MYANMAR

Exposure to seasonal hazards in earthquake-affected areas

acaps
Thematic Report
22 April 2025

OVERVIEW

On 28 March 2025, a magnitude-7.7 earthquake, followed by several aftershocks, struck Myanmar. The earthquake occurred at a depth of 10km, with its epicentre located approximately 16km northwest of Sagaing city and 19km northwest of Mandalay city, Myanmar's second-largest city. The hardest-hit states and regions were eastern Bago, Mandalay, Sagaing, and southern Shan. By 18 April, around 3,700 people had died, with more than 4,820 reported injured and almost 130 missing. It is estimated that more than 17.2 million people have been affected (AHA Centre 14/04/2025; ECHO 08/04/2025; OCHA 07/04/2025 a and 18/04/2025; UNICEF 04/04/2025). The earthquake has damaged homes, health facilities, roads, and bridges, displacing almost 200,000 people. It has also destroyed sanitation facilities and water infrastructure, disrupting access to safe drinking water and seeing people depend on spring water, surface water, or water bottle provision (ECHO 11/04/2025; AHA Centre 08/04/2025; STC 07/04/2025).

The current hot season (February–May) is compounding the crisis, with temperatures soaring above 44° C (111° F). This creates severe conditions for affected communities with inadequate shelter and complicates response operations (STC 02/04/2025; IFRC 30/03/2025). The monsoon (May–October) and cyclone (April–May and October–November) seasons will likely aggravate the already challenging conditions (ACAPS accessed 09/04/2025; WB accessed 10/04/2025). Heavy rains were already reported from 5–6 April across parts of Mandalay and Sagaing regions, damaging makeshift shelters, affecting those sleeping in the open, and increasing the risk of disease outbreaks (UNICEF 07/04/2025). The estimated 17.2 million people living in affected areas, including over 9.1 million people living in the hardest-hit areas of Mandalay and Sagaing, are at heightened risk of exposure to heavy downpours and flooding, destructive winds, and extreme heat (OCHA 07/04/2025 a). Flooding and resultant pollution from drainage systems have been reported in temporary camps and settlements, heightening public health risks from poor sanitation, inadequate latrines, and increased exposure to diseases (OCHA 07/04/2025 b; Oxfam 06/04/2025).

Globally, Myanmar is one of the countries most vulnerable to climate change, which has increased the frequency and intensity of extreme precipitation events, cyclones, and heatwaves over the past decades. In the INFORM Climate Change Risk Index, Myanmar has a score of 6.2, which means it is highly vulnerable to climate change events and lacks adaptation and coping capacity (EC accessed 14/04/2025). Environmental degradation, such as deforestation resulting from the expansion of palm oil crop and rubber plantations, has further intensified the effects of these seasonal hazards, as ecosystem damage reduces natural buffers such as mangroves, forests, and wetlands that would otherwise mitigate flooding, storm surges, and heat stress (ND-GAIN accessed 10/04/2025; MIMU 05/2022).

In 2024, Mandalay and Bago regions were among the states/regions most severely affected by flooding following Typhoon Yagi and monsoon rains (OCHA 07/04/2025 a). The map below illustrates population exposure to flooding in 2024 by township, highlighting that many earthquake-affected areas also experienced flooding that year. This aligns with flood risk data, which identifies several earthquake-affected townships in eastern and western Bago, eastern Magway, Mandalay, and Sagaing as being at risk or very high risk from flooding – particularly in the lower Ayeyarwady River basin (Wuit-Yee-Kyaw and Dudley 13/10/2020).

ABOUT THIS REPORT

Aim

Myanmar has recently been struck by a magnitude-7.7 earthquake and is approaching the start of its monsoon and cyclone seasons, with forecasts predicting above-average rainfall and temperatures. These challenging conditions, coupled with continuing conflict, increasing poverty, and diminished coping capacities, may present significant risks to the population. This report aims to outline these risks and assess their potential scope, scale, and impacts.

