# USDA-NRCS

**The Natural Resources Conservation Service (NRCS) provides technical and financial assistance to help agricultural producers and others care for the land, implement on-the-ground conservation.**

**The mission and vision of the NRCS is:**

- **Helping People Help the Land**
- **Productive lands, healthy environment**

***THE NATURAL RESOURCES CONSERVATION SERVICE IS AN EQUAL OPPORTUNITY EMPLOYER AND PROVIDER***

# Best Management Practices for Soil Erosion

Brooks Engelhardt
District Conservationist
USDA-NRCS
Somis, CA

Some slides provided by:
Peter Fahnestock
Soil Scientist
USDA-NRCS
Victorville, CA

# Partnership

- **Partnership Approach**
  Since the Dust Bowl of the 1930's, NRCS has worked through conservation districts and others throughout the U.S. to help landowners, as well as Federal, State, tribal, and local governments and community groups conserve natural resources on private lands.

- **NRCS Somis Field Office works with:**
  Ventura County Resource Conservation District
  Resource Conservation District of the Santa Monica Mountains

# Conservation Planning

- NRCS staff will conduct field visits with land owner to develop a conservation plan which involves:
  - Inventory resources, identify problems, determine objectives
  - Formulate and evaluate alternatives

# Soil Erosion

- **Most destructive worldwide soil phenomenon**
  - water, plant nutrients, soil are lost
  - soil loss in USA about 5 billion metric tons/year
    - 2/3 by water erosion; 1/3 by wind erosion
    - The majority of the erosion occurs on productive agricultural lands
  - Using the Revised Universal Soil Loss Equation for a newly planted orchard on 30% slopes, slity-clay-loam soil, 190' slope length, with 16-18 rain: estimated soil loss was 74 tons / acre

# Soil Erosion

- **Erosion is a process that transforms soil into sediment**
- **Erosion is the detachment and transport of soil particles by erosive agents such as water and wind.**
- **Essentially a natural process accelerated by man's activities**
  - Occurs continuously but majority of erosion occurs in relatively few discrete events

# Factors Influencing Soil Erosion

**Climate**: Raindrops have the velocity and energy to detach soil particles from the soil mass. Wind can increase the velocity and kinetic energy of each rain drop (Frederick et al, 1991).

**Soil properties**:

- **Soil texture**: Sands, silts and clays.
- **Soil structure**: aggregate size and stability influence permeability.
- **Organic matter**: improve soil quality, improve drainage, water and nutrient holding capacity and can help improve a soil's resistance to erosion.

