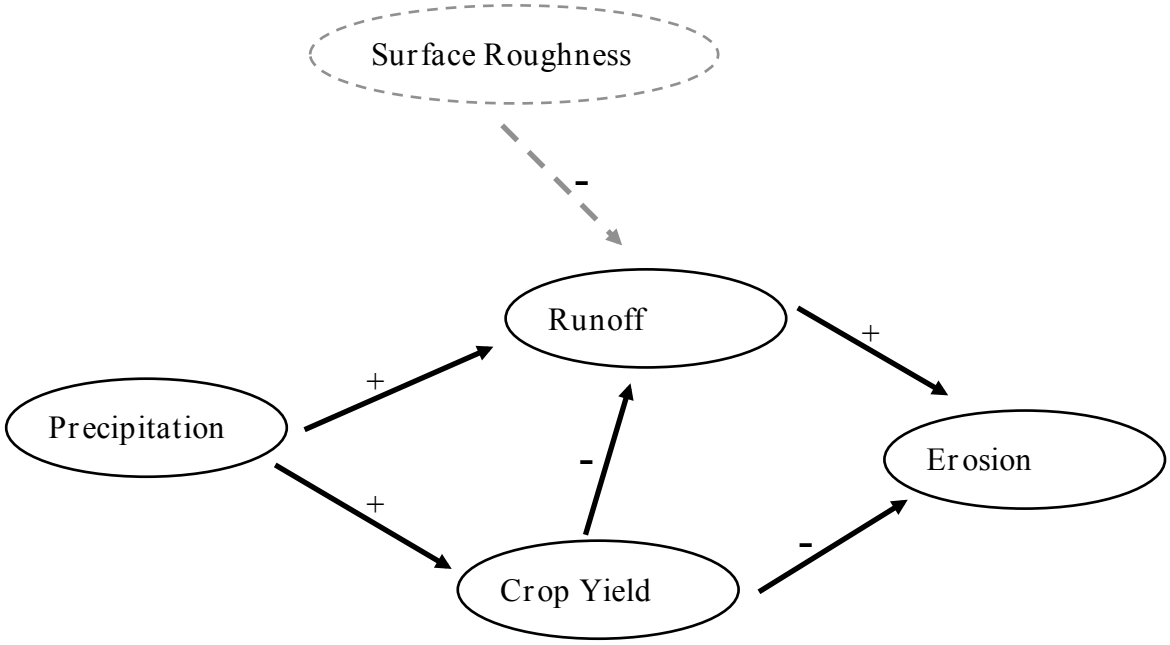
Unit 5 Follow-up homework

Soil conservation (reducing soil loss due to erosion) is a crucial aspect of agricultural sustainability. As we have seen, many different things can contribute to soil erosion in agricultural areas. Recall that the RUSLE can be used as a framework for considering how different factors that contribute to soil erosion work together and that each factor is actually made up of multiple components. *For example, surface roughness is a component of C.* Below is the schematic diagram of primary pathways whereby changes in precipitation may impact runoff and erosion (modified from Pruski and Nearing, 2002).



Part 1: Climate change impacts on soil erosion

a. Using your notes from class, list the three components that you think are most likely to be influenced by climate change in your region.

b. Add the three components you listed above to the diagram, using arrows and +/- signs to indicate relationships between the components and precipitation, runoff, crop yield, and/or erosion. *Surface roughness, which has a negative relationship with runoff, is provided as an example.*

c. Use the diagram to explain the relationship between one of your components and soil erosion. Write a complete sentence that describes the relationships between causes and effects. *Example: If surface roughness increases, this will cause a decrease in runoff and, therefore, a decrease in erosion.*

d. Based on the pathway you described in Part c, describe how perturbations in the climate system (atmosphere) can impact the geosphere, hydrosphere, and/or biosphere.

Part 2: Human influence on soil erosion

a. Now list two components of RUSLE factors that can be directly influenced by human activity.
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b. Add these components to the diagram above.

c. Use the diagram to explain the relationship between one of your components and soil erosion. Write a complete sentence describing the relationships between causes and effects.

d. Based on the pathway you described in Part c, describe how humans can impact the geosphere, hydrosphere, and/or biosphere.

References

Pruski, F. F., and M. A. Nearing, 2002, Climate-induced changes in erosion during the 21st century for eight U.S. locations, Water Resour. Res., 38(12), 1298, doi:10.1029/2001WR000493.