners is to visit land users with successful conservation treatments already applied. Technology transfer through exposure in this manner rapidly broadens an employee's perspective and improves their expertise and confidence. If successful on-farm experiences are documented and shared as case studies, the knowledge base of others within and outside the agency could also be easily enhanced. Such experiences should be recorded first in physical and biological terms rather than monetary ones, because monetary values are simply a translation of the former and can be expressed in current dollars at any time.

## (c) Impacts

The completed alternative is compared with the benchmark condition to estimate the impacts of the actions. The impacts of applied conservation options are the differences between the benchmark or current condition and trends and the proposed alternative situation. Quantification of the impacts is dependent upon the degree of detail used to describe or measure the benchmark and expected alternative conditions. The impacts should be described in narrative form at a minimum, and in quantitative terms to the extent possible. They should also be recorded in an easy to understand manner for consideration by the decisionmaker.

Conservation Effects or Impacts Worksheets can be used to record this information. Differences in erosion rates, habitat values, water quality, acres farmed, bushels harvested, labor and fuel requirements, pesticides used, etc., should all be documented to the extent that such information is needed by the land user or is required by the agency. The time frame when the impacts occur might also be identified, because certain actions such as pasture improvements can result in immediate costs, but the resulting yield increases may be delayed and then occur for an extended period of time.

## (d) Values

Each individual's values will affect the relative merits of an impact. Ten additional quail may be a positive impact to one person and a negative one to another. An individual's set of values may be in harmony with society's best interest or it may be in direct conflict. Once it has been applied to the impacts, the positive and negative points may be listed. This listing can start out generally and be expanded to increasingly detailed levels. The procedure may involve traveling completely back through the decisionmaking process, or it may involve increasingly sophisticated levels of detail on the same impacts. The process is continued until the land user has enough detail to make an informed decision. In most cases, the planner will identify the costs and describe necessary maintenance for each of the options. Often a limited amount of detailed information will be enough. Occasionally, however, a more complex analysis will be necessary, and the concepts presented in this handbook may help.

## 610.0402 Comparison of the NRCS planning process and CED

Table 4-1 compares the steps of the NRCS planning process and the concurrent activities of the CED process.

**Table 4-1** Conservation Planning versus CED Process

Conservation Planning	CED Process
<p>(1) <b>Identify the problem</b>—All significant resource problems relating to the <b>five</b> resources (soil, water, air, plants, and <b>animals</b>) are identified and documented.</p>	<p>(1) <b>Benchmark/experience</b>—The Benchmark part of CED also starts with identifying the problem. A key factor is the necessity to document the current conditions for later comparison with the Alternative, or future conditions to determine Impacts. The CED Benchmark part also overlaps Steps 2, 3, and 4, Determine the Objectives, Inventory the Resources, and Analyze the Resource Data. Experience, especially individual experience, is required in every part of CED that calls for judgment.</p>
<p>(2) <b>Determine the objectives</b>— This step establishes the level of detail for the planning effort based upon objectives. The client's objectives are clearly documented. This step includes determining the client's expectations, to try capabilities, characteristics, tenure, values, and limitations; NRCS policy and technical requirements; community traditional values; financial constraints; and legal requirements.</p>	<p>(2) <b>Alternative/values/experience</b>—The client's objectives are needed in CED for you to produce an Alternative, or future condition. The client's Values also affect the choice of which Conservation Management System</p>
<p>(3) <b>Inventory the resources</b> — Factual data sufficient to analyze problems and to develop and evaluate alternatives are available and recorded in suitable formats.</p>	<p>(3) <b>Benchmark/experience</b>—Recording factual data in a suitable format can be considered the end product of establishing the Benchmark in CED. Experience is used to decide what kind of data is important to record.</p>
<p>(4) <b>Analyze the resource data</b> — Data must be analyzed to verify the problems, determine their causes, and determine if the data are sufficient to use in formulating proposed solutions. Data are analyzed to quantify identified problems and to forecast conditions and effects without action.</p>	<p>(4) <b>Benchmark/experience</b>—Benchmark is quantifying problems and forecasting conditions and effects of resource problems.</p> <p>Experience is a CED contribution to this step of the conservation planning process of resource problems through the use of user experience documentation from Section V of the FOTG.</p>
<p>(5) <b>Formulate alternative solutions</b> — Alternative solutions are developed that produce the effects of solving or alleviating identified problems and meeting the client's objectives.</p>	<p>(5) <b>Alternative/experience</b>—If the client does not like the results of a proposed CMS, a new Alternative CMS is proposed and the CED process is cycled through again.</p>
<p>(6) <b>Evaluate alternative solutions</b>—Alternative solutions are analyzed and compared, using CED and other tools, to determine if they meet the client's objectives, NRCS policy, and technical and legal requirements. Effects of alternatives are evaluated individually and compared to Benchmark conditions as to their ability to solve or alleviate the problems and meet the client's objectives.</p>	<p>(6) <b>CED</b>—This is the most important part of the CED process.</p>
<p>(7) <b>Client determines a course of action</b>.—The alternative solutions selected is based on the client's clear understanding of the effects of each alternative, and the selected solution is recorded in the proper format.</p>	<p>(7) <b>Values/CED worksheet/hierarchy of analysis/experience</b>—The intended result of the CED process using Values, CED Worksheet, Hierarchy of Analysis, and Experience is a clear understanding of the proposed Alternative and how it would affect the operation.</p>
<p>(8) <b>Client implements the plan</b>— Client has adequate information to implement, operate, and maintain the planned treatments. Completion of this step alleviates or solves the problem.</p>	<p>(8) <b>CED</b>—The CED goal is to involve the client in the decisionmaking process, so that the client is fully committed to carrying out the conservation plan.</p>

**Table 4-1** Conservation Planning versus CED Process—Continued

---

Conservation Planning

CED Process

---

(9) *Evaluation of the results of the plan*—This step, which could also be called monitoring or follow-up, assesses the success of the NRCS assistance in solving the identified problems and meeting the client's objectives. It includes recording the client's experience with the plan as implemented. This provides NRCS with effects information for use with other clients with similar resource problems.

