

unlock the
SECRETS
IN THE
SOIL

Missouri Conservation Planning Course

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United States Department of Agriculture
Natural Resources Conservation Service

Module 4A -- Cropland
Basics, Practices, and
Tools 2013

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Objectives

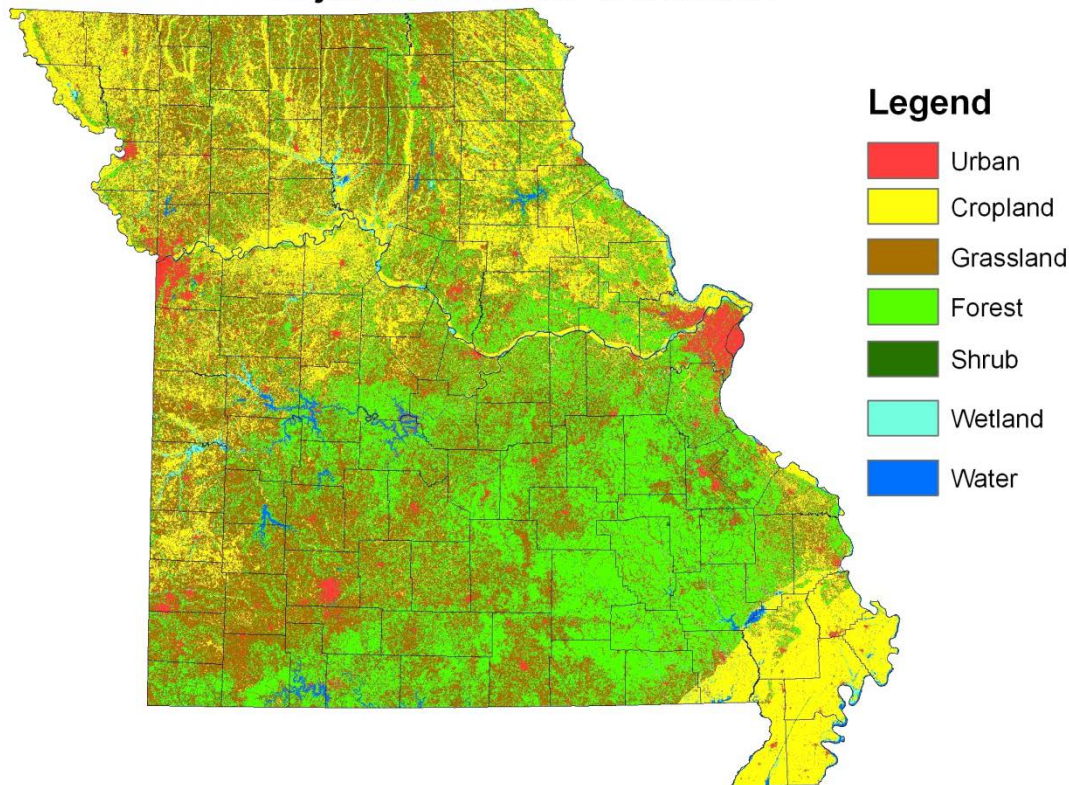
- Agronomy and Cropland Basics in Conservation Planning
- Review NRCS Agronomy Practice Standards and eFOTG
- Tools used for Conservation Planning
- Art of Communication



Objectives

- Future changes in agronomy across the world
- Agronomy's roles in the future
- Issues and Challenges
- Connecting the dots i.e.
 - Practice standards, job sheets, technical notes, eFOTG, other tools, new tools

Major Land Covers of Missouri



Missouri

Missouri landscape is typically described as 1/3 Cropland, 1/3 Grasslands, and 1/3 Forest. This is a map made by Elizabeth Cook, NRCS Geospatial Information Specialist.



Agronomy

- **Definition** = science of soils and plants: the science of soil management, land cultivation, and crop production.
- **Agronomy** is the science and technology of producing and using plants for food, fuel, fiber, and reclamation. Agronomy encompasses work in the areas of plant genetics, plant physiology, meteorology, and soil science. Agronomy is the application of a combination of sciences like biology, chemistry, economics, ecology, earth science, and genetics. Agronomists today are involved with many issues including producing food, creating healthier food, managing environmental impact of agriculture, and creating energy from plants.^[1] Agronomists often specialize in areas such as crop rotation, irrigation and drainage, plant breeding, plant physiology, soil classification, soil fertility, weed control, insect and pest control.

