

TECHNICAL NOTES

Section 20 of 22 (20d – Cropland Inventory Worksheets for Sustainable Systems)

AGRONOMY TECHNICAL NOTE NO. 70

CROPLAND INVENTORY WORKSHEETS FOR SUSTAINABLE SYSTEMS PLANNING

The key approach to achieving integrated sustainable management is to think system (ecosystem, whole farm, and watershed), think critically (connect the dots), actively seek resource opportunities, emphasize technology “exchange” vs. “transfer” with other producers and partners, plan creatively and flexibly, and focus on keeping energy flow through the integrated system. A reemphasis on biological factors is also necessary since recent agriculture has essentially forgotten biological, but rather focused on chemical and physical factors. Using agro-ecological principles and improving soil quality is key to improving soil, water, air, plant, and animal resources. Case studies, field trials, on-farm research/demonstrations, farmer-to-farmer networks are some of many important components of successful technology exchange and outreach. Interdisciplinary teams including producers and partners are essential in developing integrated sustainable farming systems. Development, implementation, and ongoing evaluation of a comprehensive conservation plan and accurate recordkeeping serve as necessary management tools.

A complete inventory and analysis of soil, water, air, plant, animal, social, and economic conditions is the vehicle that moves the producer and conservation planner to a position where feasible management alternatives can be developed and sound resource management decisions made. To evaluate existing or benchmark conditions, sufficient information must be gathered during the inventory phase on all land uses to assist in determining the status of the resources.

On lands used primarily for field and forage crop production, orchards, and ornamental crops, the client’s inputs and management practices may have a significant impact on the current and future conditions of SWAPA + H. As well as soils, rainfall and other natural resource information, cropland inventory needs to include a description of current crops, crop rotations, tillage operations, nutrient and pest management inputs, livestock numbers and class, available equipment, and the timing and management of other important activities. The best source for this information is the producer and is best collected when the producer and the planner work together on-site in the planning area (field, tract or farm). A successful inventory process will “set the stage” for planning steps 4. Analyze Resource Data, 5. Formulate Alternatives, 6. Evaluate Alternatives, and 7. Make Decisions.

This technical note provides conservationists with a series of worksheets to assist with the inventory process when providing integrated systems planning assistance on cropland. They are designed to record and organize information from the producer in a manner that documents current crop management and provide for the inventory necessary to analyze benchmark conditions and develop feasible alternatives.

The worksheets are intended for use as a set and include:

1. Crop Rotation and Crop Management
2. Tillage Equipment and Tillage Sequences
3. Crop Nutrient Inputs
4. Integrated Pest Management
5. Irrigation Management and System Description
6. Erosion Factors for Land Treatment Practices
7. Animal Feeding Operation Inventory
8. Other Considerations for Sustainable Cropping Systems Inventory

Conservationists are encouraged to “interview” producers during the inventory process and document the information provided on the appropriate worksheets. Worksheets 1, 2, 3 and 4 are formatted to record this “interview” inventory data. While these worksheets can be given to the producer to be filled out and returned to the planner, the opportunity to ask questions and interact is lost and additional time may be needed to clarify the information provided. Worksheets 5 and 6 are used to record inventory from client interviews, field observations, FOTG resource information and field measurements. Worksheet 7 is designed to use with animal feeding operations where manure is used to provide all or a portion of the nutrients for the crops grown. Worksheet 8 is designed to provide additional considerations for achieving sustainable systems. Completed worksheets should be filed as documentation in the inventory section of the producer case file.

The technical note includes blank worksheets that can be reproduced and used at the field level. These worksheets may be modified at the area level if needed to better reflect inventory needed for more localized crop production systems and management.

Additional inventory worksheets may be developed based on suggestions and input from the field or area offices. For more assistance, please contact the Linda Scheffe, State Water Quality Specialist or Rudy Garcia, State Agronomist.

