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### IMPACT OF SOIL EROSION: AN AGRICULTURAL PRODUCTION CHALLENGE IN GLOBAL ENVIRONMENT

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#### Overview

Global warming is expected to lead to a more vigorous hydrological cycle, including more total rainfall and more frequent high intensity rainfall events. Rainfall amounts and intensities increased on average in the United States during the 20th century, and according to climate change models they are expected to continue to increase during the 21st century. These rainfall changes, along with expected changes in temperature, solar radiation, and atmospheric CO<sub>2</sub> concentrations, will have significant impacts on soil erosion rates. The processes involved in the impact of climate change on soil erosion by water are complex, involving changes in rainfall amounts and intensities, number of days of precipitation, ratio of rain to snow, plant biomass production, plant residue decomposition rates, soil microbial activity, evapo-transpiration rates, and shifts in land use necessary to accommodate a new climatic regime. This paper reviews several recent studies conducted by the authors that address the potential effects of climate change on soil erosion rates. The results show cause for concern. Rainfall erosivity levels may be on the rise across much of the United States. Where rainfall amounts increase, erosion and runoff will increase at an even greater rate: the ratio of erosion increase to annual rainfall increase is on the order of 1.7. Even in cases where annual rainfall would decrease, system feedbacks related to decreased biomass production could lead to greater susceptibility of the soil to erode. Results also show how farmers' response to climate change can potentially exacerbate, or ameliorate, the changes in erosion rates expected.