Title: **Water-Soil-Vegetation Nexus in Changing Climate**

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this chapter. Moreover, the topsoil may be eroded by runoff and/or wind. When the topsoil moisture is high, the erosion is primarily induced by runoff, whereas when the topsoil moisture is low and wind speed is high, the erosion is mainly caused by wind. Under most conditions, the erosion can be due to the combined effects of runoff and wind. How to quantify these two interrelated erosion processes and predict the total erosion will be the third focus of this chapter.

**Chapter 4 Vegetation Dynamics**

This chapter will include five or more articles discussing the pivot roles of vegetation in regulating transpiration and preventing topsoil erosion. For an area of interest, plants are very important for sustaining its eco-environment and socioeconomic development. On the one hand, plants consume soil water, reducing soil moisture. On the other hand, plants facilitate infiltration, replenishing soil water. Such interrelationships between plants and soil water depend on the plants' physiological characteristics (e.g., root and leaf structures), soil properties, and water availability. Quantifying the interrelationships will be the first focus of this chapter. In addition, the roots of the plants can provide additional cohesive forces, increasing the erosivity of soils. Also, the plant canopy can well protect topsoil from being eroded. How to quantify soil erosivity as affected by plants' physiological characteristics will be the second focus of this chapter. Further, the loss of topsoil can cause the evolution of plants and even changes of vegetation species, altering the interrelationships mentioned above. As a result, the nutrient and water holding capacities of the soils will likely be lowered, ultimately resulting in land degradation and desertification. Quantifying the relationships between topsoil erosion and land degradation will be the third focus of this chapter.

**Chapter 5 Impacts of Climate Change**

This chapter will include five or more articles discussing how climate change would impact the spatiotemporal distribution of water, twist the physical processes of hydrologic cycle, and affect the vegetation diversity and dynamics. These articles will present advanced statistical techniques for identifying spatial patterns and temporal trends of precipitation, temperature, and runoff as well as mathematical models for predicting impacts of climate change on hydrologic processes and vegetation growth. In addition, these articles will present observational evidences and case studies of climate change. Further, these articles will present decision support tools for developing practical management measures in changing climate to sustaining our eco-environment and society by maintaining an optimal water-soil-vegetation equilibrium.

**Chapter 6 Overall Conclusions and Discussion**

This chapter will summarize and discuss the findings from the previous four chapters.