

Floods in central and eastern districts

OVERVIEW

Heavy rainfall on 27–28 September caused flash floods, the overflow of rivers, and landslides in 44 districts across Nepal, with the worst effects in the hilly Kathmandu Valley – where at least 10in fell, nearly 20% of the monthly average – followed by the plains of eastern Koshi and Madhesh provinces, increasing their vulnerability to flooding. Several districts in central Gandaki, Karnali, and Lumbini provinces have also been affected (UN RC Nepal 01/10/2024; UNICEF 01/10/2024; AP 02/10/2024). According to the Ministry of Home Affairs, at least 8,400 people have been displaced (IFRC 29/09/2024). By 4 October, around 236 people had been killed, 173 injured, and 19 missing (AJ 02/10/2024; The Himalayan Times 02/10/2024). By 30 September, 56 deaths had been reported in the hill-ringed capital of Kathmandu alone (Reuters 30/09/2024). Casualty estimates are expected to rise as search and rescue efforts continue, particularly in remote and inaccessible areas (The Guardian 30/09/2024; CNN 30/09/2024).

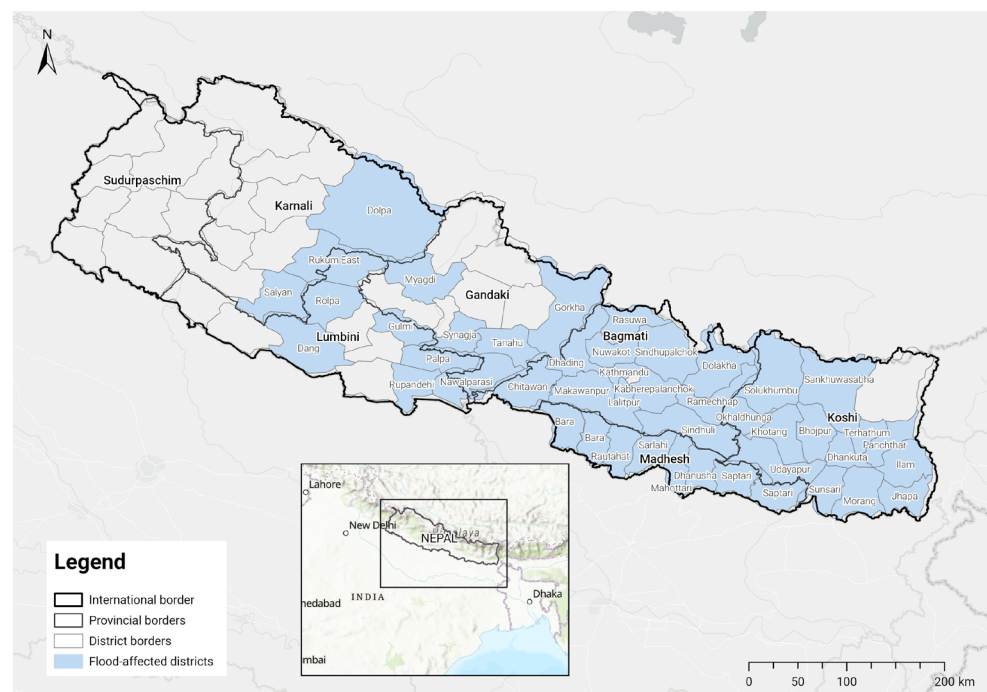
Nine stations across Kathmandu recorded the highest 24-hour rainfall since Nepal implemented its current rainfall measurement system in 1970 (Red Cross Climate Centre 29/09/2024). By 30 September, the water levels of the Bagmati River, which runs through the Kathmandu Valley, were 2m above the danger threshold (The Guardian 30/09/2024).

By 2 October, all major routes out of Kathmandu had been blocked as a result of extensive road damage, including 17 affected road sections (The Himalayan Times 01/10/2024). By 1 October, priority needs included temporary shelter and WASH facilities for flood-displaced people, food assistance, and the restoration of disrupted road and communication networks to enable rescue and relief efforts (UN RC Nepal 01/10/2024).

According to preliminary government assessments, the floods are estimated to have resulted in damages amounting to 1% of Nepal's GDP, with the agriculture sector, the backbone of the country's economy, experiencing the largest losses, totalling Rs 6 billion (USD 44.6 million). The energy sector followed with losses of Rs 4 billion (USD 29.8 million), and the water supply sector suffered Rs 3.55 billion (USD 26.44 million) in damages. The transport sector incurred Rs 2.52 billion (USD 18.7 million) in losses, and the irrigation sector reported losses of Rs 1 billion (USD 7.4 million) (Kathmandu Post 02/10/2024).

