CHAPTER 8

CHAPTER VIII - CONSERVATION EFFECTS FOR DECISIONMAKING (CED) AND CASE STUDIES

INTRODUCTION

Nearly all people in our society weigh advantages and disadvantages when making decisions. Whether we are considering a new house, car, or a new job, we look at all of the positive and negative impacts that are important to us before making a decision. Some of the decisions are made without any conscious effort while others may be agonizing.

Decision making in agriculture or resource management is the same as any other decision making. Once a situation is identified, alternative ways of dealing with it are compared based on effects, impacts and the differences among alternatives. The effects and differences may be displayed simply as a + or -, or in great detail with changes in costs, income, net return etc..

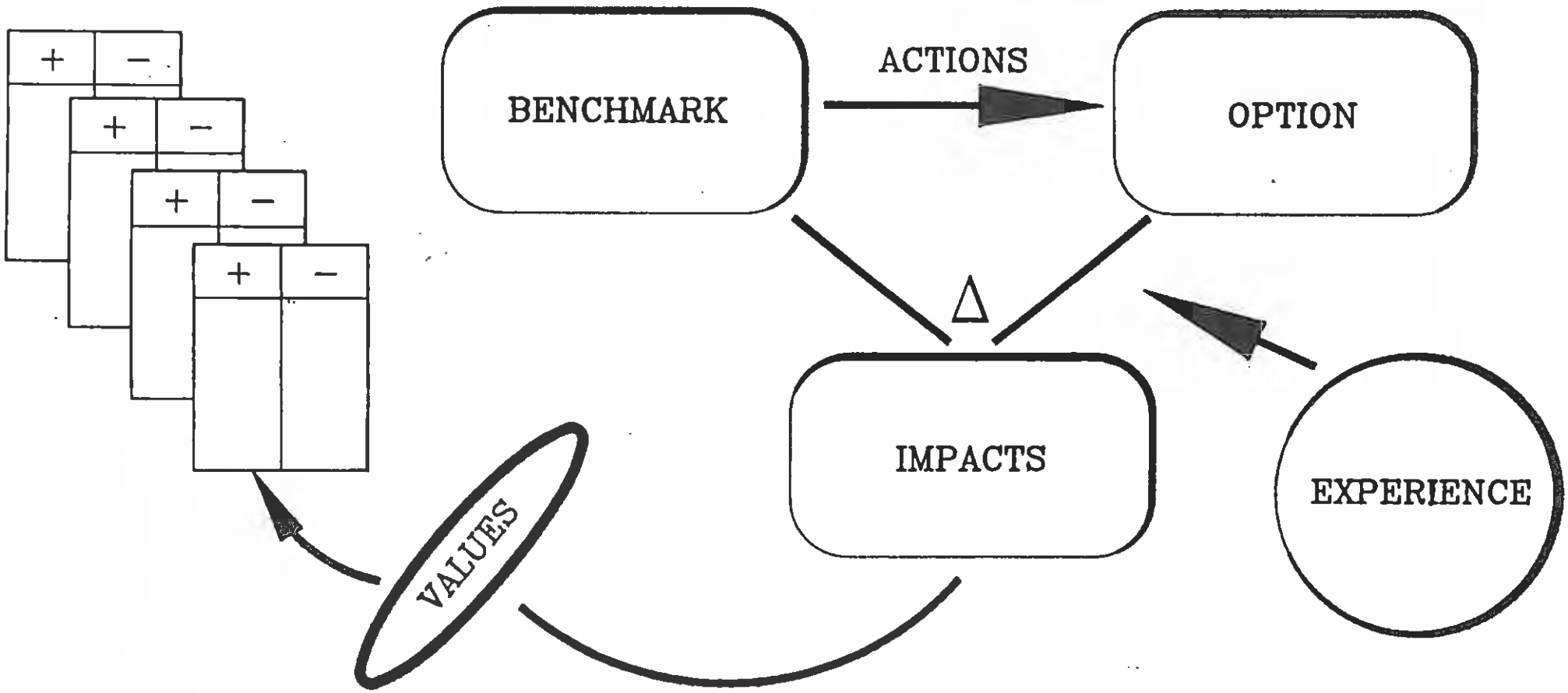
Conservation Effects for Decisionmaking (CED) is a process used to lay out the positive and negative impacts of different management systems. The primary goal of CED is to facilitate informed decision making by providing a repository of knowledge for SCS personnel.

CED assists decisionmaking by:

1. Providing a method for obtaining and storing effects information.
2. Outlines a process for presenting, discussing, and comparing the effects of the present system to any number of proposed treatments.
3. Provides a logical method of assisting the decisionmaker in his evaluation of the conservation alternatives available.

A case study is one way to obtain conservation effects information using the CED process. The CED process is an interdisciplinary effort and the resulting case studies become a part of the FOTG, Section V (Conservation Effects). Several case study examples follow.

CONSERVATION EFFECTS for DECISION MAKING



Commonsense

Planning With Common Sense

WHEN A SALESPERSON tries to sell you a car, a television, or a refrigerator, you weigh advantages and disadvantages of the features, prices, and expected maintenance as you make your decision.

To do this, you want information. How much does it cost? Or you may have other concerns like car color or kitchen space.

A land user of a farm or ranch has similar thoughts when a Soil Conservation Service conservation planner talks about advantages and disadvantages of conservation management practices.

Can I get my needed per-acre yields or my per-head weight? the landowner asks. How much will it cost me now to prevent gullies? Can I amortize costs enough to balance with future benefits? How do I avoid contaminating my pond or my neighbor's pond?

Such a producer is likely very interested in "getting conservation on the land." But he or she may want to know what happens (called effects) to the farm after plowing on the contour, for instance.

SCS has adopted Conservation Effects for Decisionmaking (CED), which uses "effects" information during conservation planning. In CED:

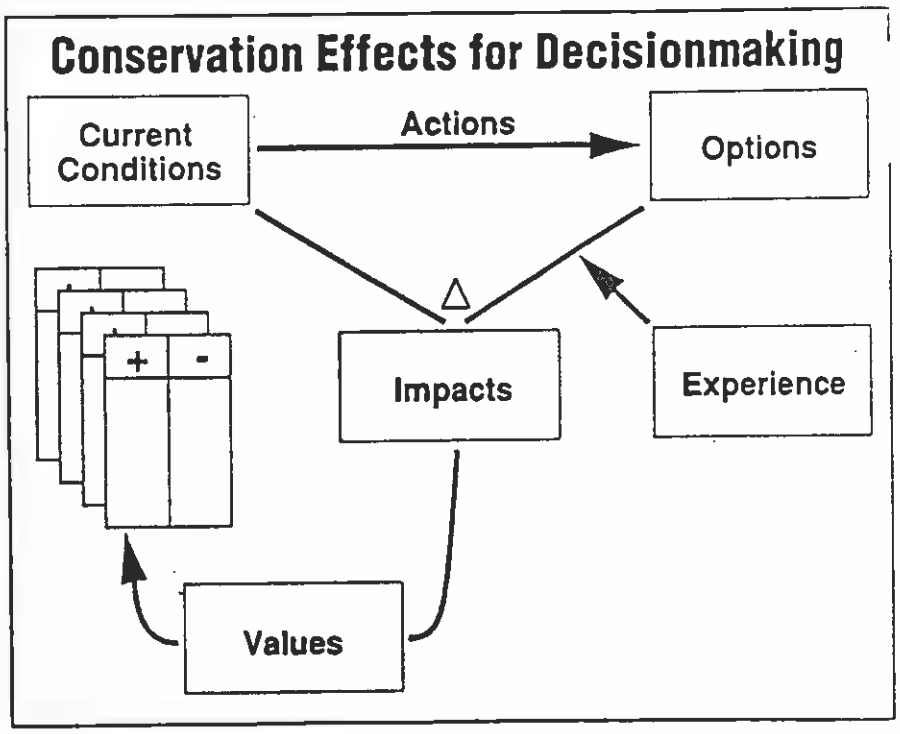
- "Effects" information is put into the Field Office Technical Guide (FOTG);
- Suggested alternatives are compared with what's happening now and are discussed with the land user; and,
- Suggested alternatives are chosen that make sense for the land user's operation.

Conservation planners use technical reference materials from the FOTG as they prepare suggestions, called alternatives, for the land user to consider.

