Hilly and mountainous landscapes in all parts of the world are blanketed with soils that vary based on the five state factors of soil formation (Heimsath et al., 2001). Many of these landscapes are not in a state of equilibrium—the processes acting on these landscapes are attempting to reach a state of morphological equilibrium. One of the primary processes involved is soil eroding in a “slide” or movement event. Such events are given many names, including soil creep, mass wasting, mass movements, slumping, debris slides, rockslides, landslides, etc. While some distinction among these terms exists, all of them play a major role in controlling long-term landscape evolution (Fernandes et al., 2004), with the overall effect being material movement downslope. A combination of some or all of these terms will be used in this article, with a universal meaning.

Landslides have significant and detrimental effects on surrounding areas, such as the destruction of homes and communities, loss of agricultural land, water contamination, and sedimentation in rivers and reservoirs. Nearly 800 million people worldwide depend directly on mountainous landscapes for their sustainability (Drees et al., 2003). Many of these people cultivate the soil on surrounding slopes, and as population demands increase with intensification of land use, the stability of the slopes decrease. Some of these movements can take place very rapidly and in massive numbers. In February 1996, extreme rains provoked hundreds of landslides in Rio de Janeiro, resulting in the loss of more than 200 houses and the death of 44 people (Amaral, 1997).

Mass movement is an extensive and poorly understood process contributing to erosion on soil-mantled hillslopes (Heimsath et al., 2002). This is likely due to the fact that there are multiple factors acting together in these landscapes. These factors include geographic and geomorphic position, vegetative cover, slope inclination, underling and exposed bedrock, soil production rates, soil depth, soil physical and chemical properties, earthquakes, and intense rainfall events. Our objective here is to review research on several important properties in an attempt to identify and explain the soil and landscape characteristics that suggest a likelihood of rapid movement and collapse.