CROPLAND INVENTORY WORKSHEET #1
CROP ROTATION AND CROP MANAGEMENT

Client Name _____ Assisted by _____ Date _____

Business Name _____ Address _____

Farm (Place) Name _____ Rainfall Zone _____ Depth to Water Table: _____

Certified Organic? _____ Transitioning to Organic? _____

Farm Objectives: _____

Farm or Watershed Issues/Opportunities: _____

Rotation Information, including Cover Crops

Tracts(s)	Field(s)	Field Name	Soil Test ^{1/}	Typical Rotation Sequences, including Grazing Management

^{1/} Yes/No. If yes, attach soil test. If irrigated, has water been tested for nutrients? Yes/No. If yes, attach test results. Has plant tissue been tested for nutrients? If yes, attach test results. If not, it is recommended that these samples, in addition to an active carbon sample, be taken to provide fertility and soil health building recommendations. See appropriate guidance on how to sample.

Additional Comments/Observations: _____

CROPLAND INVENTORY WORKSHEET #1

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Crop and Residue Management Information:

Crop	Planting Date	Harvest Date	Avg. Yield per Ac	Residue Removed Y or N	Amount Removed	Removal Method, including Grazing

Additional Comments/Observations:

CROPLAND INVENTORY WORKSHEET #3
CROP NUTRIENT INPUTS

Crop	Nutrient <u>1/</u> Source (kind)	Application <u>2/</u> Rate	Application Method/Date	Application Depth

1/ e.g., 16-20-0, urea, liquid dairy manure, etc.

2/ Units (lbs/ac., gals/ac., inches/ac.)

Additional Nutrient Management Information (Attach copies of soil tests, irrigation water test, manure test, plant tissue tests, etc., if applicable):

CROPLAND INVENTORY WORKSHEET #4

INTEGRATED PEST MANAGEMENT

Crop	Target Pests	Control Method <u>1/</u>	Pesticide Product Name Active Ingred. (if used) <u>2/</u>	Pesticide Applic. Rate <u>3/</u>	Applic. Date(s)	Broadcast or Banded <u>4/</u>	Application Surface Soil Incorp. Foliar <u>5/</u>	Rate Standard Low Ultra Low <u>6/</u>

1/ Cultural, chemical, mechanical, biological

2/ Common name or trade name

3/ Lbs. or oz. of active ingredient

4/ Broadcast – pesticide applied to > 50% of field. Banded – pesticide applied to < 50% of field.

5/ Surface application – applied to soil surface. Soil incorporated – with light tillage or irrigation. Foliar – Sprayed on nearly full crop/weed canopy and/or > 50% residue cover.

6/ Rates: Std. > ¼ lb/acre., Low - > 1/10 lb/acre and ≤ ¼ lb/acre., Ultra Low - 1/10 lb/acre.

Historic field conditions for weeds, disease, insects, other pests and observations, comments on current management:

CROPLAND INVENTORY WORKSHEET #5

IRRIGATION MANAGEMENT AND SYSTEM DESCRIPTION

Tract Number	Field Number	Type of Irrigation System	Crop (s)	Irrigation System Description (from List 1, 2, or 3)	Total Water Applied to Crop	Number Irrigations & Amount Water per Irrigation
1. Sprinkler System Description:						
Mainline Size (in)				Revolution/ Set Time / Speed of Gun (hr)		
Lateral Spacing (ft)				Operating Pressure of Line (psi)		
Sprinkler Head Spacing (ft)				Pressure Regulator Rating (Y or N)		
Nozzle Size (in)						
2. Surface System:						
Length of field(s) (ft)				Grade at end of field (Circle one)		Flat Moderate Steep
Furrow/Border Spacing				System Type		Siphon tubes Gated pipe High flow turnouts
% slope of land				Delivery System (type and condition)		
Turnout (cfs)						
3. Subsurface Drip						
Depth of Tubing (in)				Inch per day application rate (in/day)		
Emitter Size (gal/hr)				Design Efficiency (%)		
Emitter Spacing (in)				Type of filtration (explain)		
Management						
Soil Moisture Monitoring Devices Used (Type)				Water Source (well etc)		

CROPLAND INVENTORY WORKSHEET #6
Erosion Factors for Land Treatment Practices (filled out by NRCS)