To be useful, the FOTG must have factual, realistic data about applying conservation practices and their effects. SCS specialists will be working with field office conservation planners to improve and augment FOTG's for conservation planning.

CED planning consists of current conditions, actions, options, impacts, values, display, and levels of information. Experience "drives" the whole process.

Current conditions. For the producer's fields and pastures, the planner determines current condi-



Conservation

tions—what the producer is doing right now and how it affects the resources.

Information on soils, crops, rotations, and farming/ranching operations helps the planner examine such indicators as erosion rates, water quality conditions, crop yields, grazing rates, plant health, and soil tilth.

Actions. Once the planner has learned the land user's needs, problems, and concerns, the planner decides on conservation practices to suggest.

"Actions" are what the land user will do, such as using a ridge-till planter or grading terraces into a field. The planner includes actions in what is often called a conservation treatment alternative—the planner's suggestion of how to use conservation practices to solve the land-user's needs, problems, and concerns.

In preparing proposed land-user actions, the planner draws upon the FOTG as well as previous experience on how to treat problems and with what treatments.

The planner should build at least two suggested conservation treatment alternatives that are suitable for the land user's operation.

Options. The planner presents the different suggestions or alternatives to the land user. Each alternative includes the effects expected for each land-user action. Usually there are a number of actions.

Now the land user or producer is a decisionmaker with options to

Apply A Conservation Option?: Pluses and Minuses

Current condition: continuous corn; conventional cropping; residue management; up-and-downhill tillage.
Conservation option: continuous corn; conservation cropping sequence; conservation tillage (30% cover ridge-till); contouring; grassed waterway.

Display of Impacts

Pluses	Minuses
Reduced sheet and rill erosion, 14 tons/acre/year	Added equipment, $21,000.
Water conservation.	Increased herbicide use, 1 lb Atrazine/acre/year.
No ephemeral gullies.	Increased corn harvest cost for 20-bushel/acre-yield increase.
Sustained/improved corn yield, 20 bushels/acre	Slightly increased potential for groundwater pollution.
Reduced equipment use (fewer times over field)	Higher management level needed.
Reduced labor, 1.1 hours/acre.	Install waterway and outlet, $1,100.
Reduced fuel, 4 gallons/acre.	Lost corn production in waterway, 100 bushels/year.
Extended equipment life.	Harvest cost of waterway hay (4 tons/year).
Increased hay production (from waterway), 4 tons/year.	Waterway and outlet repairs, 10% of installation cost/year.
Reduced offsite sedimentation.	
50% cost-sharing for waterway.	
More labor available in May.	

Refined Display Of Impacts

Pluses	Minuses
Reduced sheet and rill erosion, 14 tons/acre/year.	Added equipment investment, $20/acre/year.
Water conservation.	Increased herbicide use, $12/acre/year.
No ephemeral gullies	Increased corn harvest cost, $5/acre/year.
Improved corn yield, $40.20/acre/year.	Slightly increased potential for groundwater pollution.
Reduced equipment cost, $2/acre/year.	Higher management level needed.
Reduced labor cost, $5.50/acre	Install waterway and outlet, $3.40/acre/year
Reduced fuel cost, $4/acre/year.	Lost corn production in waterway, $5/acre/year.
Extended equipment life.	Harvest cost of waterway hay, $5/acre/year
Increased hay production, $6/acre/year.	Waterway and outlet repairs, $2.75/acre/year
Reduced offsite sedimentation.	
50% cost-sharing for waterway.	
More labor available in May.	

...SCS wants to provide the decisionmaker with reliable information he or she needs to make an informed decision...

consider: Do I choose alternative A with no-till, alternative B with ridge-till, or continue with current conditions using a conventional planter?

Data and reference material from the FOTG will be important to determine conservation effects of the proposed actions and how effects satisfy the decisionmaker's needs, problems, and concerns.

Impacts help the land user decide which option to choose. The differences between current conditions and conditions resulting from alternative A, for example, constitute impacts. Impacts can be expressed in either narrative or quantitative terms.

For example: Sheet and rill erosion can be reduced 16 tons per acre. Conservation treatments can stop this headcut. Water quality can be improved.

Values. The farmer or rancher as a decisionmaker uses his or her values to judge impacts as positive or negative (good or bad, gains or losses). Typically, the decisionmaker will be interested in choosing the option where the positive impacts more decidedly outweigh the negative impacts, be it one of the suggested alternatives or the current conditions.

Values reflect a decisionmaker's ideals, beliefs, customs, and concerns. Values help answer questions, such as: How important is each positive or negative impact? How important are operation costs? How important are time constraints? How important are other impacts?

Display. After incorporating the decisionmaker's value judgments, the planner sets up the narrative and quantitative impacts in a plus/minus display for easier viewing and consideration.

Impacts need to include information to assist the decisionmaker in making tradeoffs, such as comparing the added $2-per-acre cost of a system with how the system will benefit the quality of the farm pond.

Sometimes the decisionmaker may need additional information before "feeling comfortable" in choosing one of the suggested alternatives.

What are installation and maintenance costs for this particular conservation practice? How many tons per acre will soil erosion be reduced? Will my corn harvest improve, and how much?

Levels of information enable the conservation planner to provide information, in the appropriate amount of detail, that helps the producer make a decision. Different people may want different amounts or types of information, so a generalized set of facts about conservation practices and systems will not work.

As more or different information is needed, additional information tools and sources may be required. A model may be necessary. Information and assistance from an agronomist, economist, or a soils specialist may be needed. Perhaps expertise from an Extension specialist may help with some questions and concerns.

In essence, SCS wants to provide the decisionmaker with reliable information he or she needs to make an informed decision—nothing more and nothing less.

Experience helps the planner look at the resources, determine current conditions, decide on management practices and land-user actions to suggest, get needed information, envision effects of land-user actions, and identify expected impacts.

A planner's insights help the decisionmaker choose the best option for his or her situation.

Many SCS conservation planners are already carrying out CED, albeit instinctively, through already-gained experience in dealing with land-user needs, problems, and concerns. SCS wants all its planners to become equally [illegible] and caring.

FOTG's will be updated and improved to include conservation effects. Conservation planners will receive training in CED. And SCS national planning and training policies will support conservation effects as an integral part of planning and decisionmaking.

The "bottom line" is help the producer make an informed choice, a choice that makes sense for the operation. With an informed choice, a reasonable and effective conservation plan can be applied and carried out over time.

John Stierna, national economist, SCS, Washington, D.C., and **Paul G. DuMont**, associate editor, *Soil & Water Conservation News*, SCS, Washington, D.C.

U.S. Department of Agriculture
Soil Conservation Service

Conservation Effects Worksheet

Name	Address	OPID No.	Field or Tract No.

Resource Setting:	Resource Problems Before Treatment	Description of Treatment Option:
Benchmark (Present management system)		

Actions (Kinds, amounts, and timing)	Effects (Effects of continuing the benchmark system)	Comparison of Effects of Benchmark and Treatment Option	
		Impacts	Decisionmaker Evaluation

Comments:

CASE STUDY - CHASE COUNTY, NEBRASKA

Conservation Information Sheet

RANGELAND -- BENCHMARK

RESOURCE SETTING: Three soil associations occur in this setting. The Valent-Tassel Association, with slopes of 3 to 30 percent, is present north of the creek. The range site is 70 percent sands and 30 percent shallow limy. The Wann Association, slopes of 0 to 3 percent, is present along the creek. The range site is subirrigated. South of the creek is the Colby association, with 3 to 60 percent slopes. The range site is limy upland. Average precipitation is 19 inches. May and June are the months of highest rainfall. Approximately 31 inches of snowfall occurs during the winter. Plant cover consists of warm season mixed grass prairie. Animal resources consist of domestic livestock (yearling cattle) and wildlife (pheasant, prairie chicken, waterfowl and deer).

MANAGEMENT SYSTEM: Leased yearling cattle operation on 600 acres of rangeland. No brush control. Livestock water is provided by a multiple use reservoir and creek. Livestock have free access to multiple use reservoir and riparian area along the creek. Travel distance to water may exceed three fourths of a mile over rough terrain. Cattle graze freely over the entire pasture throughout the winter and during a portion of the summer. The cattle are fed in the same area during the winter. Overuse of the rangeland is causing an increase in sand sagebrush and less palatable species. Ecological range condition in the limy upland and sandy range sites is fair with a downward trend.