Agronomic Conservation Practices



Agronomic conservation practices offer a wide range of technology that effectively and efficiently addresses a variety of natural resource concerns.

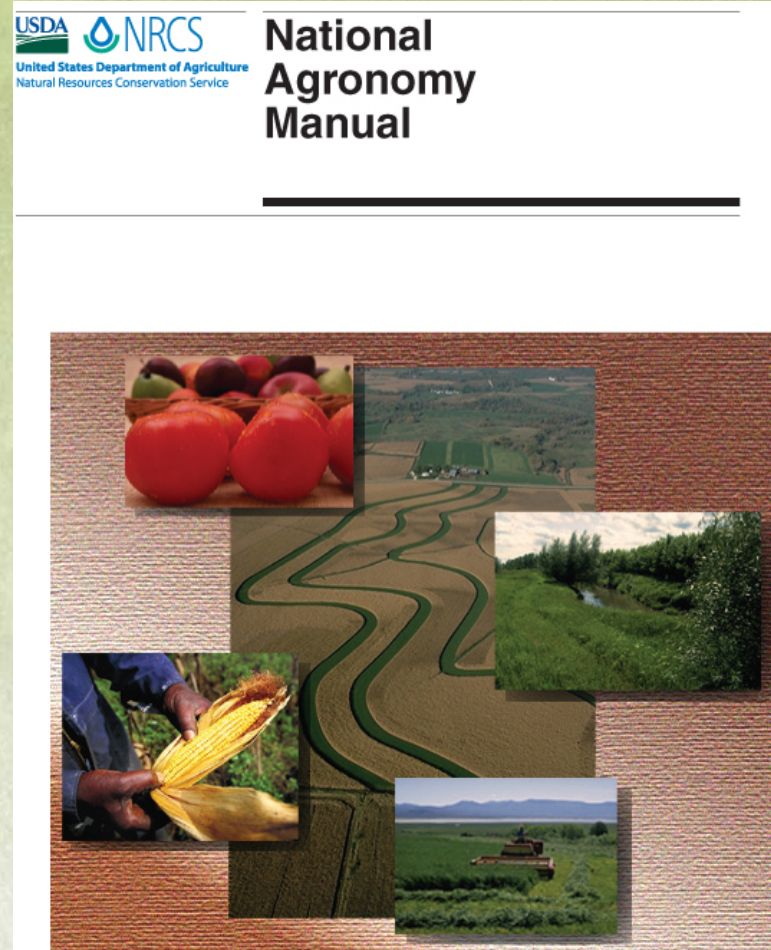


U.S. Department of Agriculture
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National Agronomy Manual



The National Agronomy Manual (NAM) contains policy for agronomy activities and provides technical procedures for uniform implementation of agronomy tools and applications. This manual is meant to complement all established USDA and NRCS policies and guidelines.





Practice Codes and Titles

NRCS Agronomy Practice Standards

Practices found in Section IV of the Field Office Technical Guide

[Go to eFOTG section IV Agronomy Technical Notes](#)

[Job Sheets](#)

[Statements of Work](#)

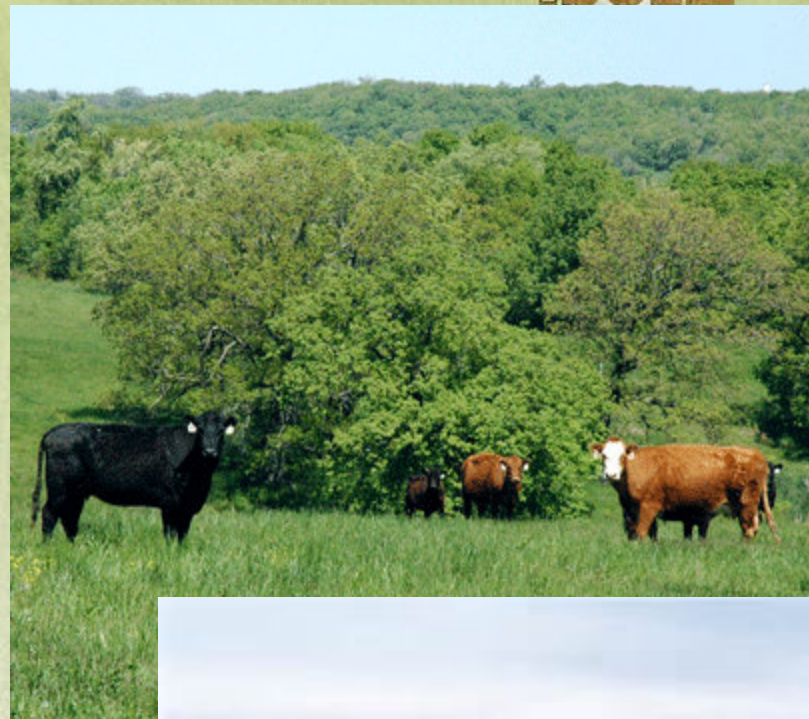
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- 328 Conservation Crop Rotation
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- 585 Stripcropping