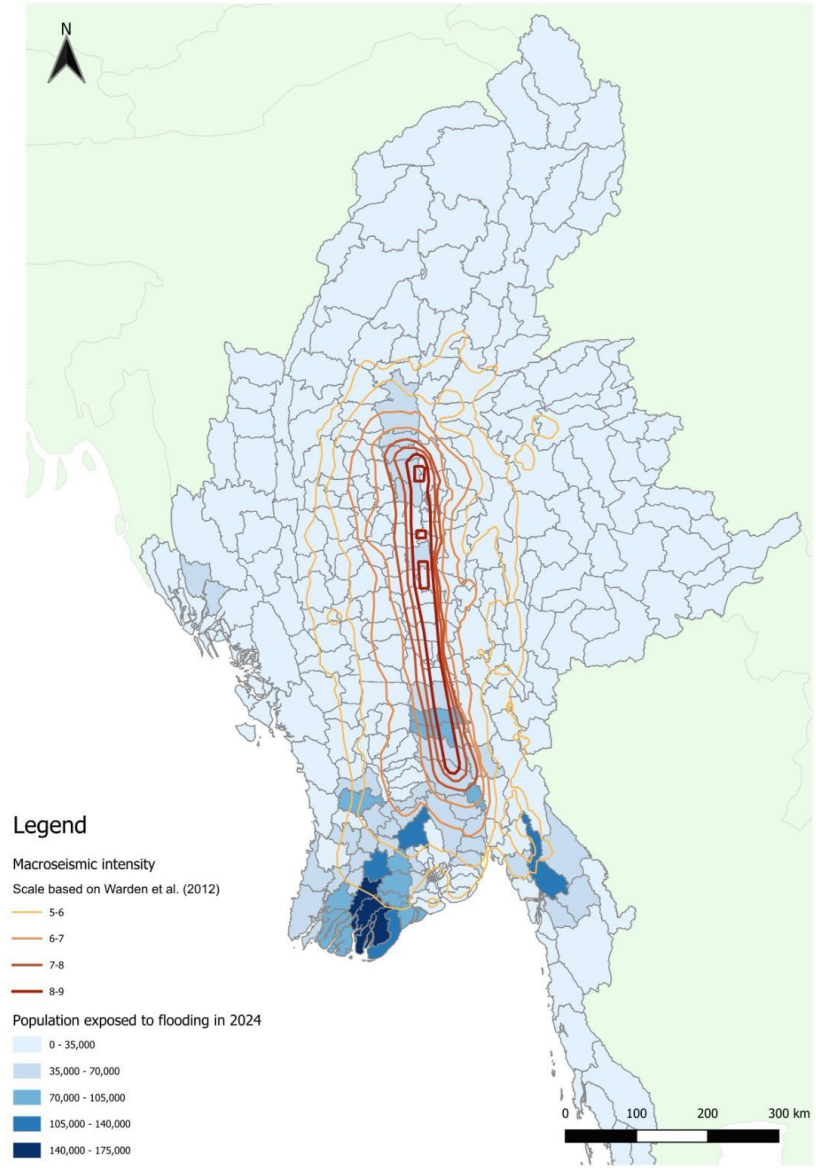
Methodology

This report is based on a comprehensive review of secondary data obtained from publicly available sources, supplemented by consultations and the analysis of non-public assessment information. The primary focus is to anticipate the impact of the monsoon, cyclone, and hot seasons, highlighting the risks faced by earthquake-affected communities.

Limitations

There are data collection constraints, particularly in some areas of Mandalay and Sagaing and near dams, where there is contested control and armed clashes restrict the presence of humanitarian organisations. These conditions restrict the aid response, leading to information gaps and a lack of contextual understanding of the situation in some townships.