ACTIONS	EFFECTS
No action taken to improve plant vigor, composition, kinds or cover	Generally overgrazed
	Low plant vigor
Generally overstocked for resource conditions	Poor grazing pattern caused by water distribution problem
No brush control	Sand sagebrush increasing
	Excessive runoff
	Plants do not meet the forage needs of the land user
	Small gullies associated with cattle trails and drainage ways
	20 pounds of beef produced per acre @ $0.90/lb = $18 gross return per acre
	Shortage of wildlife cover (pheasant, prairie chicken and deer)

CASE STUDY - CHASE COUNTY, NEBRASKA

Conservation Information Sheet

RANGELAND -- OPTION NO. 1

RESOURCE SETTING: Same as benchmark condition.

MANAGEMENT SYSTEM: Leased yearling cattle operation on 600 acres of rangeland with a resource management system (RMS) installed consisting of the practices in the ACTIONS section. Livestock have limited access to multiple use reservoir and riparian area along the creek. Travel distance to water one half mile over rough terrain. Three pasture rotation grazing. Ecological range condition in the limy upland and sandy range sites is fair with an upward trend.

A 12% interest rate was used in the analysis and no cost sharing was involved. Costs are on a per acre basis and installation costs are rounded to the nearest dollar.

ACTIONS	EFFECTS			
	COST	LIFE	% O&M	ANN. $
556 Planned grazing system ($1,200 or $2 per acre)	$ 2	10 Yr	5	.50
528 Proper grazing use	-	-		-
642 Well (200' @ $6 = $1200 or $2 per acre)	2	20	1	.30
516 Pipeline (300' @ $1.10 = $330 or $0.60) per acre)	1	20	1	.10
614 Tank (2-each 3000 gallon capacity, @ $0.09 per gal. = $540 or $0.90 per acre)	1	25	1	.10
382 Fencing (permanent elect. 7,500' @ $0.34 = $2,550 or $4 per acre)	4	10	5	.90
314 Brush mgt, chemical (treat 60 acres @ $7.20 = $432 or $0.72 per acre)	1	5	3	.30
	$11			$2.20

Up front installation cost of $6,300 or $11.00 per acre. Average annual cost of $2.20 per acre

Small gully sidewalls are stable and there is no head cutting

Infiltration improved and surface runoff reduced

Plants provide adequate growth and vigor for intended use

Option No. 1 continued

ACTIONS	EFFECTS
	Plant community is in balance Adequate cover for pheasant, prairie chicken and deer 30 pounds of beef produced per acre @ $0.90/lb = $27 gross return

CASE STUDY - CHASE COUNTY, NEBRASKA

Conservation Information Sheet

RANGELAND -- IMPACTS

COMPARING:

BENCHMARK -- Overstocked yearling cattle operation on 600 acres of rangeland.

OPTION 1 -- Yearling cattle operation with a resource management system (RMS) installed consisting of the following practices: 556 Planned grazing system, 528 Proper grazing use, 642 Well, 516 Pipeline, 614 Tank, 382 Fencing, and 314 Brush management (chemical).

PLUSES	MINUSES
Small gully sidewalls are stable and there is no head cutting Plants provide adequate growth and vigor for intended use Infiltration improved and surface runoff reduced Adequate cover for pheasant, prairie chicken and deer Increase pounds of beef sold by 10 pounds per acre Increase carrying capacity by 15 percent Increase annual gross return by $9 per acre Increase net return by $6.80 per acre	Higher level of management required Up front installation cost of $6,300 or $11 per acre. Average annual cost of $2.20 per acre (Average annual costs are the annual payments needed to payoff the principal and interest of a one time cost such as a practice installation cost)

CASE STUDY - CHASE COUNTY, NEBRASKA

Conservation Information Sheet

DRYLAND CROPLAND -- BENCHMARK

RESOURCE SETTING:

MANAGEMENT SYSTEM:

ACTIONS	EFFECTS

CASE STUDY - CHASE COUNTY, NEBRASKA

Conservation Information Sheet

DRYLAND CROPLAND -- OPTION NO. 1

RESOURCE SETTING:

MANAGEMENT SYSTEM:

ACTIONS	EFFECTS

CASE STUDY - CHASE COUNTY, NEBRASKA

Conservation Information Sheet

DRYLAND CROPLAND -- IMPACTS

COMPARING:

BENCHMARK --

OPTION 1 --

PLUSES	MINUSES

U.S. Department of Agriculture
Soil Conservation Service

Conservation Treatment Information

TECHNICAL GU
SECTIO

Field Office: Lima Field Office

Conservation Treatment: Grassed waterway, Conservation Crop. Seq. (C-Sb-W), Cons. Tillage (Nt corn & beans, MT wheat) Pest Management, Nutrient Management (meets RMS & criteria).

Resource Setting:
Blount-Morley soils, moderately sloping.

Resource Problems Before Treatment:
Excessive sheet and rill erosion, gullies, nutrients & pesticides in runoff.

Actions
(Kinds, Amounts, and Timing)

NUTRIENT MANAGEMENT
- See actions by crop below

PEST MANAGEMENT
- Scout for economic pest levels
- Select alternate control measures
- Use less mobile chemicals

GRASSED WATERWAY
- Construct and seed to smooth bromegrass

NO-TILL CORN IN WHEAT RESIDUE
- Chop stubble (August)
- Soil Test in March or April
- Apply P&K 1 wk. prior to planting
- Plant and spray
  - Bladex
  - Gramoxone
  - Isotox seed treater
- Knife in anhydrous ammonia
- Spray broadleaf weeds
  - Banvel
  - 2,4-D

NO-TILL BEANS IN CORN STALKS
- Spray preplant herbicides
- Spot spray for thistle, w/ Roundup
- Plant & Spray Turbo & Gramoxone double back for 15" rows
- Spot spray quackgrass w/Fusilade & thistles w/Basagran as needed

MULCH-TILL WHEAT IN BEAN STUBBLE
- Disk bean stubble
- Drill wheat
- Apply nitrogen in late Feb.

Effects
(Effects of Conservation Treatment)

RMS Installed
- Soil Loss 3 t/ac
- Nutrients better utilized
- Nutrient pollution reduced
- Less mobile herbicides used
- Scouting for pests needed
- Waterway eliminated gully
- Loose 1/2 acre of cropland
- 1/2 acre wildlife habitat (waterway)
- Residue improves tilth, increases runoff
- Sedimentation potential reduced
- Machinery:
  - 75 Hp tractor
  - No-till planter
  - Chopper
- Chemicals:

Corn:	Gramoxone	2 pts/ac.
	Bladex	3 qt./ac.
	Banvel	1/4 pt./ac
	2,4-D	1/4 pt./ac.
Beans:	Gramoxone	1 pt.ac.
	Turbo	1 qt./ac.
Wheat:	none	

- Fertilizer

Corn:	N 40 lb.-starter,	80—100 lb. NH_4
	P_2O_5	60 lb./ac.
	K_2O	90 lb./ac.
Beans:	P_2O_5	40 lb./ac.
	K_2O	120 lb./ac.
Wheat:	N	75 lb./ac.
	P_2O_5	45 lb./ac.
	K_2O	80 lb./ac.
•Fuel:	Corn	6.5 gal./ac.
	Beans	4.8 gal./ac.
	Wheat	4.7 gal./ac.
•Labor:	Corn	7.4 hrs./ac.
	Beans	5.5 hrs./ac.
	Wheat	4.2 hrs./ac.
•Yields:	Corn	143 bu./ac.
	Beans	42 bu./ac.
	Wheat	60 bu./ac

Comments:

The use of brand names does not constitute and endorsment by the Soil Conservation Service.

U.S. Department of Agriculture
Soil Conservation Service

Conservation Effects Worksheet

Name Joe Decisionmaker	Address Lima, Ohio	OPID No. JD123456	Field or Tract No. 1234

Resource Setting:
Bount-Morley soils, moderately sloping

Resource Problems Before Treatment
Excess sheet, rill and gully erosion, N & P_2O_5 in runoff, pesticides in runoff.

Benchmark (Present management system)
Conventional tillage for corn and beans, wheat drilled in lightly disked bean residue. No waterways.

