

Conservation Agriculture

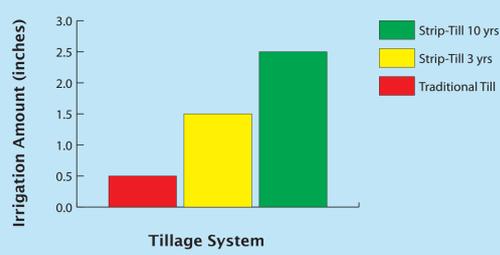
Improved Water Use and Storage



Increased Infiltration

- Residue on surface reduces (eliminates) runoff.
- More water gets into soil for storage.
- Allows greater irrigation amounts --> less wear on irrigation equipment.
- Reduced soil crust formation

Maximum Irrigation Amount Without Runoff

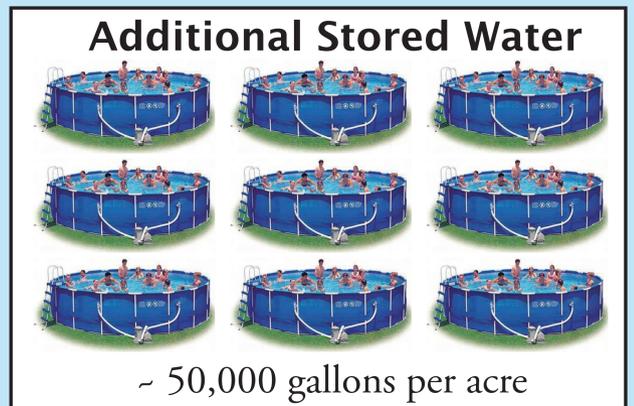


Increased Storage

- Improved soil structure contains more pores, holds more water.
- Soil organic matter holds 6 times its weight of water.
- 1–3 weeks extra water storage to cover short, mid-summer droughts.

Alabama research ...

Cotton field with heavy residue had 0.6 inches more water in top 12-inches of soil than cotton field without residue.
 ≈ 1.5 to 2-inches per three feet depth.
 ≈ 50,000 gallons per acre.
 ≈ 5–7 days of additional water for cotton.

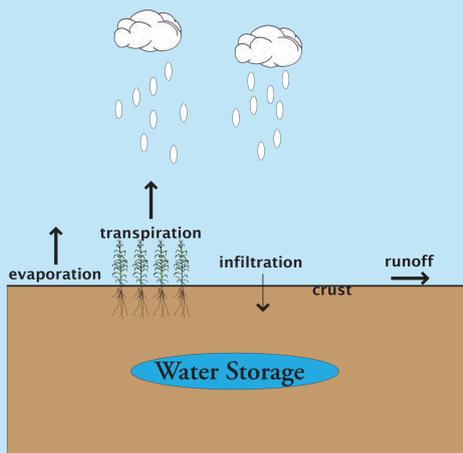


How did the heavy residue result in more water storage?

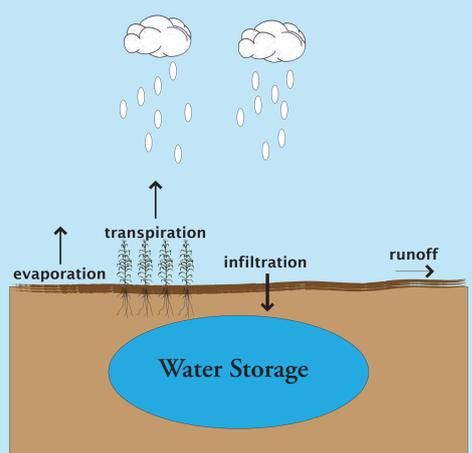
- Root channels increased infiltration.
- Mulch effect reduced crusting.
- Mulch effect reduced evapo-transpiration.

Reduced Water Use

- Residue cover lowers summer soil temperatures.
 - > Less evaporation from the soil.
 - > Less transpiration through plants.



No residue cover



Heavy residue cover



USDA-ARS National Soil Dynamics Lab
Conservation Systems Research



Auburn University