Map 1. Population flood exposure in 2024 in earthquake-affected areas



Source: ACAPS using data from USGS (accessed 09/04/2025) and UNOSAT (accessed 09/04/2025)

SUMMARY OF KEY RISKS

- There is a risk of increased mortality and morbidity from waterborne and vector-borne diseases, potentially affecting two million people in Bago, Mandalay, Sagaing, and Shan states and regions (OCHA 12/04/2025).
- Extreme heat can also increase mortality and morbidity, particularly across the central and southern states and regions (Ayeyarwady, Bago, Chin, Magway, Mandalay, part of Sagaing, Shan, and Tanintharyi), especially in urban areas.
- Further damage to housing by climate hazards, such as floods and landslides, can increase displacement in the earthquake-affected areas.
- Food insecurity is likely to rise across the country but especially in Sagaing region and Kachin state, where food insecurity was already prevalent before the earthquake. Around 2.3 million people countrywide were classified to be facing Emergency (IPC Phase 4) conditions in December 2024 (OCHA 13/12/2024).
- There is a risk of increased exposure to explosive remnants of war (ERW) in Rakhine, Sagaing, and Shan states and regions as flash floods move and expose ERW.

ANTICIPATED SEASONAL HAZARDS

Monsoon and cyclone seasons

Myanmar has a tropical to subtropical monsoon climate with three seasons: hot, dry inter-monsoonal (mid-February to mid-May); rainy southwest monsoon (mid-May to late October); and cool, relatively dry northeast monsoon (late October to mid-February) (WB accessed 03/04/2025).

Among the most vulnerable to flooding are six major river basins: the Ayeyarwady, Yangon, Bago, Sittoung, Thanlwin, and Atran. Yangon state is especially vulnerable to high flood risk as it is located at the confluence of several rivers (IFRC 14/03/2024; Wuit-Yee-Kyaw and Dudley 31/10/2020). About 95% of Myanmar's annual national average rainfall is received from the southwest monsoon. Climate change has made the season more erratic, increasing the frequency and intensity of extreme rainfall events and the risk of flooding and landslides (NYT 04/10/2022; UN-Habitat 2010). Flooding is the most common hazard in Myanmar, causing the greatest overall impact on both people's safety and property. An estimated 28 million people live in districts where at least part of the area is considered at high risk of flood exposure (IOM 28/06/2024).

Myanmar is also exposed to cyclones and typhoons, which typically affect the country in the pre- and post-monsoon seasons from mid-April to mid-May and from October–November (IFRC 14/03/2024). In September 2024, Typhoon Yagi made landfall in Viet Nam, bringing strong winds and heavy rainfall to Myanmar. This resulted in severe flooding and landslides, affecting an estimated one million people across 70 townships in nine states and regions, including Bago, Kayah, Kayin, Magway, Mandalay, Mon, Nay Pyi Taw, and southern and eastern Shan (IFRC 26/10/2024).

In 2023, Cyclone Mocha brought destructive storm surges, heavy rainfall, and flooding to Myanmar, affecting up to 1.2 million people. The most affected states and regions were Ayeyarwady, Chin, Magway, Mandalay, Rakhine, and Sagaing. The frequent weather hazards in the country, particularly during the monsoon season, prevent people from fully recovering, affecting their ability to cope and exposing them to heightened impacts from future events.

Heatwaves

Climate change is driving more frequent and intense heatwaves across Asia, with El Niño also contributing to temperature anomalies (WWA 14/05/2024). Myanmar's mean annual temperature has risen by 0.82° C over the past 50 years, and projections anticipate an increase of up to 2.07° C by 2060 (SIPRI 05/2024). During the heatwave that affected Southeast Asia from April–May 2024, some cities in Myanmar recorded temperatures exceeding 48° C (Myanmar NOW 30/04/2024). Over 1,470 people are estimated to have died in Myanmar from heat-related causes in April 2024, including 900 in Mandalay region (RFA 01/05/2024).

