

Landslides in Scotland (in the form of debris flows) have occurred in clusters over the last 7,000 years which may be related to climatic factors such as the frequency of extreme rainfall events, for example, although deforestation is also likely to be an important factor. Debris flows in the Lairig Ghru in the Cairngorms appear to occur with a return period of around 20 years, with each episode of debris flow activity thought to be linked to intense rain storms (Baird & Lewis, 1957; Innes, 1982; Luckman, 1992). Landslide and debris flow activity is reported to have increased over the last 200–500 years (Innes, 1985; Ballantyne, 2004) and it is thought that localised extreme rainfall was the major contributing factor to the landslides in 2004 (Winter et al., 2005). Triggering of peat slides is also commonly attributed to intense rainfall events such as that in September 2003 which initiated around 35 slides on the Shetland Isles (Dykes & Warburton 2008).

It is difficult to predict future trends in soil erosion and landslides. There is considerable uncertainty in the most recent UKCP09 climate change predictions particularly for the western seaboard, although most predictions agree that there will be increased rainfall over eastern Scotland during the winter months. This increase is likely to increase the erosion losses if current land use patterns remain the same.

Other vulnerable soils include eroded or bare peat, when drier summers may make these soils less able to absorb the greater autumn rainfall predicted, leading to increased run-off and increased erosion. Where significant cracking develops in these peat soils, infiltration may increase, causing a sudden rise in pore water pressure leading to failure and landslides.

Lilly et al. (2009) also suggested that overgrazing is probably the major driver of peat erosion in uplands and, although sheep numbers have decreased in recent years, the numbers of wild deer have not. This, combined with drier summers, may increase the susceptibility of peat soils to erosion.

With the uncertainty in climate predictions for the west of Scotland, it is difficult to determine if there is likely to be an increase in landslides in this area; however, it is assumed that both antecedent rainfall and intense rainfall events contribute to debris flow and landslide initiation, thus the future scenarios of more frequent and intense rainfall events would seem to indicate an increased likelihood of failures.

Retaining stubble in fields previously sown to spring cereals will help to reduce erosion. Other mitigation strategies such as adherence to policies like Cross Compliance (Good Agricultural and Environmental Condition), the Forests and Water Guidelines and the Water Framework Directive should help to minimise soil erosion in the future. Nisbet et al. (2002) reported on a study to test the effects of the Forests and Water Guidelines in controlling diffuse pollution from forestry in Argyll. They demonstrated that adherence to these guidelines meant that water quality was relatively unaffected during plant and harvesting phases.