

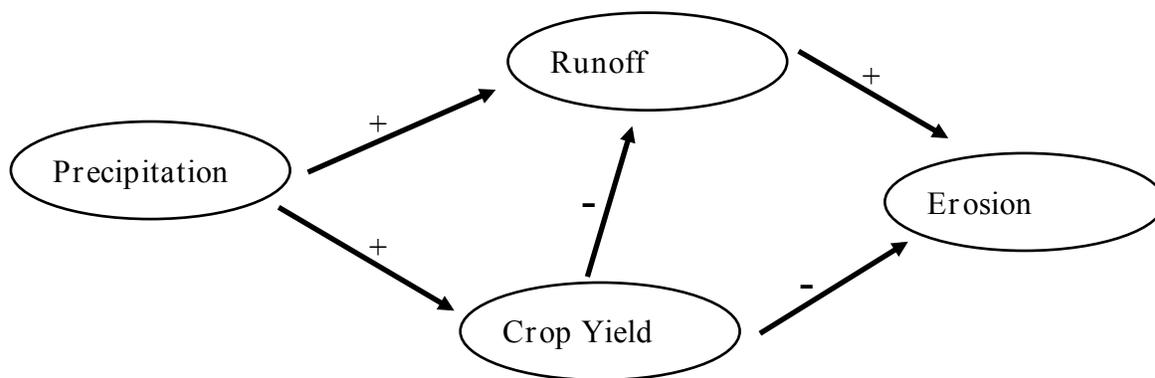
## Climate change and agriculture

### **Introduction**

As you saw in the video, *Science for a Hungry World*, global climate change is expected to have a significant impact on agriculture worldwide. While scientists are certain that increasing CO<sub>2</sub> in the atmosphere will lead to overall increases in global average temperatures and more extreme weather events, predicting the local impact of global climate change quickly becomes a very complex task. The local scale, however, is very important when considering agriculture and soil conservation and many scientists are working on aspects of this. You are going to look more closely at predicted changes in precipitation and consider the impact on soil erosion.

### **Effects on erosion**

As we have seen, there are many different things that can contribute to soil erosion in agricultural areas. Below is a schematic diagram of primary pathways whereby changes in precipitation may impact runoff and erosion (modified from Pruski and Nearing, 2002).



*Note: In this diagram, a plus (+) sign means there is a positive relationship between cause and effect. This means that when a cause goes up or down, the effect also goes up or down. For example, an increase in precipitation causes an increase in crop yield and, vice versa, a decrease in precipitation causes a decrease in crop yield. A minus (-) sign means that there is a negative relationship between cause and effect. This means that when a cause goes up, the effect goes down or when a cause goes down, the effect goes up. For example, an increase in crop yield causes a decrease in runoff and, vice versa, a decrease in crop yield causes an increase in runoff.*

1. Models for West Lafayette, Indiana, predict that, while precipitation decreases overall for the region, erosion is expected to increase for cornfields but decrease for wheat fields (Pruski and Nearing, 2002).
  - a. Using the figure above, identify which pathways are most likely to be dominant for corn and wheat.
  - b. BONUS: Can you explain how this could happen? What do you think is different for corn vs. wheat? Consider characteristics of the plants themselves.

2. Consider the components of factors in the RUSLE equation in the table on the jigsaw handout and complete the following.
- List the 3 components that you think are most likely to be influenced by climate change.
  - List 2 components that can be directly influenced by human activity (besides support practices, P).
  - Add these 5 components to the diagram below, using arrows to indicate relationships between components and precipitation, runoff, crop yield and/or erosion. Surface roughness, which decreases runoff, is provided as an example.
  - Choose two complete pathways in your new diagram and write a sentence for each that describes the relationships between causes and effects.