In recent years, the Hindu Kush Himalaya region, which includes Nepal, has seen an increase in extreme weather events. Consecutive years of intense monsoons in 2023 and 2024 resulted in widespread destruction, with floods and landslides affecting millions of people throughout the region. Nepal, alongside its neighbours Bangladesh, China, and India, is among the ten countries most at risk of experiencing extreme rainfall by 2100 (DTE 30/09/2024). By 30 September, over 300 people had died as a result of rain-related events in Nepal in 2024 (The Guardian 30/09/2024).

Map 1. Flood-affected districts by 04 October



Source: ACAPS adapted from UN RC Nepal (Accessed 07/10/2024)

ANTICIPATED SCOPE AND SCALE

By 29 September, water levels in the Bagmati and Koshi rivers remained high, but had begun to decrease as rain intensity reduced (IFRC 29/09/2024). By 2 October, the water level in the Kankai River was expected to rise but remain below the alert threshold. As a precaution, authorities have issued warnings to communities living along the river (My Republica 02/10/2024).

Nepal's monsoon season typically occurs between June–September, indicating that recent rainfall may be the last severe monsoon-related event of the season (UNEP 24/08/2023). Still, however, La Niña is expected to incur above-normal rainfall across the country for the remainder of 2024 (ECHO 29/09/2024). The World Meteorological Organisation's seasonal forecast indicates a moderate (40–50%) chance of above-normal rainfall across most of Nepal until December (WMO accessed 10/10/2024). Columbia University's International Research Institute also predicts a moderate (40–45%) likelihood of above-normal rain until December, but only in eastern Nepal. The Department of Hydrology and Meteorology has indicated a moderate risk of flooding in Dhankuta, Ilam, Jhapa, Morang, Panchthar, Sankhuwasabha, Sunsari, Taplejung, Terhathum, and surrounding districts. While there is no immediate risk of larger rivers overflowing, there remains a significant risk of flash floods in smaller rivers (IRI accessed 01/10/2024; My Republica 02/10/2024).

One of Nepal's largest festivals, Dasain, begins on 3 October and typically prompts people to travel to visit family in other parts of Nepal (The Independent 01/10/2024). As such, traffic on damaged roads may increase, exposing people to the risk of landslides and unstable land, increasing humanitarian needs. In the most affected areas, transport shortages mean that people may not be able to travel for the festival at all.

HUMANITARIAN CONSTRAINTS

By 2 October, significant damage to roads, including 17 road sections, had made all the main routes out of Kathmandu unpassable (The Guardian 30/09/2024; The Himalayan Times 01/10/2024). Several sections of the Bhimphedi-Kulekhani-Phakhel, BP, Kanti, and Kulekhani-Markhu highways had also been blocked by debris from landslides. Other routes, including Bahrabise-Tatopani, Ramechhap-Sindhuli-Khurkot, and Saljhandi-Argkhanchi-Dhorpatan along the Kaligandaki corridor, as well as the Madhyabindu section of the East-West highway, were also inaccessible by 2 October (The Himalayan Times 01/10/2024). Road damage is likely to affect the overland mobility of humanitarian teams, affecting access to aid.

Flood and landslide-induced road damage and blockages also include the Kathmandu-Naryangarh highway, which connects the capital to other parts of Nepal, and highways in western and eastern Terai and hilly areas. Many of those who have died were travelling on

highways in buses swept away by floodwaters (The Guardian 30/09/2024; IFRC 29/09/2024; AJ 28/09/2024). By 1 October, continuing rainfall and damage to infrastructure was constraining humanitarian access to affected areas, including search and rescue operations by Nepal's Armed Forces (UN RC Nepal 01/10/2024; IFRC 29/07/2024). By 30 September, bulldozers were being used to clear highways and had temporarily opened the Prithvi highway (AJ 30/09/2024; AP 30/09/2024).

Rainfall also disrupted domestic flights from Kathmandu to other parts of the country until at least 28 September (ECHO 29/09/2024). Most flights had resumed by 29 September (AJ 29/09/2024).

CRISIS IMPACTS

Shelter

By 30 September, an estimated 4,200 people had been rescued, but many others remained stranded without shelter in flooded areas (STC 30/09/2024; AJ 30/09/2024).

Preliminary government assessments indicated that over 1,769 houses had been destroyed by 2 October, with most of the losses – 1,400 homes – in Bagmati province. 103 houses were also destroyed in Koshi province and 266 in Madhesh province (Kathmandu Post 02/10/2024; My Republica 01/10/2024). OCHA reported that damage to shelters included an estimated 2,100 homes (affecting 7,600 families) in informal, marginalised settlements along rivers in Kathmandu and Lalitpur (UN RC Nepal 01/10/2024).