Description of Treatment Option:
Grassed waterway
Conservation Cropping Sequence: (C-Sb-W)
Conservation Tillage: (No-till Corn and Soybeans) (Mulch-till Wheat)
Nutrient Management, Pest Management

Actions (Kinds, amounts, and timing)	Effects (Effects of continuing the benchmark system)	Comparison of Effects of Benchmark and Treatment Option: Impacts	Decisionmaker Evaluation
CORN: • Apply N, P and K in the fall • Fall plow wheat stubble • Disk • Apply Lariat (Atrex-Lasso) • Field Cultivate to incorporate herbicides • Plant • Rotary hoe • Spray Banvel + 2, 4-D amine as needed • Row cultivate once **Beans:** • Plow in the fall • Disk twice • Plant and spray Turbo • Double back for 15" rows • Rotary hoe **Wheat in bean stubble:** • Disk once • Drill wheat	• P_2O_5 in runoff causing algae bloom in farm pond and contributes to pollution of Lake Erie. • Traces of pesticides in surface water • Nitrates in tile flows in the spring • Soil loss 12 tons/ac. • Three small gullies will enlarge • Soil tilth will decline • Machinery: 125 hp tractor moldboard plow disk field cultivator planter rotary hoe rowcrop cultivator • Chemicals: Corn: Lariat .88 gal./ac. Banvel 1/4 pt./ac. Beans: Turbo 1 qt./ac. Wheat: none • Fertilizer: Corn: N 140 lb./ac P_2O_5 60 lb./ac. K_2O 90 lb./ac. Beans: P_2O_5 40 lb./ac. K_2O 120 lb./ac. Wheat: N 75 lb./ac P_2O_5 45 lb./ac. K_2O 80 lb./ac. • Fuel: Corn 8.3 gal./ac. Beans 7.0 gal./ac. Wheat 5.5 gal./ac. • Labor: Corn 9.8 hrs./ac. Beans 8.8 hrs./ac. Wheat 5.0 hrs./ac. • Yields: (expect to decline over time) Corn 143 bu./ac. Beans 42 bu./ac. Wheat 60 bu./ac.	• Phosophorus runoff reduced • Less mobile herbicides used • Less leaching of nitrates • Soil Loss reduced 9 tons/ac. • Gully erosion eliminated • Infiltration increased • Power needs reduced 50 hp • Eliminate: Moldboard plow Field cultivator Rotary hoe Row cultivator • Less soil compaction • Slower planting • Need more time for scouting • Chemical use increased • Fertilizer requirements unchanged but timing of application is closer to when crop needs nutrients. • Fuel reduced C 1.8 gal./ac. B 2.2 gal./ac. W 0.8 gal./ac. • Labor reduced. C 2.4 hrs./ac. B 3.3 hrs./ac. W 0.8 hrs./ac. • Yields will be maintained	(+) Pond will clear up (-) Poorer weed control (+) Better quality of water (+) Conserves moisture (+) less equipment damage (+) less ponding (+) can sell big tractor (+) less machinery to maintain and fewer trips (+) better root development (-) (-) (-) burn-down herbicide needed (+) Better utilization of nutrients (+) lower input costs (+) (+) (+) can use this time for scouting and more time for (+) livestock (+) (+)

Comments:
NOTE: This sheet is to be completed with the decisionmaker during the planning visit with the decisionmaker's evaluation recorded in the right hand column.

Conservation Treatment Information

Field Office: Lima Field Office

Resource Setting:
Morley soils 14–18% slopes

Conservation Treatment: Grassed waterway, Conservation Crop. Seq. (C-Sb-W), Cons. Tillage (Nt corn & beans, MT wheat) Pest Management, Nutrient Management (Acceptable Management System)

Resource Problems Before Treatment:
Excessive sheet and rill erosion, gullies, nutrients & pesticides in runoff.

Actions (Kinds, Amounts, and Timing)	Effects (Effects of Conservation Treatment)
NUTRIENT MANAGEMENT • See actions by crop below **PEST MANAGEMENT** • Scout for economic pest levels • Select alternate control measures • Use less mobile chemicals **GRASSED WATERWAY** • Construct and seed to smooth bromegrass **NO-TILL CORN IN WHEAT RESIDUE** • Chop stubble (August) • Soil Test in March or April • Apply P&K 1 wk. prior to planting • Plant and spray Bladex Gramoxone Isotox seed treater • Knife in anhydrous ammonia • Spray broadleaf weeds Banvel 2,4-D **NO-TILL BEANS IN CORN STALKS** • Spray preplant herbicides • Spot spray for thistle, w/ Roundup • Plant & Spray Turbo & Gramoxone double back for 15" rows • Spot spray quackgrass w/Fusilade & thistles w/Basagran as needed **MULCH-TILL WHEAT IN BEAN STUBBLE** • Disk bean stubble • Drill wheat • Apply nitrogen in late Feb.	**AMS Installed** • Soil Loss 9 t/ac • Nutrients better utilized • Nutrient pollution reduced • Less mobile herbicides used • Scouting for pests needed • Waterway eliminated gully • Loose 1/2 acre of cropland • 1/2 acre wildlife habitat (waterway) • Residue improves tilth, increases runoff • Sedimentation potential reduced • Machinery: 75 Hp tractor No-till planter Chopper • Chemicals: Corn: Gramoxone 2 pts/ac. Bladex 3 qt./ac. Banvel 1/4 pt./ac 2,4-D 1/4 pt./ac Beans: Gramoxone 1 pt.ac. Turbo 1 qt./ac. Wheat: none •Fertilizer Corn: N 40 lb.-starter, 80—100 lb. NH_4 P_2O_5 60 lb./ac. K_2O 90 lb./ac. Beans: P_2O_5 40 lb./ac. K_2O 120 lb./ac. Wheat: N 75 lb./ac. P_2O_5 45 lb./ac. K_2O 80 lb./ac. •Fuel: Corn 6.5 gal./ac. Beans 4.8 gal./ac. Wheat 4.7 gal./ac. •Labor: Corn 7.4 hrs./ac. Beans 5.5 hrs./ac. Wheat 4.2 hrs./ac. •Yields: Corn 110 bu./ac. Beans 32 bu./ac. Wheat 45 bu./ac

Comments:

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U.S. Department of Agriculture
Soil Conservation Service

Conservation Effects Worksheet

Name Joe Decisionmaker	Address Lima, Ohio	OPID No. JD123456	Field or Tract No. 1235

Resource Setting:
Morley soils 12–18% slopes

Resource Problems Before Treatment
Excess sheet, rill and gully erosion, N & P_2O_5 in runoff, pesticides in runoff.

Benchmark (Present management system)
Conventional tillage for corn and beans, wheat drilled in lightly disked bean residue. No waterways

Description of Treatment Option:
Grassed waterway
Conservation Cropping Sequence: (C-Sb-W)
Conservation Tillage: (No-till Corn and Soybeans) (Mulch-till Wheat)
Nutrient Management, Pest Management

