

## **The Office of the Auditor General of Norway's investigation into the efforts of the authorities to limit flood and landslide hazards**

### **Background and goal of the investigation**

Large areas of Norway are at risk of floods and landslides. The hazards may increase as a result of climate change.

The Directorate of Water Resources and Energy (NVE), an agency under the Ministry of Petroleum and Energy, has overall responsibility for flood and landslide work in Norway. The Ministry of the Environment administers the planning part of the new Planning and Building Act. Pursuant to the Natural Damage Act and the Planning and Building Act, it is the municipalities' responsibility to prevent and protect their inhabitants from flood and landslide hazards. The county governors are responsible for ensuring that flood and landslide hazards are assessed in the municipalities' land use planning.

The goal of the investigation has been to establish what mapping of flood and landslide hazards has been carried out and how the results are communicated to and used by the municipalities, and how the authorities at different levels ensure that national objectives in the field of floods and landslides are adequately followed up.

### **Method**

This investigation used map analyses. Questionnaire surveys among municipalities and county governors were carried out, as were interviews and document analyses. The investigation was carried out in the period from October 2008 to August 2009.

### **Results**

The investigation shows a varying degree of national mapping of flood and quick clay hazards and susceptibility maps for rockslides and snow avalanches. About 160,000 people live in areas that were mapped as potentially at risk of 200-year floods, quick clay or landslides at the end of 2008. There are about 66,000 buildings in these areas.

The investigation shows that county governors and municipalities have confidence in the flood inundation maps, but that their scope is

insufficient, and that more stretches of river and minor watercourses should be mapped.

The majority of the municipalities were not aware that susceptibility maps for rockslides and snow avalanches had been produced. Nor were the majority of the county governors in question aware that susceptibility maps had been prepared for municipalities in their counties. This shows that the maps have been inadequately communicated.

Large areas of marine deposits that could contain quick clay have yet to be mapped. Moreover, the quick clay maps do not cover shore deposits or areas of less than 2.5 acres. A number of county governors and many municipalities are of the opinion that the maps must be improved, among other things by including areas under 2.5 acres and areas that could be affected by quick clay slides.

Climate change may cause flood and landslide hazards to increase. None of the present national mapping projects take climate change into consideration. The investigation shows that county governors and municipalities do not know how to take climate change into consideration in their work on limiting flood and landslide hazards.

The lack of knowledge about the mapping of flood and landslide hazards results in the maps not being used in land use planning or in risk and vulnerability analyses. This means that buildings may be built in areas at risk.

Municipalities largely comply with the flood and landslide information they receive from expert agencies, but the investigation nonetheless shows that a number of municipalities did not have an adequate understanding of the legal basis and their responsibilities. Many of the municipalities lack flood and landslide expertise, and they have not received the help they need from government agencies.

In the Office of the Auditor General's opinion, inadequate knowledge of maps, insufficient expertise in their use and unclear understanding of the municipalities' responsibility are serious matters that require targeted and active government efforts in parallel with the development of NVE as the responsible agency in this field.

<http://www.riksrevisjonen.no/en/Reports/Pages/floodandlandslide.aspx>