**Topography**

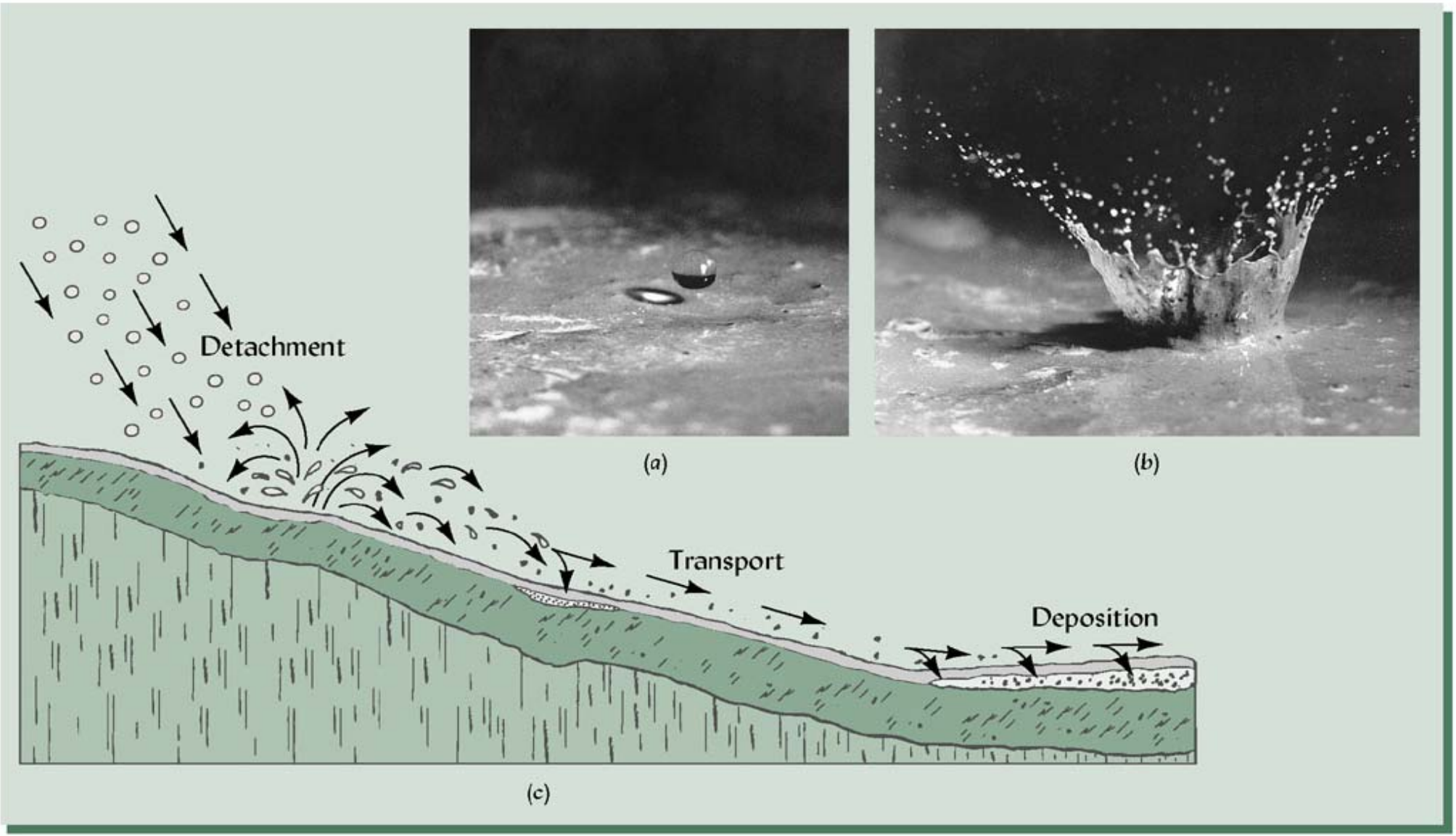
**Slope gradient**: slope steepness increases, velocity and erosivity of runoff **Slope length**: Runoff velocity generally increase with slope length.

**Slope shape**: concave, convex and complex slopes influence runoff velocity and erosivity.

# Mechanics of Water Erosion

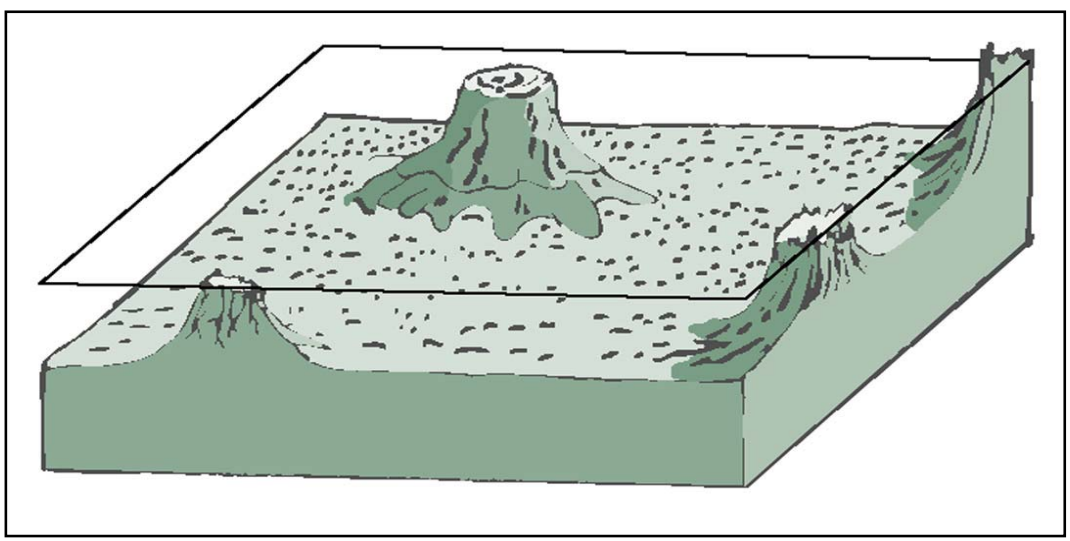
- Erosion involves three processes:
  1. *Detachment* of soil particles from soil mass
     - by raindrops, freezing/thawing, running water
  2. *Transportation* of the detached particles
     - mostly by runoff water by floating, rolling, dragging, or splashing action
  3. *Deposition* of the transported particles
     - settling of transported particles