Farm #	Tract #	Field Name or #	Precp (in)	Soil Map Unit (RUSLE)	% Slope <u>1/</u>	Length Slope (RUSLE) (ft)	Soil Map Unit (WEQ)	Soil I Factor (WEQ)	Unsheltered Distance (WEQ) (ft)	Contour Farmed <u>2/</u>	Terraces <u>3/</u>

Erosion / Tillage / Soil Condition Observations

1/ Mark location of transects in the field. Attach map showing field locations.
 2/ If contoured, indicated row and grade ridge height at beginning of critical period (this includes cross-slope farming).
 3/ Indicate average terrace interval for RUSLE run.

**SUSTAINABLE SYSTEMS INVENTORY WORKSHEET #7
ANIMAL FEEDING OPERATION
INVENTORY**

Name of Landowner/Operator _____

Address _____

City _____, OR Zip Code _____

Phone Number _____ Do you have a Comprehensive Nutrient Management Plan (CNMP)? _____ If not, do you want more information or assistance in developing one? _____
If have CNMP, attach CNMP inventory sheet.

Assisted By _____ Date _____

Emergency equipment includes:

Distance of Facility to Surface Water or any Well (surface water may include a perennial or intermittent stream, river, lake, pond, irrigation canal, or wetland):

Depth to Seasonal Water Table:

Type of Animal(s)	Actual Animal #'s	Planned Animal #'s	Avg. Weight (lbs)	Number of Days in System Confined	

Plot Map (Drawing): See Conservation Plan Map

Barn Lot (loafing area) Surface Type: _____

Barn Lot Size (sq ft): _____

Bedding *(Loads, Tons, or Bales)				Barn Wash/Flush Water (Gallons)		
Type of Bedding	*Amount Used	How Often (D/W/or M)	Total Tons Used (Yr)	Amount of Water	How Often (D/M/or Yr)	Total Used

D=daily, W=weekly, M=monthly, Yr=yearly

Housing (Describe the type of housing such as open lot, free stall, stanchion; and number and type of animals housed):

Roof and/or Runoff (Describe how runoff is collected and/or diverted and if so how):

Dead Animal and Veterinary Waste Management (Describe how dead animals and veterinary waste are disposed of):

Crop Rotation: _____ Farm # : _____ Tract: _____

Field Information:

Field # or Name	Date (year)	<u>Crop</u>	Acres	Irriga- tion (ac in/ac)	Yield	Grazed (Y/N)	*NMPI	*Resource Concerns	Sensitive Areas/Site Problems

*NMPI=New Mexico Phosphorus Index; Resource Concerns=Soil, Water, Air, Plant, or Animal; Sensitive Areas=areas next to water, wetlands, etc.; Site Problems = Problems such as rocky or sandy soils, watertables, shallow soil depths, steep slopes, etc.

Describe how solid and liquid manure is collected, transferred, treated, and stored (Include how often, method used, storage sizes, equipment used, manure test values, etc. How often is manure scraped/cleaned? (Attach manure test information)

Solid:

Liquid:

Manure Application Equipment					
Type of Spreader	Dimensions (l-w-h)(dia)	Capacity (ft ³ , bu, gal)	Number and Kind of Spreader Setting(s)	Spread Width (ft)	Spread Distance (ft)

Length, w=width, h=average height when full of manure, ft³=cubic feet, bu=bushels, gal=gallons, type of spreader=box, slurry, tank, etc., kind of spreader settings=PTO, apron, etc.

Irrigation Water Management									
Field # or Name	Method of Irrigation	Stream Size (cfs or gpm)	System Pressure (psi)	Power Source (Electric, Diesel, Natural Gas, Propane, Gasoline)	Field Length (ft)	Width of Sets (ft)	Hours /Set	# of Irrigations/Yr	Volume of Effluent Applied Ac.ft.