SCOPE AND SCALE

- **Seasonal forecasts anticipate a moderate to high probability that temperatures will be above average across the entire country between April–June, with temperatures expected to remain above 40° C (104° F).** The same forecasts indicate a very high probability for temperatures to remain above the seasonal average between July–September. This indicates that heatwaves are likely in the next six months, especially in the central regions, which are typically exposed to extreme heat, and densely populated urban areas, including Magway, Mandalay, Monywa, and Sagaing townships (WMO accessed 10/04/2025; IRI accessed 10/04/2025; GRI Risk Viewer accessed 14/04/2025).
- The intense heat will add to the hardship of those displaced or living in temporary shelters not equipped to deal with extreme temperatures and without access to adequate supplies of clean drinking water. This poses serious health risks, such as heat-related illnesses, and logistical challenges for humanitarian operations (STC 02/04/2025; IFRC 30/03/2025).
- Seasonal forecasts indicate that precipitation across Myanmar is likely to be above the seasonal average between April–June, especially in May. This raises the **risk of riverine flooding, especially along the upper and lower Ayeyarwady River basins**, including areas most affected by the earthquake in Mandalay and Sagaing (WMO accessed 10/04/2025; IRI accessed 10/04/2025; Matheswaran et al. 04/05/2020).
- **Intense rains during the monsoon season will increase the risk of landslides, which are a common hazard in areas along the Sagaing Fault** (a tectonic fault that runs north to south and is more than 1,200km or 746mi long). In regions with gold, jade, and other mine extraction activities – such as Sagaing and Kachin – landslides have previously caused significant damage, as heavy rains make land more susceptible, loosening earth piles and sweeping them down. With the approaching monsoon season, there is a heightened risk of similar events, threatening both communities and critical infrastructure (AHA Centre 08/04/2025; BBC 14/08/2023).
- **Heavy monsoon rains are expected to cause more damage than usual, as the earthquake has weakened many structures.** There is growing concern that dams weakened by the recent earthquake may be at risk of collapsing during the upcoming monsoon season, potentially worsening flooding and threatening nearby communities (Reuters 28/03/2025; The NRI Nation 29/03/2025). In 2018, the breach of a dam in Bago region killed four people, inundated around 100 villages, and affected over 60,000 people (The Irrawaddy 31/08/2018; The Guardian 29/08/2018).
- **Flooding is expected to add to the number of people already displaced by the earthquake.** In 2024, more than 320,000 people were displaced by monsoon flooding and Typhoon Yagi across Myanmar, with Mandalay region being one of the worst affected (IFRC 29/09/2024). A similar number are expected to be displaced this year, including the re-displacement of some displaced by the earthquake. Between 2010–2023, flooding displaced 3.4 million people across the country, including 1.7 million displaced by the severe flooding of 2015 (iDMC accessed 10/04/2025; OCHA accessed 10/04/2025).
- People displaced by the earthquake will face heightened shelter needs, as makeshift and temporary shelters are unlikely to withstand heavy rains and strong winds (Myanmar NOW 10/04/2025; AA 03/04/2025).
- **The combination of heat and rain is likely to increase the incidence of waterborne and vector-borne diseases,** such as acute watery diarrhoea (AWD), malaria, and dengue (STC 07/04/2025; OCHA 07/04/2025 a).
- **There is a significant risk of floodwaters dislodging mines and ERW left behind from clashes between armed resistance groups and the Myanmar Armed Forces.** Movement into areas previously considered safe will increase the risk of civilian casualties (IFRC 26/10/2024).

ANTICIPATED IMPACTS OF SEASONAL HAZARDS

Health and WASH

Flooding may contaminate water points and damage sanitation facilities in shelters, increasing the spread of waterborne diseases (UNICEF accessed 10/04/2025). Since June 2024, Myanmar has been experiencing an AWD outbreak. From 22 June 2024 to 23 March 2025, the State Administration Council (SAC) Ministry of Heath registered a total of 12,195 AWD cases (not confirmed as cholera) in 9 out of 15 regions and states (Health Cluster 03/04/2025). Information remains scarce for several affected states where the SAC has little presence. For example, until 3 April, there were only five confirmed AWD cases in Sagaing, but media reports indicated 95 cases, suggesting that the outbreak may be spreading (UNICEF 04/04/2025; OCHA 19/02/2025).

