

Morocco earthquake: Why traditional earthen architecture is not to blame for the destruction communities have endured

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The 6.9 magnitude earthquake that hit [Morocco](#) on Friday, September 8 has [claimed](#) almost 3,000 lives. A further 5,530 people are injured, and

the death toll is [expected to rise](#).

The epicenter was high in the Atlas Mountains. Entire villages have been flattened. Neighborhoods in Marrakech, the Old City in particular, [suffered significant damage](#).

Much of the [media coverage](#) has focused on the region's traditional architecture. Antonio Nogales, head of Spain's United Firefighters Without Borders NGO [told Reuters](#) that the chances of survival are greatly reduced due to the traditional [building](#) materials turning to rubble and not creating pockets of air in the way that steel-and-[concrete buildings](#) can when they collapse.

Interviewed by the Washington Post, US earthquake geologist Wendy Bohon [said](#) these were not buildings "built to withstand the strong shaking from their base. So they are very likely to collapse and damage like we've seen." These views assume these traditional structures are weak and liable to damage, ill-suited to an earthquake-prone region.

In the immediate aftermath of an earthquake, it is common for local building cultures to be blamed for their own destruction. [My research](#) into [earth](#) buildings shows, however, how this type of structure is in fact designed to be resilient. Vulnerabilities arise when patterns of knowledge transfer—and the traditional systems of repair and maintenance—are disrupted. Further, when new materials, such as concrete and cement, are introduced, they can be incompatible and so can reduce the buildings' seismic resilience.

The resilience of earth buildings

Earth has been used as a [building material](#) for at least the last 12,000 years. Ethnographic research into earth being used as an element of Aboriginal architecture in Australia suggests its use probably goes back

much further.

The huge variety in earthen architecture—which encompasses everything from defensive, religious and elite structures to everyday housing—reflects local geographies, geologies and climates.

There are [adobe](#) structures in the American south west and the [mudbrick](#) of Mali's grand mosque in Djenne. [Rammed earth](#) or "pise" was used in both Yemen's 11th-century tower houses in Sanaa and Shibam and 17th-century farm buildings in [Switzerland](#).

The use of [cob](#), meanwhile, stretches from the Great Wall of China to 16th-century houses in south-west England. And [turf](#) is characteristic of traditional Scottish, [Icelandic](#), Norwegian, Irish, Greenlandish and Faroese buildings. Used elsewhere as [mortar](#), [render](#), [plaster](#) and [wall infilling](#), earth is a resilient material.

These building cultures are uniquely adapted to their locality. In seismic regions in South America and north Africa, in particular, horizontal timbers, fibers or netting are often incorporated to resist the displacement and lateral movement and reduce damage.

In Morocco, both single story and multi-story houses are constructed from mudbrick, rammed earth (where walls are built up with layers of compressed earth between wooden shutters), stone and timber. More recently breezeblock has been added into this architectural mix. The thermal properties of earth ensure these traditional buildings stay cool in the height of the summer.

A history of mis-characterization

Too often, building materials wrongly characterized as "primitive" are equated with inevitable destruction. There is a long history of earthen

buildings, and traditional construction methods, being labeled as ["primitive"](#).

In colonial accounts of discovery, this characterization was used as a tool to discredit indigenous cultures and justify what was thought to be the "civilizing" influence of colonization. The British proponents of the Tropical Modernism architectural movement, among others, claimed to have "invented" architecture in West Africa.

This resulted in a shift away from vernacular architecture to colonial architecture and its "new" materials. Earth buildings, today, are still often [classified](#) "unsafe" with limited building codes or standards to enable the use of the material. This can be used to justify the shift from traditional building cultures to commercial building materials. You can make money from a bag of cement, but not from a bag of "free" earth.

Across the world—from [Mali](#) to [the UK](#)—traditional patterns of what ethnographers term "[knowledge transmission](#)" have been disrupted. This is made particularly visible within [cultural heritage](#) conservation.

When the knowledge and skills required to look after historic buildings, or build new ones using traditional methods is lost, the structures in question become more vulnerable. They can either suffer from inadequate maintenance or alterations—such as replacing earth plaster with concrete render—which makes them weaker.

Elsewhere, repairs from earlier seismic events have not always been made because the loss of traditional skills means no one knows how to do it properly. This can set in motion a negative cycle where structures are then much more vulnerable in subsequent seismic events.

As with the earlier colonial narratives of earth as a primitive material, the news coverage of seismic events needs to be sensitive to the local

building cultures. This can lead to local communities being pressured into abandoning traditional methods in favor of modern cement block buildings. If these new buildings are poorly constructed, with little regard to seismic threats, they in turn become vulnerable to further damage.

Following the 2023 Turkey-Syria earthquake, experts ascribed the extensive damage to recent construction in concrete, steel and brick, that had been undertaken without regard to building codes, not to mention the region's traditional building culture.

After the 2003 earthquake in Bam, Iran, in which 90% of the urban fabric was damaged and 34,000 people died, there was, similarly, [intense scrutiny](#) of the traditional building culture. Yet [subsequent studies](#) revealed that the traditional earth buildings, had in fact fared much better than recent restoration work and more modern buildings of breezeblock and cement.

Seismic events are traumatic for local communities at their heart. Failing to understand the resilience of traditional building cultures makes the same communities even more vulnerable.

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