Method of Irrigation=wheeline, border, furrow, etc., cfs=cubic feet per second, gpm=gallons per minute

Well Lift (ft) _____

Do you use? Flow Meter _____ Irrigation Scheduling _____

Regular irrigation application system maintenance and upgrades _____

Irrigation Water Delivery (Include if source is from a stream or well, if it is delivered on demand or on turns or some other way, variability of stream size, No₃ -N PPM in Water etc.):

Grazing Management								
*Field # or Name	Acres	Yield	Grass/Crop Grown	Animal Type	# of Animals	Average Weight	Days on Field	Month(s) on Field

*Include only those fields where manure is or will be applied in addition to grazing

Feed management (Describe any measures that are or will be used to alter manure nutrient content through feed management such as phytase feeding, milk urea nitrogen testing, etc.):

Conservation Practices You Believe Are Needed (List and describe the practices such as changes needed in collection, storage, treatment, transfer, or utilization, changes in land management practices, animal numbers or type, feed management, etc.):

Do you utilize all of your liquids and solids produced with on-site land application? _____
Composting? _____ Other? _____

If not, how is the surplus utilized? _____

Are there opportunities for biodigestion, composting, manure coop, etc to provide sustainable use of liquids and solids? _____

SUSTAINABLE SYSTEMS INVENTORY WORKSHEET #8
Other Considerations for Sustainable Cropping Systems Inventory:

- ✚ What are the natural resources on farm? How can these be used more efficiently?
- ✚ What resource opportunities exist throughout watershed?
- ✚ What crops can I grow? Marketing niche/opportunities, climatic considerations, agroecological needs, etc.
- ✚ How is water quality on the farm for all purposes? Have I minimized runoff and leaching?
- ✚ How can I protect air quality, including reducing dust, odor? (See New Mexico Environment Tech Note No. 8, Air Quality Assessment Tool and New Mexico Environment Tech Note No. 12, Cropland Air Quality Practices)
- ✚ Am I using crop rotations for nutrient cycling and to reduce disease/pest problems?
- ✚ What type of livestock/wildlife exists or could be raised?
- ✚ Besides using crop residues, manure, legumes, compost, cover crops, what other practices can be applied to build soil quality? To recycle nutrients? To use water efficiently?
- ✚ Which practices would contribute to an environmentally and economically sound farm?
- ✚ How can I conserve/produce energy or reduce energy use?
- ✚ How can I maximize biodiversity, including:
 - ✚ Integrate crop and livestock production, use hedgerows, insectary plants, cover crops, etc. to attract beneficial insects, bats, and birds
 - ✚ Plant trees and perennial crops
 - ✚ Abandon monocropping in favor of crop rotations, intercropping and polycultures
 - ✚ Manage pastures to support diverse selection of forage plants
 - ✚ Plant cover crops
- ✚ How to manage pests ecologically, including: (See Water Quality Technical Note 20, New Mexico Guidance for Integrated Pest Management)
 - ✚ Prevent pest problems by building healthy, biologically active soil, creating habitat for beneficial organisms, and choosing appropriate plant cultivars/rotations
 - ✚ *Tolerate, don't eradicate*
 - ✚ *There is no silver bullet*
 - ✚ *Treat the causes of pest outbreaks, not the symptoms*
 - ✚ *If you kill the natural enemies, you inherit their job*
 - ✚ *Pesticides are not a substitute for good farming*

EXISTING AND PLANNED SUSTAINABLE SYSTEM COMPONENTS

Practice Standard	Description	Existing	Planned
313	Waste Storage Facility		
	Tank		
	Waste Storage Pond-		
	Solid Waste Stacking Facility-		
317	Composting Facility		
328	Conservation Crop Rotation		
340	Cover Crop		
342	Critical Area Planting		
344	Residue Management		
356	Dike (Berms)		
359	Waste Treatment Lagoon		
362	Diversion		
382	Fencing		
393A	Filter Strip		
412	Grassed Waterway		
430	Irrigation Water Conveyance Pipeline		
442	Sprinkler Irrigation System		
449	Irrigation Water Management		
511	Forage Harvest Management		
512	Pasture and Hayland Planting		
521	Pond Sealing or Lining		
533	Pumping Plant for Water Control		
558	Roof Runoff Structure		
560	Access Road		
561	Heavy Use Area Protection		
590	Nutrient Management		