327 Conservation Cover

Establishing and maintaining permanent vegetative cover

Purposes:

- Reduce soil erosion and sedimentation
- Improve water quality
- Improve air quality
- Enhance wildlife habitat
- Improve soil quality
- Manage plant pests



328 Conservation Crop Rotation

Growing crops in a planned sequence on the same field

Purpose:

- Reduce sheet and rill or wind erosion
- Improve soil quality
- Manage the balance of plant nutrients
- Supply nitrogen through biological nitrogen fixation to reduce energy use
- Conserve water
- Manage saline seeps
- Manage plant pests: weeds, insects, and diseases
- Provide food for domestic livestock
- Provide annual crops for bioenergy feedstocks
- Provide food and cover for wildlife, pollinators, cover, and nesting



332 Contour Buffer Strips

Strips of permanent, vegetative cover established around the hill slope with wider cropped strips that are farmed on the contour.

Purposes:

- Reduce sheet and rill erosion
- Reduce transport of sediment and other water-borne contaminants downslope
- Enhance wildlife habitat



330 Contouring Farming

Using ridges and furrows formed by tillage, planting, and other farming operations to change the direction of runoff from going directly downslope.

Purpose:

- Reduce sheet and rill erosion
- Reduce transport of sediment, and the contaminants attached to them
- Increase water infiltration



340 Cover Crop

Crops including grasses, legumes and forbs for Seasonal cover and other conservation purposes.

Purposes:

- Reduce erosion from wind and water
- Increase soil organic matter content
- Capture and recycle or redistribute nutrients in the soil profile
- Promote biological nitrogen fixation
- Increase biodiversity
- Suppress weeds
- Provide supplemental forage
- Manage soil moisture
- Reduce particulate emissions into the atmosphere
- Minimize and reduce soil compaction



342 Critical Area Planting

Establishing permanent vegetation on sites that
Have or are expected to have high erosion rates
And on sites that have physical, chemical, or
biological conditions that prevent the
Establishment of vegetation with normal practices.



Purpose:

- Stabilize areas with existing or expected high rates of soil erosion by water or wind
- Rehabilitate and revegetate degraded sites that cannot stabilize through normal farming practices
- Stabilize coastal areas such as sand dunes and riparian areas



386 Field Border

A strip of permanent vegetation established
At the edge or around the perimeter of a
field.

Purpose:

- Reduce erosion from wind and water
- Protect soil and water quality
- Manage pest populations
- Provide wildlife food and cover
- Increase carbon storage
- Improve air quality



393 Filter Strip

A strip or area of herbaceous vegetation that removes contaminants from overland flow.



Purpose:

- Reduce suspended solids and associated contaminants from overland flow
- Reduce dissolved contaminant loading in runoff
- Reduce suspended solids and associated contaminants in irrigation tailwater



603 Herbaceous Wind Barriers

Herbaceous vegetation established in rows or narrow strips in the field across the prevailing Wind direction.

Purpose:

- Reduce soil erosion from wind
- Reduce soil particulate emissions to the air
- Protect growing crops from damage by wind or wind borne soil particles
- Enhance snow deposition to increase plant available moisture



484 Mulching

Applying plant residues or other suitable materials
To the land surface.

Purpose:

- Conserve soil moisture
- Moderate soil temperature
- Provide erosion control
- Suppress weed growth
- Facilitate the establishment of vegetative cover
- Improve soil quality
- Reduce airborne particulates
- Reduce energy use associated with irrigation



329 Residue and Tillage Management

- Managing the amount, orientation and distribution of crop and other plant residues on the soil surface year around.