Actions (Kinds, amounts, and timing)	Effects (Effects of continuing the benchmark system)	Comparison of Effects of Benchmark and Treatment Option: Impacts	Decisionmaker Evaluation
CORN: • Apply N, P and K in the fall • Fall plow wheat stubble • Disk • Apply Lariat (Atrex-Lasso) • Field Cultivate to incorporate herbicides • Plant • Rotary hoe • Spray Banvel + 2, 4-D amine as needed • Row cultivate once	• P_2O_5 in runoff causing algae bloom in farm pond and contributes to pollution of Lake Erie. • Traces of pesticides in surface water • Nitrates in tile flows in the spring • Soil loss 35 tons/ac. • Three small gullies will enlarge • Soil tilth will decline • Machinery: 125 hp tractor moldboard plow disk field cultivator planter rotary hoe rowcrop cultivator • Chemicals: Corn: Lariat .88 gal./ac. Banvel 1/4 pt./ac. Beans: Turbo 1 qt./ac. Wheat: none • Fertilizer: Corn: N 140 lb./ac P_2O_5 60 lb./ac. K_2O 90 lb./ac. Beans: P_2O_5 40 lb./ac K_2O 120 lb./ac. Wheat: N 75 lb./ac P_2O_5 45 lb./ac. K_2O 80 lb./ac • Fuel: Corn 8.3 gal./ac. Beans 7.0 gal./ac. Wheat 5.5 gal./ac. • Labor: Corn 9.8 hrs./ac. Beans 8.8 hrs./ac. Wheat 5.0 hrs./ac. • Yields: (expect to decline over time) Corn 110 bu./ac. Beans 32 bu./ac. Wheat 45 bu./ac.	• Phosophorus runoff reduced but still some in sediment • Less mobile herbicides used • Less leaching of nitrates • Soil Loss reduced 26 tons/ac. • Gully erosion eliminated • Infiltration increased • Power needs reduced 50 hp • Eliminate: Moldboard plow Field cultivator Rotary hoe Row cultivator • Less soil compaction • Slower planting • Need more time for scouting • Chemical use increased • Fertilizer requirements unchanged but timing of application is closer to when crop needs nutrients. • Fuel reduced. C 1.8 gal./ac. B 2.2 gal./ac. W 0.8 gal./ac. • Labor reduced: C 2.4 hrs./ac. B 3.3 hrs./ac. W 0.8 hrs./ac. • Yields will decline over time	(–) Pond will still have some algae problem (–) Poorer weed control (+) Better quality of water (–) Erosion still problem (+) less equipment damage (+) less ponding (+) can sell big tractor (+) less machinery to maintain and fewer trips (+) better root development (-) (-) (-) burn-down herbicide needed (+) Better utilization of nutrients (+) lower input costs (+) (+) (+) can use this time for scouting and more time for (+) livestock (+) (–) Increased fertility needed to offset yield decline
Beans: • Plow in the fall • Disk twice • Plant and spray Turbo • Double back for 15" rows • Rotary hoe			
Wheat in bean stubble: • Disk once • Drill wheat			

Comments:
NOTE: This sheet is to be completed with the decisionmaker during the planning visit with the decisionmaker's evaluation recorded in the right hand column.

Conservation Treatment Information

Field Office:	**Resource Setting:**
Conservation Treatment:	**Resource Problems Before Treatment:**

Actions (Kinds, Amounts, and Timing)	**Effects** (Effects of Conservation Treatment)

Comments:

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Illustration of Higher Levels of Analysis
for Conservation Decisionmaking
(Hypothetical)

FIRST LEVEL OF ANALYSIS:

Conservation impacts by broad categories.

Pluses	Minuses
Reduced S & R Erosion	Installation cost of treatment
Water conserved on land	Slight increase in potential for groundwater pollution
Sustained yield over long term	
Reduced labor requirements	Greater need for scouting
Reduced equipment use	Maintenance required for system
etc.	etc.

SECOND LEVEL OF ANALYSIS

Impacts with some quantification.

Pluses	Minuses
Reduced S & R Erosion 16 T/A/Y	Added equipment investment $21,000
Water conserved on land	Slight increase in potential for groundwater pollution
Sustained yield at 20 bu/ac	
Reduced labor of 1.1 hr./ac	Added scouting 2 visits per season
Reduced equip use: 2 times over	Maintenance required for system
etc.	etc.

THIRD LEVEL OF ANALYSIS:

Refined narrative information on some impacts and simple cost analysis of equipment investment and other items.

Pluses	Minuses
Reduced S & R erosion 16 T/A/Y	Added equipment investment $20/ac/yr
Water conserved on land	Slight increase in potential for groundwater pollution due to higher Atrazine use on soil with moderate leaching capability
Sustained yield of 20 bu/ac	
Reduced labor of 1.1 hr/ac	
machine time -- operators	
own labor at critical time	Added scouting 2 visits @ $2/acre
in growing season	Maintenance required for system
Reduced equip use $2/acre/yr	
etc.	etc.

Notes are on the reverse side of this page.

Notes on Hierarchy of Analysis Illustration

1. The hierarchy of analysis refers to different levels of analysis needed to assist the decisionmaker in making an informed choice. Any number of levels can occur (1 through n) depending on the needs of the decisionmaker.

2. The level numbers are not intended to have specific definitions other than relative to other levels.

3. The impact information on the account ledger is not intended to be read across as single lines. Instead, the combination of positive impacts are compared to the combination of negative impacts.

4. Information obtained from models and tools can be used to refine or better determine the impacts as needed when going to higher levels of analysis.

5. Sometimes a higher level of analysis is needed to include an impact not previously considered, even though it may not involve refining information already displayed.

6. Information can be presented in the manner most helpful for the decisionmaker, such as total amounts for the treatment unit rather than per acre amounts.

Conservation Effects for Decision Making

Landuser's Name: Flowers, Red Conservationist: Jim Smith CTU No.: 3 Date: 3/7/90

Existing Condition: Corn, continuous, fall plowing. Soil loss - 8.1 tons per acre

Crop	Years x	Acres x	Yield x	Price =	Gross 1/	Cost/Acre =	Prod. Costs 2/	Practices	Averag Ann. Co
Corn	1	100	120	$2.75	$33,000	$167	$16,700		

CROSS RETURN — PRODUCTION COSTS — CONSERVATION PRACTICE COS

Total Gross Return: $33,000 Total Costs: $16,700 Annual Cons. Cost: 0

Annual Gross Return 3/: $33,000 / 1 Years = $33,000 Annual Production Costs 4/: $16,700 / 1 Years = $16,70

Annual Returns 5/: $33,000 - $16,700 - $0 = $16,300

Other Effects: Road and drainage ditches need frequent cleanout. Very little wildlife habitat.

Alternate # 1 Corn, continuous, no till with diversion and grassed waterway. Soil loss -1.1 tons per ac

Crop	Years x	Acres x	Yield x	Price =	Gross	Cost/Acre =	Prod. Costs	Practices	Avera Ann. C
Corn	1	98	120	$2.75	$32,340	$153	$14,994	Diversion, 300'	$48
								Waterway, 2Ac	335

Total Gross Return: $32,340 Total Costs: $14,994 Annual Cons. Cost: $383

Annual Gross Return: $32,340 / 1 Years = $32,340 Annual Production Costs: $14,994 / 1 Years = $14,9

Annual Returns: $32,340 - $14,994 - $383 = $16,963

Other Effects: Sediment deposition in road and drainage ditches is greatly reduced. Wildlife habitat improved. Yields should improve over the long term.

Conservation Effects For Decision Making

Alternate #2 Corn - 3 years, alfalfa - 5 years, conventional tillage. Soil loss -28 tons per acre

GROSS RETURN								PRODUCTION COSTS		CONSERVATION PRACTICE COSTS	
Crop	Years x	Acres x	Yield x	Price =	Gross	Cost/Acre	= Prod. Costs	Practices	Average Ann. Cost
Corn	3	100	120	$2.75	$99,000	$167	$50,100		
Alfalfa	1	100	2T	$55.00	$11,000	$59 1/	$5,900		
Alfalfa	4	100	6T	$55.00	$132,000	$200	$80,000		
			Total Gross Return:		$242,000	Total Costs:	$136,000	Annual Cons. Cost:	0

Annual Gross Return: $242,000 / 8 Years = $30,250 Annual Production Costs: $136,000 / 8 Years = $17,000

Annual Returns: $30,250 - $17,000 - $0 = $13,250

Other Effects: Same as alternative #1

Alternate #____

Crop	Years x	Acres x	Yield x	Price =	Gross	Cost/Acre	= Prod. Costs	Practices	Average Ann. Cost
			Total Gross Return:			Total Costs:		Annual Cons. Cost:	

Annual Gross Return: _____ / _____ Years = _____ Annual Production Costs: _____ / _____ Years = _____

Annual Returns: _____ - _____ - _____ = _____

Other Effects: _____

1/ Annual cost of establishment plus + of harvest operation

Conservation Effects For Decision Making

Summary of Monetary Effects

	Annual Gross Return	Annual Prod. Costs	Annual Cons. Costs	Annual 5/ Returns	Annual 6/ Value of Other Effects	Annual 7/ Soil Loss Estimated
Existing Condition	$33,000	$16,700	$0	$16,300		8.1 Ton
Alternate # 1	$32,340	$14,994	$383	$16,963		1.1 Ton
Alternate # 2	$30,250	$17,000	$0	$13,250		2.8 Ton
Alternate #						

1/ Gross = Years x Acres x Yield x Price.

2/ Prod. Costs = Years x Acres x Cost/Acre.

3/ Annual Gross Returns equal Total Gross Returns divided by years of evaluation.