An unspecified number of survivors were provided temporary shelter in schools in Kathmandu, but were forced to return to damaged homes by 1 October, when schools reopened (France 24 01/10/2024).

The Government of Nepal has committed to providing those whose homes have been damaged with Rs 50,000 (USD 400) in two payments in order to construct temporary housing (UN RC Nepal 01/10/2024). It is unclear what building materials will be available and affordable for these recipients and whether such temporary housing will be built in a manner that provides adequate shelter.

WASH and health

By 1 October, floods and landslides had affected water supplies and sanitation facilities in various unspecified locations (IFRC 02/10/2024; WaterAid 01/10/2024). An estimated half of the urban population (cities not specified) was reliant on alternative water sources, including tanks and wells, raising the risk of water and vector-borne disease transmission, including cholera and dengue (UNICEF 01/10/2024).

By 4 October, of the 62 health facilities affected by the floods, 6 were completely damaged, and 56 suffered partial damage. While 49 facilities are operating with limited services, 9 are able to provide regular care (UN RC Nepal 07/10/2024; UNICEF 01/10/2024). With transport already affected, this will mean people in affected communities may have to travel further distances to access healthcare.

Livelihoods and food security

Agriculture was the sector worst hit by flooding and landslides, suffering losses of up to Rs 6 billion (USD 44.7 million) (Kathmandu Post 02/10/2024). By 4 October, at least 46,569 hectares of land had been damaged in eight districts of Madhesh province alone (Nepal Live Today 02/10/2024; UN RC Nepal 07/10/2024). Heavy rainfall flooded rice fields during the pre-winter harvest period (STC 30/09/2024). In 2022, at least 64% of the country's population was employed in agriculture. With significant losses recorded in this sector, many are likely to face unemployment and loss of income. As a result, they may need to borrow money to meet basic needs (ILO 11/2022). Blocked roads mean that access to markets is likely impeded, resulting in income losses and further increasing risks of poverty.

Reduced employment opportunities, especially for casual labourers, is likely to aggravate economic difficulties. Casual labour plays a vital role in sustaining many rural households in Nepal, particularly during the monsoon season, when agricultural work is at its peak. These seasonal jobs, crucial to activities such as planting, transplanting, weeding, and harvesting, serve as an essential source of income for impoverished communities (DTDA 2022).

As planting and harvesting occur between June–October, disruptions to harvesting – alongside flood-induced displacement – may increase already high food insecurity levels across Nepal (Volunteer World accessed 04/10/2024). Crop losses are projected to significantly affect the economy, likely resulting in slower economic growth, rising food prices, and decreased incomes for farmers. The country may also need to increase food imports. Rising food prices will disproportionately affect low-income households, who already spend a substantial portion of their income on food (Kathmandu Post 02/10/2024).

Flood-induced damage to the transport sector will also likely affect tourism, which contributes 6.7% to the country's GDP (Kathmandu Post 02/10/2024; DH 02/10/2023). Floods and landslides have also damaged small–medium sized businesses in Kathmandu Valley (UN RC Nepal 01/10/2024).

Education

Nearly 23,000 students have been affected by school damage, with at least 190 schools impacted to varying degrees. The full extent of the damage remains unclear, including any losses of learning materials. Eleven schools in Morang and Sindhuli districts are currently serving as shelters. Schools with severe damage, including destroyed infrastructure, lost materials, and obstructed access, have been forced to close (UN RC Nepal 07/10/2024; The Independent 01/10/2024; UNICEF 01/10/2024).

Critical infrastructure

By 2 October, preliminary assessments revealed infrastructural damage to 37 highways, 312 telecom sites, five major transmission lines, and 16 hydropower projects with a combined capacity of 664MW (Kathmandu Post 02/10/2024; The Rising Nepal 03/10/2024).

DRIVERS

Urban planning and infrastructure challenges

Unplanned construction along the Bagmati River Basin, particularly on floodplains, leaves homes vulnerable to flooding, as there is inadequate space for water drainage (ICIMOD 28/09/2024). In Kathmandu, rapid population growth and urban development have led to increased construction on riparian land along the Bagmati River. Riverbanks are often encroached for shelter, making people living in such areas more vulnerable to riverine flooding. Deforestation, driven by the clearing of land for new settlements, has also heightened the area's vulnerability to flooding, as forests play a crucial role in preventing surface water runoff (AJ 02/10/2024; ICIMOD 17/04/2023; Chaudhary et al. 19/08/2024).

As settlements have encroached on the river basin, there is insufficient space for river water to flow freely during the monsoon season, leading to frequent flooding, particularly in Kathmandu (Reuters 30/09/2024).

Monsoon season

In Nepal, monthly rainfall is divided into four seasons: monsoon (June–September), post-monsoon (October–November), pre-monsoon (March–May) and cold winter (December–February) (Bagale et al. 09/2023).

