

Death toll rises following torrential rains and floods in China

Ben McGrath
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The death toll following torrential rains in Henan province, in central China, has risen to at least 69 as authorities continue to clean up following the extensive flooding that took place last week. The floods have caused at least 65.5 billion yuan (\$US10 billion) in damages, while raising serious questions about the dangers of climate change.

As of Sunday, approximately 1.24 million people in Zhengzhou, the capital of Henan province, have been displaced. Rescue teams continued to drain flooded portions of the city over the weekend as they searched for survivors. The industrial city is home to over 12 million people.

Other cities in the region have also been hard hit. Xinxiang, a city just to the north of Zhengzhou, with a population of six million, experienced similar record-breaking rains, with 260mm of precipitation falling in just two hours. The Wei River, running through the city, overflowed, leading to extensive flooding. In Gongyi, 80 kilometers west of Zhengzhou, floods and landslides killed at least four people.

Scientists are warning about the increasing danger from climate change, as extreme weather events including heat waves and intense wild fires take place around the world. Chris Rapley, a professor of climate science at University College London, told the *Financial Times*, “I think I would be speaking for many climate scientists to say that we are a bit shocked at what we are seeing. There is a dramatic change in the frequency with which extreme [weather] events occur.”

As Earth’s temperature rises, this is contributing to the increased rainfall. For each 1C of increased temperature, the air is able to hold approximately 7 percent more water moisture. This means regions with monsoon seasons are seeing an even higher amount of rain than usual. Zhengzhou, in fact, experienced more than a year’s worth of rain, 671.1mm in just over three days, with 201.9mm

falling in just one hour on July 20.

Chinese authorities are being criticized for failing to adequately plan for the extreme weather event. An emergency was declared in Zhengzhou, but little action taken to protect the population. Cheng Xiaotao, a former director of the Institute of Flood Control and Disaster Mitigation at the China Institute of Water Resources and Hydropower Research, told Chinese media that, “After the warnings, in what type of situation should we halt work and manufacturing? How should various departments co-ordinate? What are the actual emergency actions to take in response?”

The lack of preparation meant that many people were placed in danger, as waters flooded the city’s subway system and highways. At least 13 people were killed on a subway train. Another victim was discovered on Saturday, raising the previous death toll. At least another four people were killed after being trapped in the Jingguang traffic tunnel in Zhengzhou, where some 200 to 300 cars were blocked by flooding water.

These tragedies were entirely avoidable. The Jingguang tunnel was built in a low-lying area, prone to flooding. It was opened in 2012, the same year that 80 people died in Beijing after being trapped in a flooded underpass, following a large storm. The *New York Times* reported that an investigation into the new tunnel’s possible dangers was published in 2011, which stated, “If water accumulates in the tunnel it will seriously threaten the safe operation of the tunnel.”

The danger from climate change is all the more acute as 98 percent of China’s 654 major cities are vulnerable to flooding. About two-thirds of China’s 1.4 billion people live in cities. Zhou Jinfeng, of the non-governmental organization, China Biodiversity Conservation and Green Development Foundation, warned that “because of global climate change, the rainfall statistics will continue to break new records in the future.”

The floods have called into question the viability of China's so-called "sponge cities," supposedly meant to deal with these types of weather events. Zhengzhou was among the cities included in the first phase of this program, which includes the use of permeable asphalt and the expansion of green spaces to better drain water.

In Zhengzhou, thousands of kilometres of new drainage were built to eliminate some 125 flood-prone areas and create large new green spaces, some of which were quickly inundated as torrential rains hit the city. The so-called "sponges" were never designed to absorb downpours on the scale of those that occurred last week.

As cited by the *New York Times*, academic Konstantinos Papadikis at the Xi'an Jiaotong-Liverpool University, explained: "Although the sponge city initiative is an excellent sustainable development approach for stormwater management, it is still debatable whether it can be regarded as the complete solution to flood risk management in a changing climate."

In recent decades, there has been a massive urban expansion, as China has industrialised and drawn in tens of millions of migrant workers from rural areas. According to one commentator, there are at least 93 cities with more than one million residents and a number, like Zhengzhou, have a population greater than 10 million. A significant proportion of these are built on river flats and thus are vulnerable to flooding—a danger that will only increase with climate change.

Typhoon In-fa, which was a major contributing factor to the heavy rains in Henan province, lashed the coastal city of Shanghai, with its population of more than 26 million last Sunday, before moving north to hit the city of Pinghu. No deaths were reported as of Monday evening, but the wild weather caused the suspension of above ground rail services, with some roads being submerged, along with local blackouts and the cancellation of hundreds of flights.



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