4/ Annual Production Costs equal Total Costs divided by years of evaluation.

5/ Annual Returns equal Annual Gross Returns minus Annual Production Costs minus Annual Conservation Practice Costs.

6/ Reflects value of other effects--May include estimated value of nutrients lost (net reduction in tons of soil x valu nutrients lost x acres affected in CTU), cost sharing practices and other items having monetary value.

7/ Wind and water erosion soil loss calculations.

CED Effects Worksheet

Resource setting: MS1410
Morley Soils 14-18% slopes

Benchmark Treatment Description:	Alternative Treatment Description:	Decision Maker Evaluation Area: Short Term Pos	Short Term Neg	Long Term Pos	Long Term Neg	Worksheet
Conventional tillage for corn and beans, wheat drilled in lightly disked bean residue. No waterways.	Grassed waterway, conservation cropping sequence (C-Sb-W), conservation tillage (NT corn & beans, MT wheat), pest management, nutrient management. This is an acceptable management system (AMS) for this field office.					
SOIL/EROSION/SHEET & RILL soil loss 35 tons/ac.	SOIL/EROSION/SHEET & RILL soil loss 9 tons/ac.					
SOIL/EROSION/CLASSIC GULLY three small gullies will enlarge	SOIL/EROSION/CLASSIC GULLY waterway eliminated gully					
SOIL/CONDITION/TILTH soil tilth will decline	SOIL/CONDITION/TILTH residue improves tilth, increases runoff					
	SOIL/DEPOSITION/OFFSITE DAMAGE sedimentation potential reduced					
WATER/QUALITY/SURFACE/PESTICIDES traces of pesticides in surface water	WATER/QUALITY/SURFACE/PESTICIDES less mobile herbicides used					
WATER/QUALITY/SURFACE/NUTRIENTS-ORGANIC MATTER P205 in runoff causing algae bloom in farm pond and contributes to pollution of Lake Erie. Nitrates in tile flows in the Spring.	WATER/QUALITY/SURFACE/NUTRIENTS-ORGANIC MATTER nutrients better utilized					
PLANTS/CONDITION/PRODUCTIVITY yields (expect to decline over time): corn 110 bu./ac. beans 32 bu./ac. wheat 45 bu./ac.	PLANTS/CONDITION/PRODUCTIVITY yields: corn 110 bu./ac. beans 32 bu./ac. wheat 45 bu./ac.					

PLANTS/MANAGEMENT/AGR. CHEMICAL MANAGEMENT

fertilizer:

corn: N 140 lb/ac
P2O5 60 lb/ac
K2O 90 lb/ac

beans: P2O5 40 lb/ac
K2O 120 lb/ac

wheat: N 75 lb/ac
P2O5 45 lb/ac
K2O 80 lb/ac

pesticides:

corn: Lariat 0.88 gal/ac
Banvel 0.25 pt/ac

beans: Turbo 1.0 qt/ac

wheat: none

PLANTS/MANAGEMENT/AGR. CHEMICAL MANAGEMENT

fertilizer:

corn: N 40 lb-starter
NH4 80 - 100 lb
P2O5 60 lb/ac
K2O 90 lb/ac

beans: P2O5 40 lb/ac
K2O 120 lb/ac

wheat: N 75 lb/ac
P2O5 45 lb/ac
K2O 80 lb/ac

pesticides:

corn: Gramoxone 2 pt/ac
Bladex 3 qt/ac
Banvel 0.25 pt/ac
2,4-D 0.25 pt/ac

beans: Gramoxone 1 pt/ac
Turbo 1.0 qt/ac

wheat: none

PLANTS/MANAGEMENT/PEST MANAGEMENT

scouting for pests needed

ANIMALS/HABITAT/FOOD

lose 1/2 acre of cropland
gain 1/2 acre wildlife habitat (waterway)

ANIMALS/HABITAT/COVER

lose 1/2 acre of cropland
gain 1/2 acre wildlife habitat (waterway)

ECONOMIC

machinery:

125 hp tractor
moldboard plow
disk
field cultivator
planter
rotary hoe
rowcrop cultivator

fuel:

corn 8.3 gal/ac
beans 7.0 gal/ac
wheat 5.5 gal/ac

labor:

corn 9.8 hrs/ac
beans 8.8 hrs/ac
wheat 5.0 hrs/ac

ECONOMIC

machinery:

75 HP tractor
no-till planter
chopper

fuel:

corn 6.5 gal/ac
beans 4.8 gal/ac
wheat 4.7 gal/ac

labor:

corn 7.4 hrs/ac
beans 5.5 hrs/ac
wheat 4.2 hrs/ac

lose 1/2 acre of cropland

Benchmark Actions:	Alternative Actions:
CORN	**CORN**
apply N, P, K in the Fall	no-till in wheat residue
Fall plow wheat stubble disk	chop stubble (August)
apply Lariat (Atrex-Lasso)	soil test March or April
field cultivate to incorporate herbicides	apply P & K one week prior to planting
plant	plant and spray:
rotary hoe	Bladex
spray Banvel + 2,4-D amine as needed	Gramoxone
row cultivate once	Isotox seed treater
	knife in anhydrous ammonia
	spray broadleaf weeds
	Banvel
	2,4-D
BEANS	**BEANS**
plow in the Fall	no-till in corn stalks
disk twice	spray preplant herbicides
plant and spray Turbo	spot spray for thistle w/Roundup
double pack for 15" rows	plant & spray Turbo & Gramoxone
rotary hoe	double back for 15" rows
	spot spray quackgrass w/Fusilade
	& thistles w/Basagran as needed
WHEAT IN BEAN STUBBLE	**WHEAT**
disk once	mulch-till in bean stubble
drill wheat	disk bean stubble
	drill wheat
	apply N in late Feb.
	PEST MANAGEMENT
	scout for economic pest levels
	select alternate control measures
	use less moblie chemicals
	GRASSED WATERWAY
	construct and seed to smooth bromegrass

CED Effects Worksheet

Resource setting: MS1418
Morley Soils 14-18% slopes

Benchmark Treatment Description:	Alternative Treatment Description:	Decision Maker Evaluation Area				
		Short Term		Long Term		Worksheet
		Pos	Neg	Pos	Neg	
Conventional tillage for corn and beans, wheat drilled in lightly disked bean residue. No waterways.	Grassed waterway, terraces w/sodded risers, contour farming, strip cropping, conservation cropping sequence (C-Sb-W), conservation tillage (NT corn & beans, MT wheat) pest management, nutrient management. Leave turn rows standing after harvest. This is a resource management system (RMS) for this field office.					
SOIL/EROSION/SHEET & RILL soil loss 35 tons/ac.	SOIL/EROSION/SHEET & RILL soil loss 2 tons/ac.					
SOIL/EROSION/CLASSIC GULLY three small gullies will enlarge	SOIL/EROSION/CLASSIC GULLY waterway eliminated gully					
SOIL/CONDITION/TILTH soil tilth will decline	SOIL/CONDITION/TILTH residue improves tilth, increases runoff					
	SOIL/DEPOSITION/OFFSITE DAMAGE sedimentation potential negligible					
WATER/QUALITY/SURFACE/PESTICIDES traces of pesticides in surface water	WATER/QUALITY/SURFACE/PESTICIDES less mobile herbicides used					
WATER/QUALITY/SURFACE/NUTRIENTS-ORGANIC MATTER P2O5 in runoff causing algae bloom in farm pond and contributes to pollution of Lake Erie. Nitrates in tile flows in the Spring.	WATER/QUALITY/SURFACE/NUTRIENTS-ORGANIC MATTER nutrients better utilized					
PLANTS/CONDITION/PRODUCTIVITY yields (expect to decline over time): corn 110 bu./ac. beans 32 bu./ac. wheat 45 bu./ac.	PLANTS/CONDITION/PRODUCTIVITY yields: corn 124 bu./ac. beans 35 bu./ac. wheat 50 bu./ac.					
PLANTS/MANAGEMENT/AGR. CHEMICAL MAN[illegible]MENT [illegible]er: n: N 140 lb/ac	PLANTS/MANAGEMENT/AGR. CHEMICAL MANAGEMENT fertilizer: corn: N [illegible] rter					

