

## Letter to the Editor

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# Challenges and Technological Requirements in Landslide Disaster Search and Rescue Efforts: Türkiye Artvin Landslide Case Study

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Dear Editor,

Natural disasters such as floods, landslides, and rockfalls occur frequently in the Eastern Black Sea Region of Türkiye. As a result of the landslide in Artvin province on August 12, 2024, deaths occurred,<sup>1</sup> and the international transportation route was closed. Artvin is a province with a high risk of landslide disasters. The main reasons for this situation include the fact that the region is sloped and exposed to too much rain. Landslides occurring in Artvin frequently cause various damages and loss of life. A landslide disaster occurred on August 12, 2024 at 03:15 in the Kiyıcık area of the Arhavi district of Artvin province. Due to the landslide, the Artvin-Rize highway, which is an international road, was closed to traffic in both directions. The landslide that occurred at the exit of the Kiyıcık tunnel in the Arhavi district caused the interruption of two-way transportation. It is said that 100 000 tons of soil mass moved in the area where the disaster occurred.<sup>2</sup> At the same time, it has been determined that the risk of landslides continues in the region, and small slides occurred during the intervention works.<sup>3</sup> In the success of search and rescue efforts, reaching the victim on time and starting the work immediately is an important factor. For this reason, it was reported that the relevant teams started working immediately to open the access road that was closed to traffic. By examining the PTS (License Plate Recognition System) records, it was determined that a vehicle entered the tunnel, but there were no exit images. Following this detection, search efforts were carried out in large quantities of soil. It has been determined that in detecting the vehicle buried under landslide, searches were conducted using new generation search devices with sensors, supported by the General Directorate of Mineral Research and Exploration. Additionally, searches were conducted using drone systems and the Coast Guard teams searched from the sea.<sup>4</sup> After the sensor search device detected the vehicle under the landslide, rescue efforts were carried out. Following search and rescue activities, the vehicle wreckage under landslide was reached and it was determined that 4 people had died.<sup>5</sup>

New generation technological devices are observed to be needed in search and rescue efforts in landslide disasters. On the other hand, while carrying out rescue operations in a 100 thousand ton soil mass, it may be important to evaluate the risks in the region and train search and rescue teams within this framework. Cooperating with different institutions, organizations, and NGOs in search and rescue activities and ensuring preparedness through joint exercises may be important approaches. Another important issue is that having new generation technological equipment specifically for search and rescue activities in landslide disasters can increase the intervention capacity. In this context, it is thought that more research and action is needed to increase the search and rescue response capacity for landslide disasters.

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