Minnesota Field Office Technical Guide – Section V
Conservation Effects for Decision-making (CED)

Conservation Effects for Decision-making (CED) is a tool to present the economic effects of a proposed alternative compared to the current situation. The purpose of this section is to explain the CED process and provide guidance for using the CED tool to facilitate the decision making during the conservation planning process. This section also shows how CED framework can be used to develop case studies to capture producer experiences which are used for marketing conservation.

Conservation Effects for Decision-making (CED) and the Practical Economics

CED is one of several economic tools used to gather and display economic effects information to producers. The CED can be as simple as a piece of paper with a line down the middle with + on one half and – on the other (called a T-Chart) which is used to facilitate a conversation with the producer about what are the positive and negative effects of a proposed conservation alternative. The CED framework encourages the conservationist to draw two pictures of the world: 1) a benchmark condition without conservation; and 2) the conditions that would be expected with conservation treatment. Effects information is intended to be a relatively quick and practical means of providing potential cooperators in comparable resource situations with a vision of the way their current situation might be modified to achieve a desired resource condition. By displaying both the advantages and the disadvantages, the conservationist can show what the conservation treatment means from the producer's perspective. They are not intended to be definitive analyses of resource treatments, which scientifically determine complete cause-and-effect relationships.

CED is an optional tool that can be used to assist a producer when they request additional information. CED displays the effects before conservation compared to the effects after conservation and describes the difference between the effects as impacts. If a CED worksheet has been completed for a producer, it would be included in that producer's file along with his/her conservation plan. CED worksheets can also be completed as part of a case study. To be most useful, the effects information used in CED must be factual, realistic, and practical. CED is a process that helps producers to understand the effects and impacts of resource management systems on their operation. The process helps the planner display the impacts of conservation options when compared to the current conditions as they exist on the decision maker's land. Impacts may be rated as positive or negative by the decision maker.

Conservation Effects vs. Impacts

The difference between "before and after treatment" or "with vs. without treatment" conditions represents the change or impact. The impacts may be all or in part due to the conservation treatment. Change attributable to the recommended treatment is defined as the conservation impact. Effects represent the quantitative and qualitative descriptive characteristics of the outcomes of treatment only. They are the overall results, which provide a general vision of the treatment and its effectiveness. The effects show what a practice or system looks like, its characteristics and results, and represent the general expectations achievable elsewhere if the resource conditions are relatively similar. Several methods for organization and development may be used and a minimum of data requirements must be met to help other producers understand the consequences of their choice. The data collected in at a minimum must:

1. Be specific for a conservation practice or system.
2. Only include the variables relating to the conservation treatment (this requires careful producer communications and consultation during implementation to avoid errors from missing changes in seed varieties, fertilizer, etc.).
3. Include the kinds, amounts and timing of treatment actions.
4. Identify the physical and biological effects associated with the conservation actions. Because every year's weather, crop sequence, and methodology of operations will vary; it can be challenging to estimate effects, but effort should be made to not include other induced changes unrelated to the conservation treatment.

How should the information be displayed?

There are two forms for CED; one is more detailed and the other is in a T-Chart format. The T-Chart format is the most commonly used and suggested format, but the more detailed form may be used to address the needs of a producer or when the planner feels it would facilitate the decision making process. The effects of conservation may be expressed in either narrative terms that represent factual data on experience or expected results of the specified conservation treatment as applied to the resource setting. For example, typical effects could be: an erosion rate of 2 tons per acre *per year* or a significant reduction in sheet, rill erosion will occur with this treatment. Effects information will also include management, social, cultural and economic information. Factors such as cost, producer acceptability and physical changes to cultural resource sites associated with the specific conservation treatment component are to be identified. Included for example would be: economic effects from changing tillage equipment, labor inputs, expected net economic returns, Information developed and displayed on conservation effects will vary significantly in scope and detail depending on the resource conditions in the local area as well as upon the needs for technical reference materials to carry out conservation activities in that location.

Three levels of analysis

CED can be done at three levels of analysis. Level one is a narrative form. Level two includes physical measurements and Level three includes monetary terms. When doing a CED you can use a mix of impact levels. For example, the impact on soil erosion can be at level two when the number of tons of erosion reduced is displayed while the impact on air quality may be a level one narrative and some other impact could be in dollar values.

Examples of CED

The following pages show blank CED forms and examples of a completed CED analyses.

The form below is the longer more detailed form where effects and impacts are displayed in two colums with a space for the producer to mark them as positive or negative. This is the older of the two forms and planners may still find this tool as part of conservation plan documentation and may find it useful. The next page has the T-Chart form which is a simplier format the planner can develop as part of the decision process. The CED is designed to facilatate the producer in making an informed conservation decsion.