P2O5 60 lb/ac
K2O 90 lb/ac
beans: P2O5 40 lb/ac
K2O 120 lb/ac
wheat: N 75 lb/ac
P2O5 45 lb/ac
K2O 80 lb/ac

pesticides:
corn: Lariat 0.88 gal/ac
Banvel 0.25 pt/ac
beans: Turbo 1.0 qt/ac
wheat: none

NH4 80 - 100 lb
P2O5 60 lb/ac
K2O 90 lb/ac
beans: P2O5 40 lb/ac
K2O 120 lb/ac
wheat: N 75 lb/ac
P2O5 45 lb/ac
K2O 80 lb/ac

pesticides:
corn: Gramoxone 2 pt/ac
Bladex 3 qt/ac
Banvel 0.25 pt/ac
2,4-D 0.25 pt/ac
beans: Gramoxone 1 pt/ac
Turbo 1.0 qt/ac

wheat: none

PLANTS/MANAGEMENT/PEST MANAGEMENT
scouting for pests needed

ANIMALS/HABITAT/FOOD
lose 6.5 acres of cropland
gain 6.5 acres wildlife habitat
(waterway, back slopes, edges)
turn rows standing after harvest

ANIMALS/HABITAT/COVER
lose 6.5 acres of cropland
gain 6.5 acres wildlife habitat
(waterway, back slopes, edges)

ECONOMIC
machinery:
125 hp tractor
moldboard plow
disk
field cultivator
planter
rotary hoe
rowcrop cultivator
fuel:
corn 8.3 gal/ac
beans 7.0 gal/ac
wheat 5.5 gal/ac
labor:
corn 9.0 hrs/ac
beans 8.0 hrs/ac
wheat 5.0 hrs/ac

ECONOMIC
machinery:
75 HP tractor
no-till planter
chopper
fuel:
corn 6.5 gal/ac
beans 4.8 gal/ac
wheat 4.7 gal/ac
labor:
corn 7.4 hrs/ac
beans 5.5 hrs/ac
wheat 4.2 hrs/ac

lose 6.5 acres of cropland

Name Joe Decisionmaker	Address Lima, Ohio	OPID No. JD123456	Field or Tract No. 1234

Resource Setting:
Blount-Morley soils, moderately sloping

Resource Problems Before Treatment
Excess sheet, rill and gully erosion. N & P_2O_5 in runoff, pesticides in runoff.

Description of Treatment Option:
Grassed waterway
Conservation Cropping Sequence: (C-Sb-W)
Conservation Tillage: (No-till Corn and Soybea
(Mulch-till Wheat)
Nutrient Management, Pest Management

Benchmark (Present management system)
Conventional tillage for corn and beans, wheat drilled in lightly disked bean residue No waterways.

Actions (Kinds, amounts, and timing)	Effects (Effects of continuing the benchmark system)	Comparison of Effects of Benchmark and Treatment Option: Impacts	Decisionmaker Evaluation
CORN: • Apply N, P and K in the fall • Fall plow wheat stubble • Disk • Apply Lariat (Alrex-Lasso) • Field Cultivate to incorporate herbicides • Plant • Rotary hoe • Spray Banvel + 2, 4-D amine as needed • Row cultivate once Beans: • Plow in the fall • Disk twice • Plant and spray Turbo • Double back for 15" rows • Rotary hoe Wheat in bean stubble: • Disk once • Drill wheat	• P_2O_5 in runoff causing algae bloom in farm pond and contributes to pollution of Lake Erie. • Traces of pesticides in surface water • Nitrates in tile flows in the spring • Soil loss 12 tons/ac • Three small gullies will enlarge • Soil tilth will decline • Machinery: 125 hp tractor moldboard plow disk field cultivator planter rotary hoe rowcrop cultivator • Chemicals: Corn: Lariat .88 gal./ac. Banvel 1/4 pt./ac. Beans: Turbo 1 qt./ac. Wheat: none • Fertilizer: Corn: N 140 lb./ac P_2O_5 60 lb./ac. K_2O 90 lb./ac. Beans: P_2O_5 40 lb./ac. K_2O 120 lb./ac Wheat: N 75 lb./ac P_2O_5 45 lb./ac. K_2O 80 lb./ac. • Fuel: Corn 8.3 gal./ac. Beans 7.0 gal./ac Wheat 5.5 gal./ac. • Labor: Corn 9.8 hrs./ac Beans 8.8 hrs./ac. Wheat 5.0 hrs./ac. • Yields: (expect to decline over time) Corn 143 bu./ac. Beans 42 bu./ac. Wheat 60 bu./ac.	• Phosophorus runoff reduced • Less mobile herbicides used • Less leaching of nitrates • Soil Loss reduced 9 tons/ac. • Gully erosion eliminated • Infiltration increased • Power needs reduced 50 hp • Eliminate: Moldboard plow Field cultivator Rotary hoe Row cultivator • Less soil compaction • Slower planting • Need more time for scouting • Chemical use increased • Fertilizer requirements unchanged but timing of application is closer to when crop needs nutrients. • Fuel reduced: C 1.8 gal./ac. B 2.2 gal./ac. W 0.8 gal./ac. • Labor reduced C 2.4 hrs./ac. B 3.3 hrs./ac. W 0.8 hrs./ac. • Yields will be maintained	(+) Pond will clear up (-) Poorer weed control (+) Better quality of water (+) Conserves moisture (+) less equipment damage (+) less ponding (+) can sell big tractor (+) less machinery to maintain and fewer trip (+) better root development (-) (-) (-) burn-down herbicide needed (+) Better utilization of nutrients (+) lower input costs (+) (+) (+) can use this time for scouting and more t (+) livestock (+) (+)

Comments:
NOTE: This sheet is to be completed with the decisionmaker during the planning visit with the decisionmaker's evaluation recorded in the right hand column.

Economics Of Windbreaks

Landowners Name: Showers, May B. Address: RR 3, Bx 10

Conservation Planner: Dryer, I. B. County: Ford

The Situation:

Has a 40 acre field in continuous corn, conventional tillage. Soil erosion is estimated at 15 Ton per acre per year. Would like to stay with corn and get the soil loss down to 5 Ton or less.

Alternatives: Owner likes trees and the wildlife they attract. Is willing to put in field windbreaks. Wants to know the estimated establishment cost, annual cost and benefits.

Existing Condition

Gross Return:

Crop	Years	x	Acres	x	Yield	x	Price	=	Gross Return
Corn	1		40		126 1/		$2.49		$12,550

Total Gross Return $12,550

Annual Gross Return: $12,550 ÷ 1 years = $12,550

Production Costs:

Crop	Years	x	Acres	x	Cost/Acre	=	Production Cost
Corn	1		40		$200		$8,000

Total Production Costs $8,000

Annual Production Costs: $8,000 ÷ 1 years = $8,000

Conservation Practice Costs:

Practices	Average Annual Cost
None	0
Total	$8,000

Nonmonetary Effects: Road and drainage ditches need frequent cleanout. Very little wildlife habitat. Yields decreasing over time.

1/From page 4

Alternative # 1

Establish a windbreak to protect the 40 acre field. A two row windbreak will be put in on the N and W side, a single row on the E side and a single row in the center running N-S. 4 ton soil loss per acre per year.

Gross Return:

Crop	Years	x	Acres	x	Yield	x	Price	=	Gross Return
Corn	1		37		135 1/		$2.49		$12,440
							Total Gross Return		$12,440

Annual Gross Return: $12,440 ÷ 1 years = $12,440

Production Costs:

Crop	Years	x	Acres	x	Cost/Acre	=	Production Cost
Corn	1		37 2/		$200		$7,400
						Total Production Costs	$7,400

Annual Production Costs: $7,400 ÷ 1 years = $7,400

Conservation Practice Costs:

Practices	Average Annual Cost
Windbreak	$100 2/
Total	$100

Nonmonetary Effects: Sediment deposition in road and drainage ditches is greatly reduced. Wildlife habitat is improved. Yields will improve over time.

1/From page 5
2/From page 6

Summary

Monetary Effects

	Annual Gross Return	Annual Production Costs	Annual Conservation Practice Costs	Annual Net Return
Existing Condition	$12,550	$8,000	$ 0	$4,550
Alternative # 1	12,440	7,400	100	4,940
Alternative #				
Alternative #				
Alternative #				

Nonmonetary Effects

Existing Condition: 40 acres of continuous corn, conventional tillage. Soil erosion is estimated to be 15 Ton per acre per year. Little wildlife habitat. Road and drainage ditches need frequent cleanout.