Purpose:

- Reduce sheet and rill erosion
- Reduce wind erosion
- Maintain or improve soil quality
- Increase plant available moisture
- Reduce energy use



585 Stripcropping

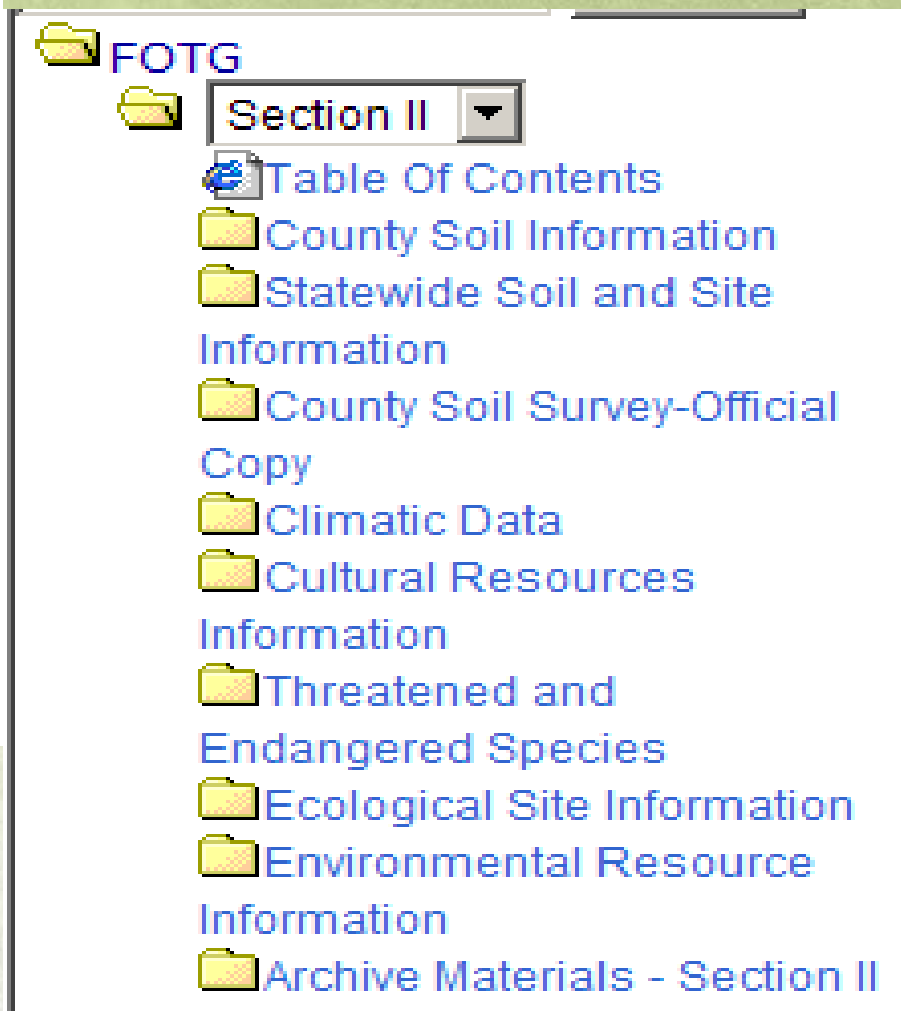
Growing planned rotations of row crops, forages, small grains or fallow in a systematic arrangement of strips across a field.

Purpose:

