IIT
INDIAN INSTITUTE OF TECHNOLOGY

MANDI

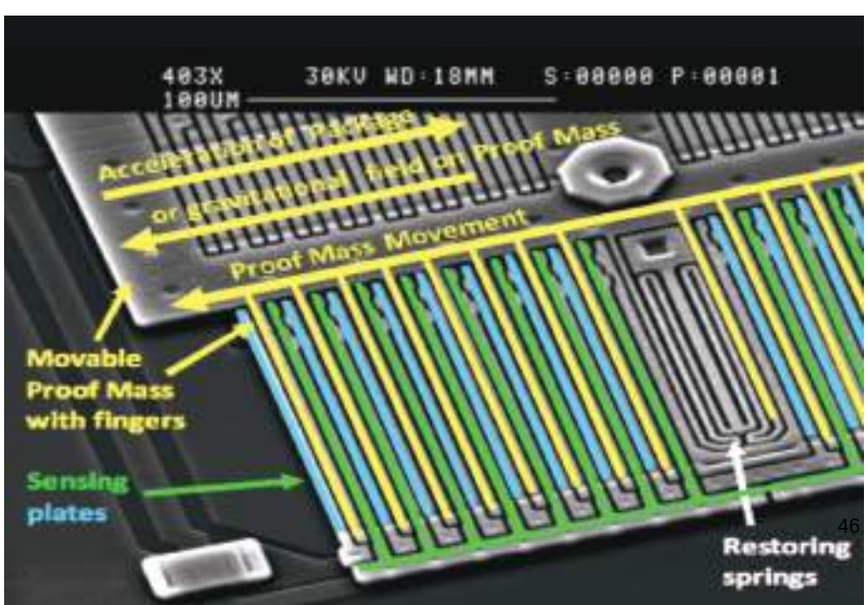
Technology Predicting Natural Disasters

Indigenous low cost landslide monitoring and early warning system has come as a boon for travellers and inhabitants of mountainous terrain.

Every year, landslides cause major infrastructure damages and deaths. As per the data provided by National Institute for Disaster Management (NIDM), more than 5,000 people are buried alive under landslides and economic losses of more than USD 4 billion is reported every year globally due to it. In India, landslides cause more than 1,000 deaths every year.

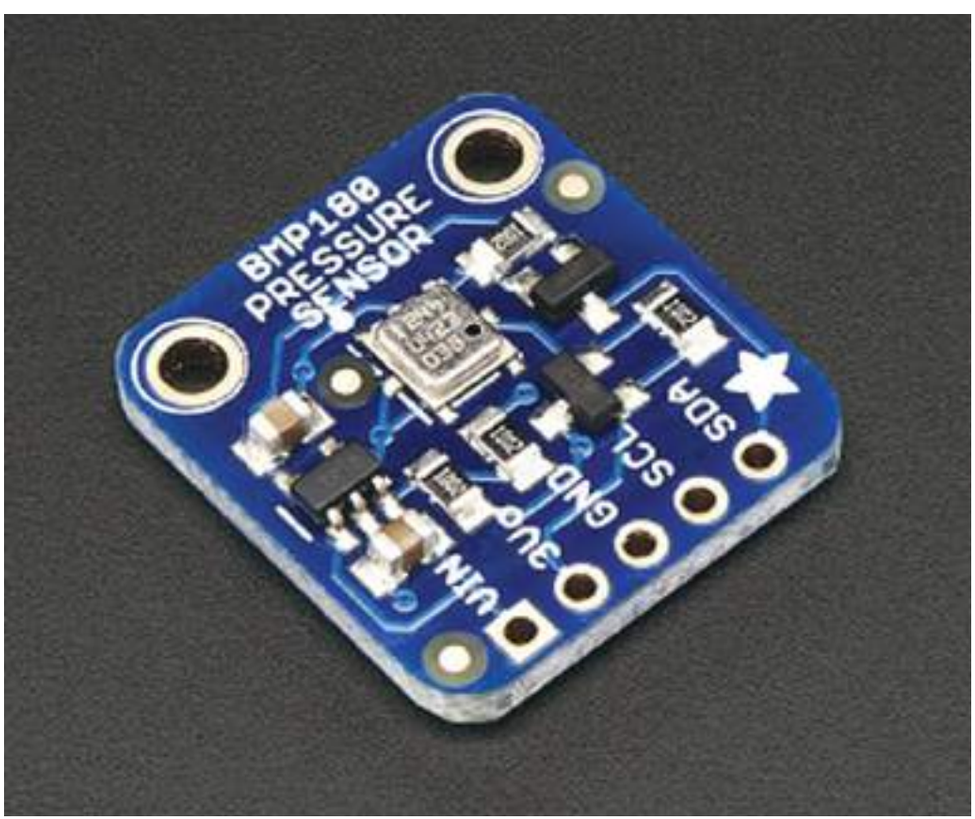
The main objective of this innovation by Indian Institute of Technology (IIT), Mandi was to develop an indigenous, low-cost, and real-time landslide monitoring and warning system which could overcome this annual problem.

Not all the landslides can be treated or mitigated. However, major disasters can be addressed by landslide monitoring and early warning. The low-cost landslide monitoring and early warning system developed by IIT Mandi senses various soil parameters and weather properties at a landslide prone site.



" A major tragedy was averted at Kutropi along the Mandi – Jogindar Nagar National Highway due to rains and flash flood by this low-cost landslide monitoring system. The system issued a set of warnings minutes before the disaster at Kotropi. The local disaster response and security team stopped traffic before the flash flood and avoided a big disaster."

This technology first captures data of historical rainfall records, soil properties and geological information of the selected site. Then it is analysed to understand the susceptibility of landslides in the area.



SENSORS USED IN THE SYSTEM

- **Accelerometer:** Sensitive to both linear acceleration and the local gravitational field.
- **Capacitive Soil Moisture Sensor:** Measures the amount of moisture in the soil with the help of the volumetric soil moisture sensor.
- **Weather sensors:** Temperature, humidity, atmospheric pressure and light intensity sensors are used for measuring the weather parameters.
- **Rain Gauge:** Measure rainfall duration keeps a track of intensity.

In addition to these sensors, a Global System for Mobile or Long Range Radio (LoRa) service is used for uploading the sensed data at regular time intervals to the cloud. This data is used to generate local and global alerts. Also, a local storage device is installed for keeping data stored locally.