

Fuchs, S. & M.C. McAlpin (2005): The net benefit of public expenditures on avalanche defence structures in the municipality of Davos, Switzerland. *Natural Hazards and Earth System Sciences* 5 (3). p. 319-330.

Abstract

Avalanches pose a threat to settlements as well as industrial and recreational areas in the Alps. As a counter measure, technical mitigation measures have been implemented since the 19th century, resulting in a raise in value of formerly endangered areas. This increase in value can be considered as a benefit due to prevented damage. This paper compares the total costs and benefits of technical mitigation measures in the municipality of Davos, Switzerland as a basis for evaluating their net social benefit. The benefit of avalanche defence structures is determined using two different approaches. First, the replacement value of buildings protected by mitigation measures is quantified. Second, the number of protected persons is monetarily assessed by means of a human capital approach. The quantified benefit is compared with the present value of cumulative capital expenditures on avalanche mitigation measures. In addition, distributional effects of the public expenditures on technical mitigation measures are discussed based on the average future tax revenues within protected areas. Depending on whether benefits are calculated in terms of protected buildings or protected persons, the results show a large range of cost-benefit ratios. Critical issues of cost-benefit analyses in the context of alpine natural hazards are highlighted, including problems related to the human capital approach and the sensitivity of results to how benefits are calculated. The applicability of cost-benefit analyses for evaluating avalanche mitigation measures is discussed.