There is also a significant risk of further outbreaks of vector-borne diseases, such as malaria and dengue, and acute respiratory infections, especially in overcrowded and makeshift shelters where flooding and stagnant rainy water may further increase vector breeding. The recent suspension of US assistance has also diminished vector control strategies in the country. More information is available in ACAPS' report on the impact of the US funding cuts in Myanmar. There is also growing concern over the spreading of preventable diseases, including measles, diphtheria, whooping cough, and polio, which are aggravated by the low vaccination coverage for children (UNICEF 04/04/2025; OCHA 19/02/2025).

Before the earthquake, **health facilities were already in a precarious state.** According to satellite imagery, there is suspected damage in at least 190 health facilities after the earthquake (Health Cluster 11/04/2025; OCHA 12/04/2025; UNICEF 07/04/2025). Health facilities have reported the need for essential antibiotics and medication for chronic illnesses, such as hypertension, diabetes, and cardiovascular diseases (WHO 04/04/2025).

Exposure to extreme heat also poses additional health risks and increases mortality and morbidity rates, particularly among vulnerable populations, such as earthquake-affected IDPs with inadequate shelter, children, older people, and those with pre-existing medical conditions. Prolonged high temperatures increase the risk of heat exhaustion, heatstroke, and dehydration while also aggravating cardiovascular and respiratory illnesses. In urban areas, the urban heat island effect intensifies these risks, especially where access to cooling, clean water, and healthcare is limited (HKRC 10/04/2025; IFRC 13/12/2024).

The earthquake's impact has worsened WASH conditions in the affected states. **There is limited access to clean water, compounded by the scarce availability of donated bottled drinking water.** In regions such as Sagaing, there are no reliable or safe sources of drinking water owing to the damage and destruction of existing infrastructure. Sanitation conditions are worsening, with at least 42,000 damaged latrines in the affected areas (HKRC 10/04/2025; UNICEF 09/04/2025; WHO 04/04/2025). The most urgent WASH needs include mobile toilets for both hospitals and camps, as well as soap, waste bins, temporary hand-washing stations, water filters, and purification tablets. **There is an increased risk of infectious diseases spreading from improperly managed decaying corpses** (WHO 04/04/2025). Significant damage to urban water systems and rural aquifers, coupled with poor drainage systems, has also raised concerns that potential flooding could submerge sanitation facilities, accelerating the spread of infectious and vector-borne diseases (HKRC 10/04/2025; UNICEF 09/04/2025).

Shelter

The current context, including debris clutter, is likely to heighten the urgent need for safe shelter during the approaching monsoon season, particularly for the 3.5 million existing IDPs plus those newly displaced by the earthquake. By 8 April, over 34,600 people were staying in 85 temporary shelters, and many more are likely to be with relatives and in makeshift shelters. The earthquake affected a total of 49,857 houses (12,516 destroyed and 37,341 damaged) (AHA Centre 08/04/2025). Gender-based violence has not been highlighted in assessments, but it could be a potential risk since temporary shelters tend to carry heightened protection risks for women and children.

Between June–August 2024, during the southwest monsoon, shelter was the most urgent need according to OCHA assessments. Myanmar experienced flash floods that hit the northern and northwestern states and regions – including Bago, Kachin, Magway, Mandalay, Sagaing, and Shan – affecting at least 363,000 people, most of whom lost their homes and were temporarily displaced to evacuation centres (OCHA 16/08/2024). In September 2024, the resulting floods from Typhoon Yagi damaged houses and roads with mud, water, debris, floating waste, and large logs (IFRC 26/10/2024).