USDA – Natural Resources Conservation Service
Conservation Effects Worksheet

Service Center _____			
Client / Business Name: **Address:**		**Resource Setting (s) / Description:**	
Effects of continuing the benchmark system	**Effects of Proposed Treatment**		**Impacts** **+/- Decision Maker Judgement**
Ecological: **Social:** **Economic:**	**Ecological:** **Social:** **Economic:**		**Ecological:** **Social:** **Economic:**

USDA-NRCS-MICH (Notice 221 – 09/2009) CED_form.doc

CONSERVATION TREATMENT EFFECTS INFORMATION

CONSERVATION MANAGEMENT UNIT -

CONSERVATION TREATMENT: RMS #	**RESOURCE PROBLEMS:**
POSITIVE +	**NEGATIVE -**

Conservation Treatment Effects (CED example)

Cropland Convention tillage to Residue Management No-Till

Resource Setting - Family owned farm, Cash Crop
Crop Rotation: 1-2 year corn, 1 year soybeans, 1 year wheat (subject to market conditions)

CONSERVATION TREATMENT:	RESOURCE ISSUES:
• Residue management, No-till -(329) • Conservation crop rotation -(328) • Critical area planting -(342) • Grade stabilization structures -(410) • Subsurface Drain -(606) • Nutrient Management-(590) • Pest Management -(595)	Wind erosion, water erosion, sheet, rill and gully erosion, weed control, low crop yields, surface and ground water concerns, soil compaction, low soil fertility and organic matter content, subsurface drainage
POSITIVE EFFECTS +	**NEGATIVE EFFECTS -**
+ **Reduced Soil erosion** • Decreased to 2 tons/acre/year + **Improved soil quality:** • Increase in soil fertility • Increased soil organic matter content by 2% • Increased water holding capacity and water infiltration rates of the soil • Increases Carbon Dioxide in soil, aided to a change in plant bio mass • Reduced soil compaction • Reduced soil crusting • Increased number of night crawlers • Improve yield in drought years. + **Improved water quality** • Reduced sedimentation up to 7 ton/ac/yr. + **Sustained soil tilth and crop production resulted in increased yields on average.** • Corn from 100 to 150 bu./yr. • Soybeans from 25 to 45 bu./ yr. • Wheat from 50 to 100 bu./yr. + **Reduced equipment and Labor needed** • **at most** 3 trips with the equipment is needed + **Reduced pesticide use** • Discontinued and replaced atrazine from 4lbs/ac/yr. to 0 • Saved approx. $50 lbs./ac/yr.	- **Reduction in crop yields at start of practice** • 3 year lag to get yields back up to normal or above • $ loss of income with low yields, especially in the first year - **Social pressure at the start of the practice because no-till was not well received in 1988** - **Increased cost for Grade Stabilization Structures and other practices** - **Machine Transition Costs to purchase and outfit no-till equipment** • Purchase price of the cost to modify a no-till planter. This was a minor negative for this farm as they were at a time for replacing equipment, but thought it might be different for others not ready to replace older machinery.

Oregon CED level 1 & 2 example for a CRP Case Study

Conservation Effects for Decision Making

Level One Analysis

CONSERVATION TREATMENT:
CRP Reduced erosion and increased soil tilth due to perennial cover establishment of species adapted to site. Water quality will improve when nutrients and sediments are retained on the field. Weed sources will be reduced. Wildlife food, cover and water needs will be met.

RESOURCE PROBLEMS:
Sheet and rill erosion, declining soil tilth potential surface water quality problems from nutrients and sediments. Plant suitability to site. Pest (weed) invasion. Lack of wildlife food and cover.

POSITIVE +

+Reduce soil erosion to meet T
+Reduce annual terrace repair costs
+Reduce or eliminate weed sources by seeding perennial grasses to compete with weeds
+Sustained soil tilth
+Improve surface water quality by reducing surface water quality by reducing surface loss of soil attached pesticides and sediments
+Perennial grasses planted will be suitable to site
+Eliminate weed sources
+Increase food, cover, and water availability for targeted wildlife species
+Reduced labor after establishment
+Potential cost share to apply system
+Annual payments to maintain grass stand for 10 years

NEGATIVE -

-Initial increase in labor to prepare and install system
-Potential for increased perennial weedy species
-Loss of crop production
-Maintenance costs
-Ten year contract

Conservation Effects for Decision Making

Level Two Analysis

CONSERVATION TREATMENT:
CRP Reduced erosion and increased soil tilth due to perennial cover establishment of species adapted to site. Water quality will improve when nutrients and sediments are retained on the field. Weed sources will be reduced. Wildlife food, cover and water needs will be met.

RESOURCE PROBLEMS:
Sheet and rill erosion, declining soil tilth potential surface water quality problems from nutrients and sediments. Plant suitability to site. Pest (weed) invasion. Lack of wildlife food and cover.

POSITIVE +

+Reduce soil erosion to meet T
From 7 to 3 Tons/Acre = 4 Ton/Acre
8,000 Tons over 2,000 Acres

+Reduce annual terrace repair costs
$.03/Foot/Year Maintenance Cost
12,000 Feet /2,000 Acres = $360/Year

+Reduce or eliminate weed sources by seeding perennial grasses to compete with weeds

+Sustained soil tilth

+Improve surface water quality by reducing surface water quality by reducing surface loss of soil attached pesticides and sediments

+Perennial grasses planted will be suitable to site

+Eliminate weed sources

+Increase food, cover, and water availability for targeted wildlife species

+Reduced labor after establishment
Save 250 Hours/Year @ $8/Hr = $2,000/Yr

+Potential cost share to apply system
50% of $12,000 = $6,000, or $600/Year

+Annual payments to maintain grass stand for 10 years
$55/Acre CRP pmt, 2,000 Acres = $110,000/Year

NEGATIVE -

-Initial increase in labor to prepare and install system
200 Hours * $8/Hour = $1,600 or $160/Year

-Potential for increased perennial weedy species

-Loss of crop production
50 Bushels/every other year, @ $3.25/Bu, 2,000 Acres, minus production cost $1.25/Bu = $100,000

-Maintenance costs
$.25/Acre * 2,000 Acres = $500/Year

- Ten year contract

Total Dollar Benefits = $112,960 **Total Dollar Costs = $100,660**

Net Benefit = +$12,300