(9) *Experience*—The experience part of CED directly relates to this step of the conservation planning process. Because the CED process documents the effects in Section V of the FOTG, it will provide a growing base of experience to draw upon when working with other clients with a similar resource setting.



## 610.0403 Case studies

Information regarding the effects of conservation can be collected from **any** source possible, but without extensive research results or local expert knowledge, a case study is a convenient and relevant way to collect **this information**. A case study enables the conservation planner to document conservation **systems** currently used in **a** farming or ranching community, along with the motivations **that** led to their adoption. Having ready data about the effects **and** impacts of conservation systems will enhance NRCS's ability to implement effective conservation technologies and policies. A case study **is** also a way to record conservation effects information using the CED process. The CED process is a multidiscipline effort often including information from agronomy, engineering, geology, and economics. Resulting case studies felt to be useful should become part of the FOTG, Section V, Part B (Conservation Effects).

### (a) What to record

The conservation practice effects that a land user experiences can be used to project what may happen when the same practice is applied to a different farm or ranch with similar resource characteristics and problems. In a case study, NRCS conservationists systematically record resource settings and conditions, before and after a conservation option is implemented. The changes or effects that occur as a result are the important things to record.

The value of the case study concept is establishment of a systematic method for NRCS field staffs to record the effects they observe when conservation has been applied. Conservationists and land users **can** then use this information when choosing which conservation option will best suit their needs.

### (b) Format choice

The choice of a case study format is based on the ease with which one can document **a** wide variety of factors influencing an individual's conservation decisions— including those factors that may be non-quantitative in

nature. While **the** initial focus of a case study may be a single land use, the study **can** be expanded to include relevant social and environmental factors.

Case studies may provide the land user and conservation planner with information such **as**:

- a Effectiveness of conservation and resource management **systems**
- a New innovative practices
- Educational tools for field staff, farmers, and ranchers
- Planning and marketing tools
- Insight into **the** impacts of policy and technology changes.

### (c) Procedure

Section V of the Field Office Technical Guide contains procedural references on Guidance for the Development and Use of Case Studies **as** a Source of Conservation Effects Information. This might be **a** useful reference for those interested in developing their own case study files. Case studies can be used to examine a variety of topics, including but not limited to soil conservation, pesticide use, archaeological and historical preservation, water quality, and wetland preservation. The documented topic is usually determined by the land user.

A detailed outline of the information sought in the interview of the land user should be made beforehand. To facilitate comparisons among case studies, it is useful to decide upon a format for answers (i.e., qualitative, quantitative or mixed). Questions that can be answered with a yes or no should be avoided. Informal, neutral questioning is usually effective with this type of study, **as** is individual opinions, descriptions of practices, and recommendations. Questioning should be structured to minimize note taking so that concentration can be focused on observing responses and stimulating a natural flow of conversation.

The interview should begin with an explanation of how the information will be used and by whom. Responses are often less guarded and more enthusiastic when the person interviewed knows that they will not be quoted in the local paper, and that the information generated may be useful at the local, state, regional, **or**

national level, It is helpful to make arrangements to provide **the** land user being interviewed **with** a draft of the study **after** it **has** been completed along with the option to edit **his/her** own responses. **This** review process is **an important** means of ensuring the accuracy of each **case** study.

**Case** studies allow the analysis of any number of factors relevant to **the** land user. Since such a vast amount **of** information can be obtained, not all of it can or should be used **in the** final report. It is important to remember **that** brevity and concise observations are valuable assets for effective use of a case study.

Some case studies **can** last several years, when the land user is willing to keep track of **costs** and yields. This is probably **the** most useful situation since the extra data add reliability to the findings.

#### **(d) Types of case studies**

Case studies can be of three types:

- A comparison of the before and after treatment conditions on a single site.
- A comparison of two separate but comparable resources and land use situations (sites) on different farms or even on the same farm, i.e., one site with and one without treatment.
- A simple recording of farmer experiences with treatment on a single site regardless of the earlier conditions.

The **first** and second types mentioned above require that data be collected for both the before treatment or benchmark situation and the after treatment condition arising from the adoption of conservation.

The third type of case study represents the simplest approach, but inherently involves the greatest risk of misunderstanding the cause and effect relationships. It **focuses** on *with* treatment conditions only. This may not be important for the immediate future, **as** the optional situation with **any** conservation is considered more desirable than the present situation. However, a more precise understanding of the cause and effect relationships of conservation is of great importance when considering the long run.

#### **(e) Hierarchy of analysis**

The following notes should be helpful when constructing a case study for which a greater level of detail is requested.

- The hierarchy of analysis refers to different levels of analysis needed to assist the land user in making an informed choice. **Any number of** levels may be used, depending on the amount of detail desired by the land user.
- The level numbers are not intended to have specific definitions other than relative to **other** levels.
- The impact information on the account ledger is not intended **to** be read **across as** single **lines**. Instead, the combination of positive impacts is compared to the combination of negative impacts.
- Information obtained from models and **tools** can be used to better determine the impacts when going to higher levels of **analysis**.
- Sometimes a higher level of analysis is needed in order to include an impact not previously considered, even though it may not involve refining information already displayed.
- Information should be presented in the manner most helpful for the land user, such **as** total amounts for the treatment unit rather than per acre amounts.