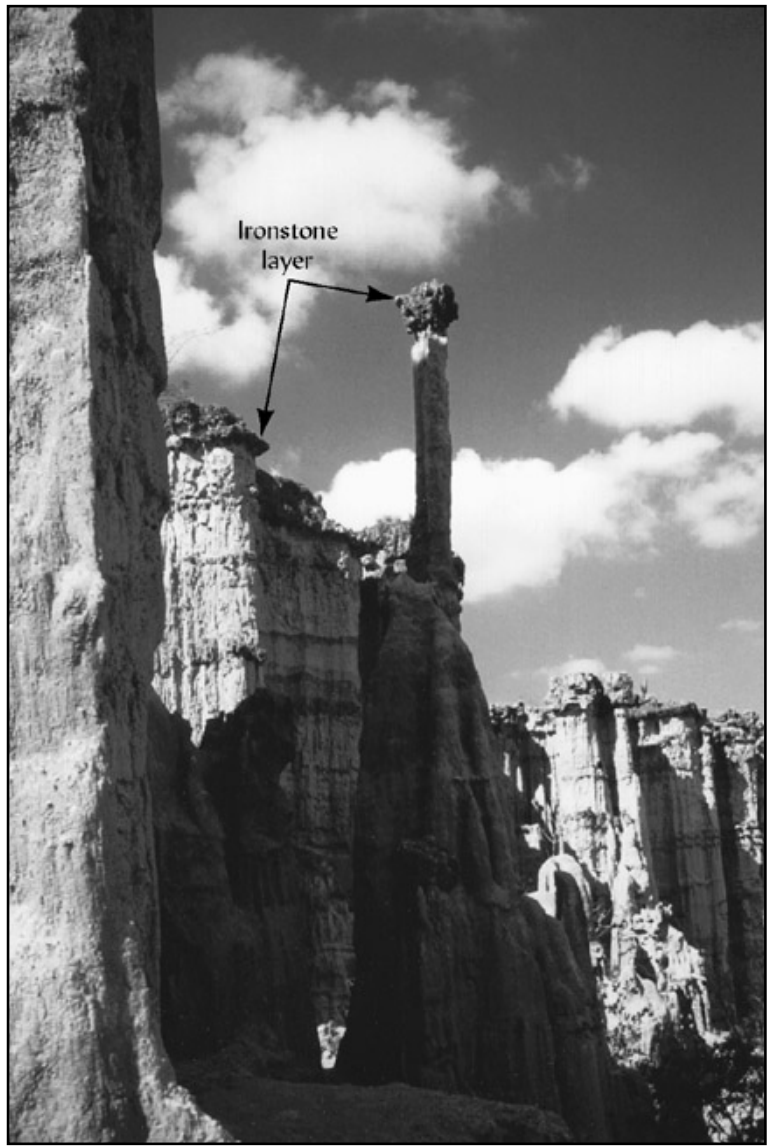
# Three step process of soil erosion by water