Alternative # 1: 37 acres of continuous corn, conventional tillage. 3 acres in windbreaks. When fully protected the soil loss is estimated to be 4 Ton per acre per year. Wildlife habitat improved. Reduced sediment in ditches.

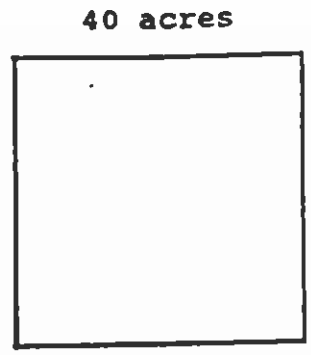
Alternative #___:

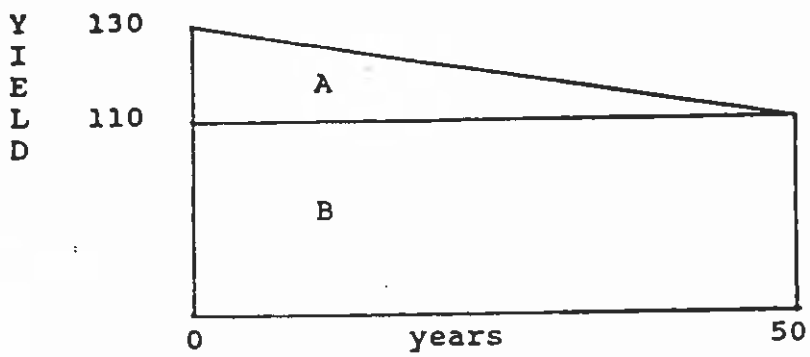
Alternative #___:

Alternative #___:

Calculating Average Annual Yield Without Windbreaks

10 percent interest
50 year evaluation
40 acre field
continuous corn
current yield = 130 bu.
yield in 50 years if current rate of erosion is allowed to continue = 110 bu.





Calculating the present value (PV) of area A

1. 20/50 = .4 bu. annual change
2. .4 x 400.85186 (PV of a decreasing annuity for 50 years) = 160.34

Calculating the PV of area B

1. 110 x 9.91481 (PV of an annuity of 1 per year for 50 years) = 1090.63

Calculating the total PV

1. PV of area A = 160.34
2. PV of area B = 1090.63
   TOTAL PV = 1250.97

Calculating the average annual yield without windbreaks

1. 1250.97 x .10086 (amortization factor for 50 years) = 126.17; round to 126 bu. and carry forward to Conservation Effects For Decision Making (CED) worksheet.

Short Cut Method*

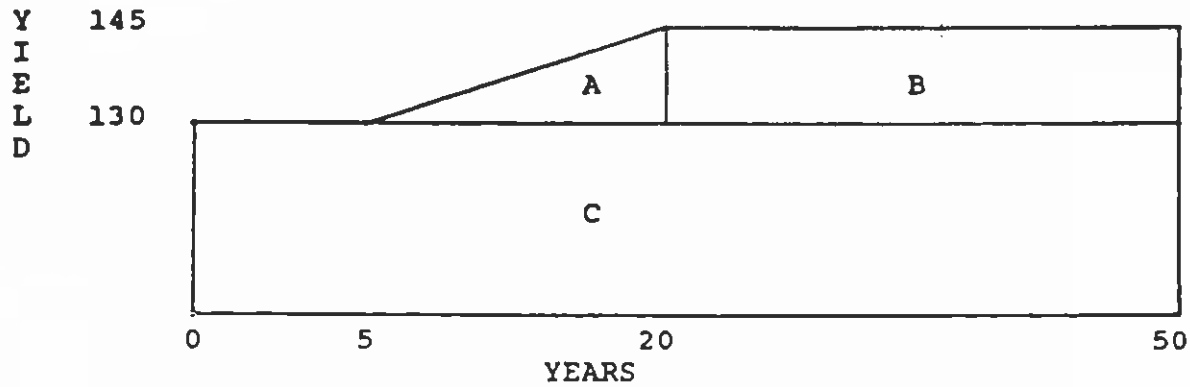
1. .19 x 20 (130-110) = 3.8
2. 130 - 3.8 = 126.2; round to 126 bu. and carry forward to Conservation Effects For Decision Making (CED) worksheet.

* See PRODUCTIVITY MAINTENANCE BENEFIT ANALYSIS handout for proce

Calculating Average Annual Yield With Windbreaks

10 percent interest
50 year evaluation
40 acre field
continuous corn
Protection is assumed to begin at the end of year 5, increase over the next 15 years and full protection reached at age 20. Yield will have increased to 145 bu. and will remain there for the rest of the evaluation period. Current yield is 130 bu.
(/) = double row of trees
(.) = single row of trees

40 acres



Calculating the present value (PV) of area A

1. 15/15 = 1 bu. annual change
2. 1 x 47.75807 (PV of an increasing annuity for 15 years) = 47.76
3. 47.76 x .62092 (PV of 1, 5 years hence) = 29.66

Calculating the PV of area B

1. 15 x 9.42691 (PV of an annuity of 1 per year for 30 years) = 141.40
2. 141.40 x .14864 (PV of 1, 20 years hence) = 21.02

Calculating the PV of area C

1. 130 x 9.91481 (PV of an annuity of 1 per year for 50 years) = 1288.93

Calculating the total PV

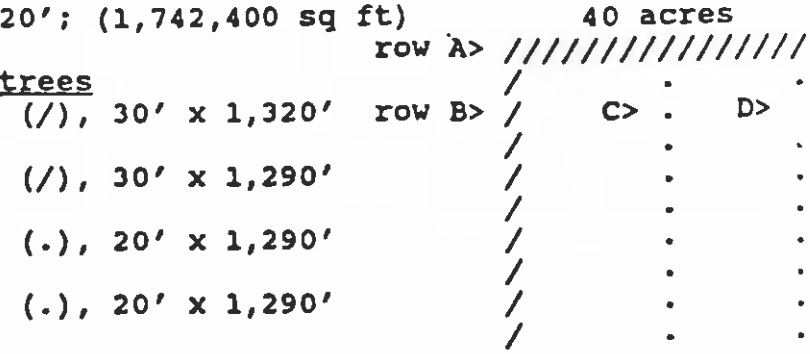
1. PV of area A = 29.66
2. PV of area B = 21.02
3. PV of area C = 1288.93
   TOTAL PV = 1339.61

Calculating the average annual yield with windbreaks

1. 1339.61 x .10086 (amortization factor for 50 years) = 135.11; round to 135 bu. and carry forward to Conservation Effects For Decision Making (CED) worksheet, alternative 1.

Calculating Area Taken Out Of Production With Windbreaks

40 acre field, 1,320′ x 1,320′; (1,742,400 sq ft)



Area required for trees

Row A - double row of trees (/), 30′ x 1,320′
= 39,600 sq. ft.

Row B - double row of trees (/), 30′ x 1,290′
= 38,700 sq. ft.

Row C - single row of trees (.), 20′ x 1,290′
= 25,800 sq. ft.

Row D - single row of trees (.), 20′ x 1,290′
= 25,800 sq. ft.

TOTAL sq. ft. required = 129,900
129,900/43,560 = 2.98, round to 3 acres. 40 acre field less 3 acres of trees = 37 acres of cropland. Carry the 37 acres of cropland forward to the CED worksheet, alternative 1.

Calculating Average Annual Cost Of Windbreaks

Number of trees required at 10′ spacing

Row A - 2,640′/10 = 264 trees
Row B - 2,580′/10 = 258 trees
Row C - 1,290′/10 = 129 trees
Row D - 1,290′/10 = 129 trees
TOTAL trees = 780

Cost of the trees, seedbed preparation, and planting is estimated to be $0.65 per tree. 780 trees x $0.65 = $507.

Table 1 shows the year costs are incurred, the costs, and the present value of those costs.

Year	Cost	PV
Establishment	$507	$507
1	200	182
2	150	124
3	100	75
5	100	62
10	100	39
20	100	15
30	100	6
40	100	2
	TOTAL PV	$1,012

Average Annual Cost = $1,012 x .10086 (amortization factor for 50 years) = $102.07; round to $100 and carry forward to the CED worksheet, alternative 1, conservation practice costs.