Nepal's Himalayan valleys are particularly susceptible to flooding, primarily because of the region's unpredictable monsoon rainfall. In 2021, a significant increase in flood events – from 91 in 2020 to 144 – followed a year of unusually heavy precipitation (SCMP 01/03/2024; Adhikari et al. 16/11/2023). This trend culminated in severe flooding in western Nepal, devastating rice fields and compromising local livelihoods and food security. Nepal's northeastern regions experienced another extreme flooding event in June 2023, resulting in substantial loss of life, agricultural damage, and infrastructure disruption (NEF 02/08/2023; Aryal et al. 22/12/2022). Over the preceding year, Nepal recorded 153 flood incidents and 173 heavy rainfall events nationwide. The densely populated Kathmandu Valley, which is undergoing rapid urbanisation, faced repeated flooding challenges between 2011–2022. Inadequate drainage systems and limited flood prevention measures in the region aggravated the impact of these events (NEF 02/08/2023; Pandey 29/03/2023; Chaudhary et al. 19/08/2024).

Climate change

Nepal is among the countries most vulnerable to climate change, as its topography (such as hills and flat plains) is fragile, it lacks infrastructure, and its people engage in climate-sensitive livelihoods, have limited capacity to adapt as a result of high poverty levels, and have limited access to education and technology (CSC 09/01/2024; WB accessed 02/10/2024; Govt. of Nepal 08/12/2020). By 2060, the mean annual temperature in the country is projected to increase by 1.3–3.8° C. Winters are also expected to be drier and monsoon summers wetter (WB accessed 04/10/2024; Bajracharya et al. 04/11/2023).

Rising temperatures are causing glaciers in the Himalayas to melt at an accelerated rate, contributing to increased water flow in rivers during the monsoon season and worsened flooding (University of Leeds 20/12/2021). Climate change has resulted in warmer temperatures and more moisture in the atmosphere, resulting in heavier and more frequent rainfall events during the monsoon season. With an increasing number of urban poor building houses on riverine land, as there is inadequate affordable housing, more people will likely be affected by upcoming monsoon seasons (Times of India 30/09/2024).

AGGRAVATING FACTORS

Socioeconomic vulnerability

In 2022, 20.3% of Nepal's population lived below the national poverty line, with urban poverty rising to 18% in 2022–2023, up from 15% in 2010–11, as a result of population growth and a decline in rural poverty in the same period, from 27–25% (ADB accessed 02/10/2024; UNDP 18/08/2021). Floods are likely to disproportionately affect poor communities, as they lack the resilience to rebuild after a crisis and may require government support (Times of India 30/09/2024).

In 2023, the country fell into recession, the first in six decades, only growing by less than 1% at the end of the year (Kathmandu Post 01/05/2023). The recession has led to a decline in the agricultural and industrial sectors. The high inflation rate (8%) has also reduced the population's purchasing power, resulting in large number of youth seeking opportunities outside Nepal and the loss of a market for Nepali goods, severely worsening the economic situation (ADB accessed 07/10/2024). Widespread flooding has severely affected key economic sectors, increasing the likelihood of poverty. Many communities, particularly those living in flood-prone areas with inadequate housing and limited resources, are already vulnerable to economic shocks. These communities often have fewer income-earning opportunities, making them less resilient to the devastating effects of floods, especially given already slow economic growth (Dangol 27/03/2024; Bista 01/08/2019; WB 11/2019).

FUNDING AND RESPONSE

By 30 September, the Nepalese army had been deployed to support the response, and search teams were continuing to recover people buried in mud and rubble, using ziplines to reach those stranded (AVNN 30/09/2024).

Nepal's Minister of Home Affairs is chairing the National Disaster Risk Reduction and Management Executive Committee. By 1 October, the committee had announced that it would provide Rs 200,000 (USD 1,500) to the families of those killed or missing. Local governments were mandated to identify recipients by around 7 October, with grants provided within three days of verification (Xinhua 01/10/2024). Provincial and local disaster management committees were responsible for search, rescue, relief, rehabilitation, reconstruction, and recovery activities (UN RC Nepal 01/10/2024). These committees' capacities and activities in different areas are unknown. The Government also deployed security forces to conduct search and rescue operations (IFRC 29/09/2024).

By 1 October, the UN had activated the Central Emergency Response Fund Anticipatory Action for Eastern Nepal and was identifying those in need of assistance. The Nepal Red Cross was conducting search and rescue and distributing assistance. Save the Children was also supporting the response (UN RC Nepal 01/10/2024).

By 1 October, UNICEF was supporting the WASH, health, education, nutrition, and protection responses (UNICEF 01/10/2024).