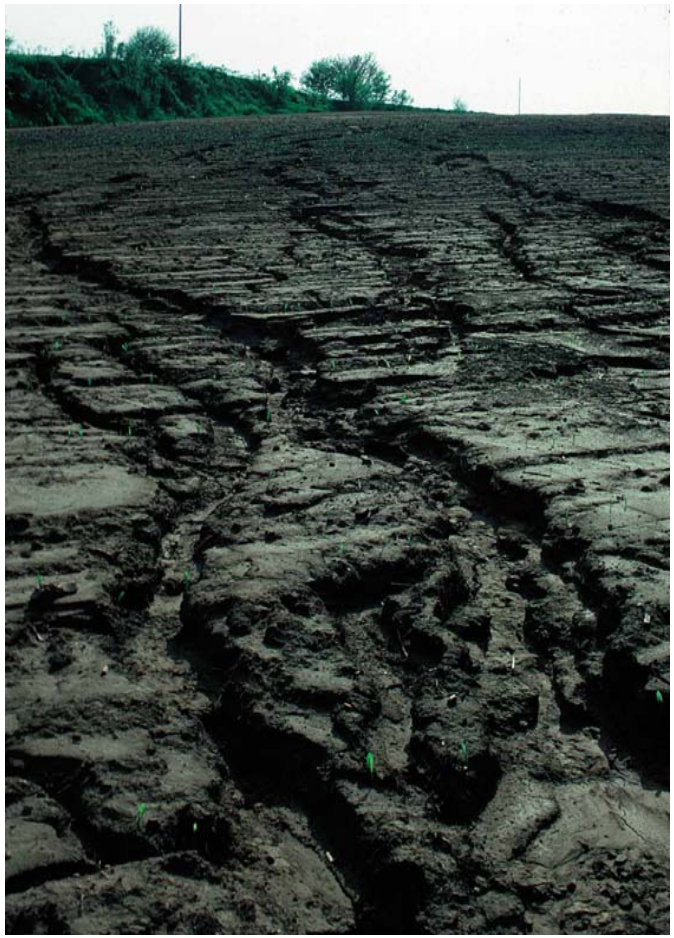


# Sheet Erosion

"Pedestals" left behind after a rain event







Rill Erosion

Ephemeral Gully

Classic Gullly

Access Road

# Principles of Erosion Control

- Reduce impact of rain drops
- Reduce velocity and volume of runoff
- Increase resistance of soil to erosion

**Vegetative**: Planting vegetation or applying mulch to disturbed soil is the most cost effective method for controlling erosion.  Plant materials, both living and dead, hold the soil mass in place, absorb rain drop energy, decrease run off velocity, improve infiltration, increase organic mater, which improves aggregate stability thereby increasing soil permeability resulting in decreased runoff.  Avoid rain drop impact on bare ground.

# Vegetative Pracitces


# Structural Practices

**Structural**: provides for rapid removal of surface flows or runoff in a non-erosive manner. Intercepts overland flow essentially reducing the influence of slope length on runoff velocity. Conservation structures intercept runoff before flows build up enough velocity to concentrate and become erosive. Structural practices need to be engineered and designed correctly to avoid future problems.

# Examples of structural practices

Underground outlet to safely convey surface runoff without causing erosion

# Streambank ersosion

# Irrigation Water Management

- **Irrigation:** Making improvements in irrigation systems and irrigation water management not only saves water, but can greatly reduce irrigation induced erosion.

- **Micro or drip irrigation**, water applications directed more towards root zone.

- **Irrigation water management**: using available technologies for scheduling irrigations according to plant needs and controlling volumes and frequencies of applications.

- **Irrigation Reservoir:** Part of a water conservation system to store water until it is needed to meet crop water requirements.

# Examples of practices installed through EQIP

Improved irrigation systems to apply water directly to root zone

# Examples of practices installed through EQIP

Irrigation tail-water return systems to collect, store, transport and re-use irrigation tail-water

Irrigation storage and regulation reservoirs

# Conservation Planning

- The conservation plan can be scheduled and implemented through an EQIP contract
- Cost-share incentives are generally 50% for practice installation and implementation

# Environmental Quality Incentives Program (EQIP)

- An incentive program to address resource concerns related to soil, water, air and other resource issues on private land

- A voluntary program to provide agricultural producers technical and financial assistance to promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, help producers meet environmental requirements.

# EQIP Eligibility
# producer eligibility

- Must be an agricultural producer engaged in livestock or agricultural prodcution
- Be in compliance with highly erodible land and wetland conservation provisions
- Be in compliance with adjusted gross income (AGI) requirements
- Maintain control of the land for the life of the contract
- Federal and state governments are not eligible

# EQIP Eligibility
# land eligibility

- Land in which agricultural commodities or livestock are produced
  - Cropland
  - Rangeland
  - Pastureland
  - Private non-industrial forest
  - Grassland

# Applying for EQIP

- Applications accepted year round
- There is a cut-off date for each funding cycle
- Several forms need to be filled out by the applicant
  - CCC-1200 application and appendix
  - AD-1026 HELC and WC certification
  - CCC-526 Adjusted gross income certification (AGI)
  - CCC-501 Member's information (entity)
  - Direct deposit form

# Applying for EQIP

- Contact your local NRCS field office

3380 Somis Road, P.O. Box 260

Somis, CA 93066

805-386-4489