# In Many Parts of the World, the Ground Is Literally Sinking

Extracting underground natural resources is causing land to sink in on itself, which will put 635 million people at risk by 2040.

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A study published last month suggests 8 percent of the world's ground surface is on track to sink by 2040, making the affected regions more susceptible to flooding and other disasters, reports Dharna Noor for *Gizmodo*.

A team of researchers used spatial and statistical analyses to forecast how subsidence—the gradual sinking or caving in of the ground—will affect land in the future. Their findings were published in the journal *Science*.

The model incorporated climate, geologic, flood, and drought data to predict the places that will be most affected by subsidence, Bob Yirka reports for *Phys.org*. According to the study, up to 22 percent of the world's major cities will be affected by subsidence, and 635 million people will be at risk, reports AJ Dellinger for Mic.

When the ground sinks, it becomes more vulnerable to flooding, especially in areas where sea levels are also rising. Additionally, movement underground causes everything sitting atop the land—like buildings, houses, and roads—to also shift, which can cause serious damage, reports *Gizmodo*.

As the fastest sinking city in the world, Jakarta, Indonesia, is already experiencing the devastating outcomes of subsidence, Mayuri Mei Lin and Rafki Hidayat reported for BBC in 2018. The city sinks around ten inches every year, and scientists say that 95 percent of North Jakarta will be submerged underwater within 30 years. Buildings have slumped deep into the ground, floodwaters have swamped ground floors and cracks now ripple through the foundations of

buildings. This sinking isn't a completely natural occurrence, but rather a result of pumping too much water from underground aquifers.

Although subsidence can be triggered by earthquakes or the formation of sinkholes, it is intensified by extracting natural gas, minerals, and groundwater out from the Earth, reports *Gizmodo*. According to the United States Geological Survey, 80 percent of the identified occurrences of subsidence in the U.S. are a result of exploiting groundwater. When the water is pumped out, the soil cannot support the ground above it, causing it to compact or fall in on itself.

As such, the study found that the most at-risk areas are clustered around highly populated urban areas or regions that are heavy on agriculture, where farmers use underground reservoirs to access water, reports *Phys.org*. Because of this, the risk of subsidence isn't evenly distributed across a map—86 percent of people who will likely be impacted live in Asia, mostly in China and India, reports *Gizmodo*.

These findings are "a key first step toward formulating effective land subsidence policies that are lacking in most countries worldwide," researchers write in their paper. They suggest that countries restrict how much oil and water can be extracted from the ground while also finding innovative ways to reduce how much water is used in resource-heavy industries like textile production and agriculture, reports *Gizmodo.*

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