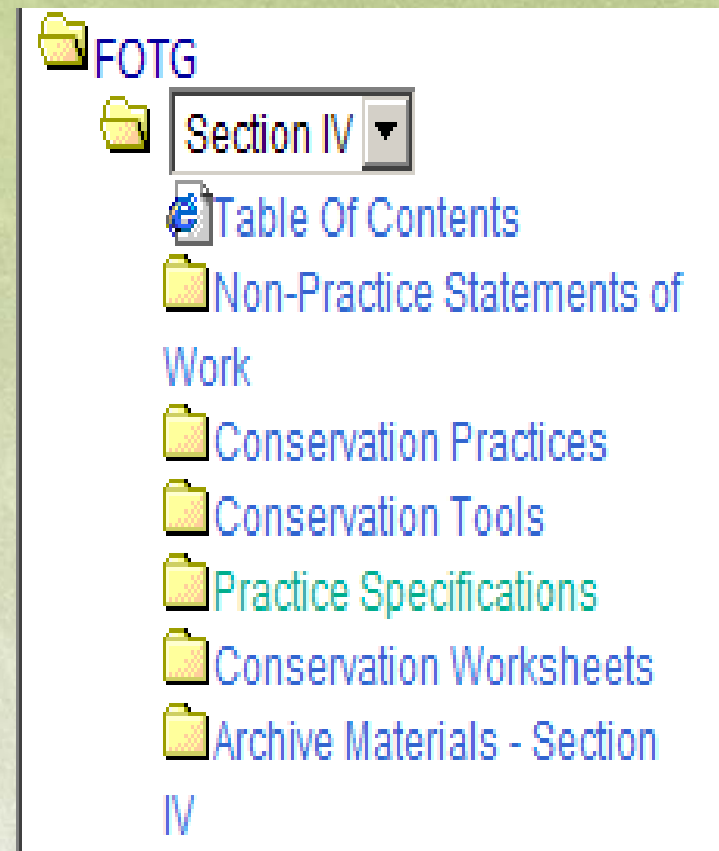
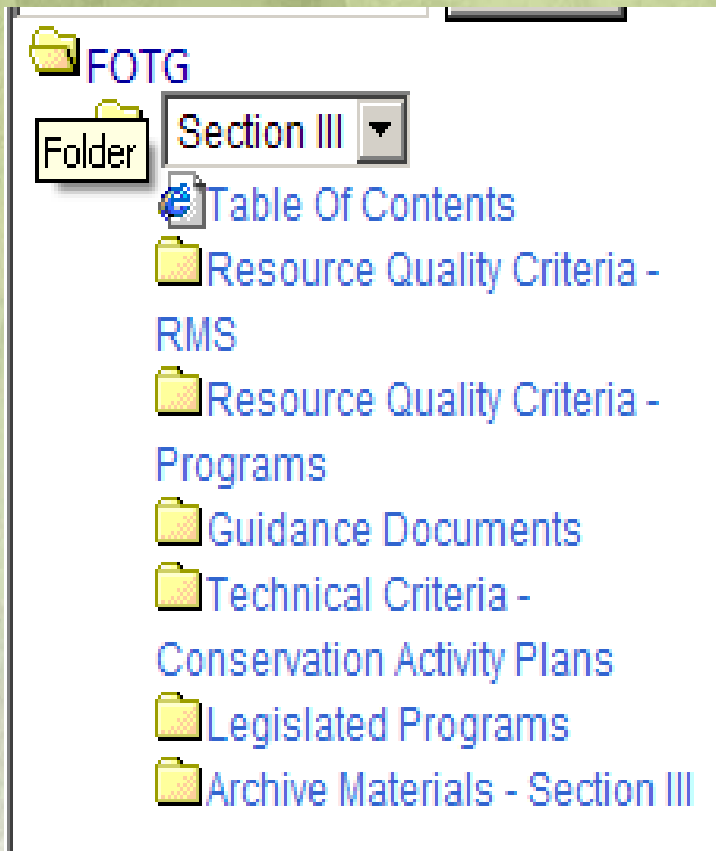
- Reduce soil erosion from water and transport of Sediment and other contaminants
- Reduce soil erosion from wind
- Protect growing crops from damage by wind-borne soil particles



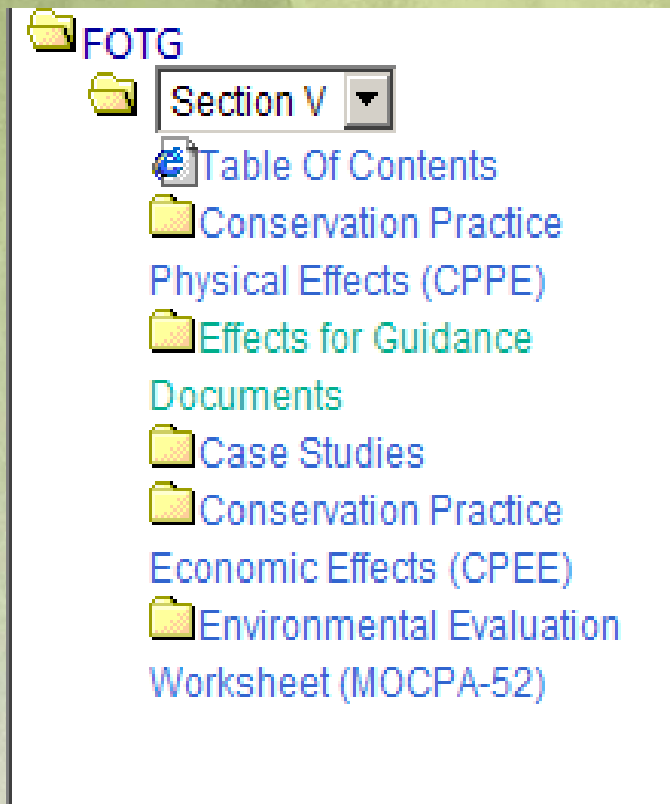
KNOW electronic Field Office Technical Guide (eFOTG)



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Conservation Planning Tools

- Evaluate effectiveness of practices or combinations of practices (RMS) using NRCS planning/risk assessment tools.
- RUSLE2 (revised universal soil loss equation tool for sheet and rill erosion by water)
 - Soil Conditioning Index (SCI)
 - Soil Tillage Intensity Rating (STIR)
- Wind Erosion Prediction System (WEPS)
- Conservation Practice Physical Effects (CPPE)
- WIN-PST (pesticide environmental risk screening tool)
- Phosphorus Index
- Leaching Index
- Wildlife Habitat Suitability Index
- Manure Management Planner



Conservation Planning Tools

New and Upcoming Tools

- COMET – carbon management evaluation
- Energy Estimator Tools



Art of Communication

We as conservationists do not apply conservation to the land. We sell it to people who do apply it to the land.

Our job is to help landowners want to do the things that will be of most benefit to them and resources in the long run.

Art of Communication

A few helpful hints for the “art of communication”

- Get to know and understand the person with whom you are working. Build a working relationship with that person. Adapt your approach to that individual accordingly.
- Never ask a question to which they might give the wrong answer



Art of Communication

- A conservation plan does not exist until the owners or operators make decisions.
- Let the landowner think they thought up the ideas in the first place.
- Admit you don't know the answer. Tell them, "I am not sure, but I will find out for you."
- The landowner has to make the final decision because they will embrace their own decisions.

Checklist of Resource Concerns

CROPLAND

CLIENT		LOCATION	
PLANNER		DATE	
LAND UNITS		TOOLS	

This check sheet is designed to assist planners and clients in identifying resource concerns during the planning process. The planning criteria outlined in Section III of the FOTG sets the minimum level of treatment. If a screening question is NO, this indicates no resource concern exists and no assessment is required. If a screening question is YES, the assessment must be completed to evaluate if there is a resource concern. If the Assessment is YES, Planning Criteria is met. If the Assessment is NO, the Planning Criteria is not met and a Resource Concern exists.

Resource Concern * required response	Screening Questions NO = Met Screening (Not a RC) YES = Go to Assessment	Y E S	N O	Assessment Tools	Assessment Level Required to Meet Planning Criteria YES = Meets Planning Criteria NO = Resource Concern	Y E S	N O
SOILS RESOURCES							
1.SOIL EROSION: Sheet, rill and wind erosion*	Are perennial ground cover < 90% and slope > 10%.			<ul style="list-style-type: none"> ➤ RUSLE2 ➤ WEPS 	Water erosion rate <=T AND Wind erosion rate <=T		
2.SOIL EROSION: Concentrated flow erosion*	Do Ephemeral gullies occur? AND Are classic gullies present?			<ul style="list-style-type: none"> ➤ Field measurements ➤ Observations 	Are conservation practices and managements in place to prevent or control ephemeral gullies? AND Is classic gully management adequate to stop the progression of head cutting and widening and are offsite impacts are minimized by vegetation and/or structures?		
3.SOIL EROSION: Excessive bank	Are streams or shoreline on or adjacent to site?				For shorelines and water conveyance channels; are banks stable or commensurate with normal geomorphological processes? AND		



Roles of Agriculture in the Future

- Feeding a growing humanity
- Carbon sequestration
- Grow crops as a fuel source
- Plant based bi-products to replace petroleum base derivatives

Issues and Challenges

- Water use efficiency
- Agriculture and bioterrorism
- Future crop demands may not only be for food products, they will compete with energy feedstock and by product feedstock for specific plant derived uses.
- Climate change coupled with the production systems of growing crops
- Water quality and soil erosion challenges