Food security

Prior to the earthquake, an estimated 15.2 million people needed food assistance countrywide, with the most severe needs in Chin, Kachin, Rakhine, and Sagaing states and regions. The combination of armed conflict and floods in 2024 caused massive losses of food and seed stocks, productive assets, and animals. By 11 April 2025, food assistance needs had likely increased from earthquake-related damages, especially in Sagaing region, which was already facing high food insecurity prior (OCHA 13/12/2024). The earthquake also disrupted markets, likely increasing food prices – which may force people to use potentially harmful coping mechanisms, such as less consumption of meat and nutrient-dense foods,

especially among rural and conflict-affected households. This can contribute to malnutrition and heighten any existing health issues. A recent assessment indicated that markets in Mandalay region were non-functional. Around 46% of the respondents in the affected regions of Magway, Mandalay, and Sagaing reported above-normal food prices, and 48% noted below-normal availability of key food items (COAR/Premise 03/04/2025).

The earthquake has caused significant damage to agricultural land, with preliminary assessments indicating that more than 3.7 million hectares of cropland have been affected. The states and regions most affected in terms of cropland area include Sagaing (1.5 million hectares), Mandalay (1.4 million hectares), Shan (431,000 hectares), and Magway (389,000 hectares), posing risks to future planting seasons and food production, especially for rice, corn, and cotton (OCHA 07/04/2025 a; USDA accessed 14/04/2025). Sagaing region and Shan state contribute 14% and 7% of the country's rice production and 13% and 56% of corn production, respectively. Magway and Mandalay account for 46% and 35% of the national cotton output, which serves as a vital source of income for thousands of farmers (USDA accessed 14/04/2025). Damage to cropland is likely to affect the planting of corn and rice, expected to begin in May and June, respectively, resulting in reduced planting areas. Rice and wheat are expected to be harvested in October (ACAPS accessed 14/04/2025). While an above-average monsoon season could benefit agricultural production, it also raises the risk of flooding, which may damage crops and further disrupt farmers' livelihoods.

Mines and explosive remnants of war

In 2024, during Typhoon Yagi, **the floods heightened pre-existing risks in areas affected by clashes, with floodwaters displacing mines and ERW** and shifting land masses (IFRC 26/10/2024). Landmine use has significantly increased in Myanmar as conflict has spread across the country since the military coup in February 2021. In 2024, incidents involving landmines and ERW caused a total of 1,082 casualties nationwide. The states and regions that reported more landmine and ERW incidents were Shan state, with 159 incidents and a total of 256 casualties (24% of the annual total); Sagaing region, with 106 incidents and 186 casualties (17%); and Rakhine state, with 91 incidents and 130 casualties (12%) (UNICEF 25/02/2025; The Guardian 20/11/2024). The upcoming rainy season, coupled with the impact of the earthquake, raises the risks involved with the movement of unexploded ordnance in areas previously believed to be safe, putting communities at risk. Children and IDPs (including people newly displaced by the earthquake) tend to be more at risk because they are likely to be unfamiliar with the terrain and the reported locations of landmines and ERW.

AGGRAVATING FACTORS

Access restrictions on humanitarian assistance delivery

- **Conflict between the Myanmar Armed Forces and armed resistance groups impedes the access of humanitarian responders to some areas,** with incidents reported in Kachin, Mandalay, and Sagaing. The SAC, the National Unity Government, and the Three Brotherhood alliance all announced ceasefires following the earthquake until mid-late April. While the SAC extended its ceasefire, originally intended to expire on 22 April, to 30 April, air strikes and clashes have continued. On 9 April, local media reported at least 72 people dead and 91 injured by shelling attacks and air strikes countrywide since the earthquake (The Irrawaddy 09/04/2025; BBC 07/04/2025; Reuters 22/04/2025).
- **By 8 April, 31 railways and 214 roads had been recorded to be damaged by the earthquake, limiting road access in Sagaing region** as Yangon and Mandalay airports operated at limited capacity. Heavy rains during the monsoon season are expected to compound the challenges posed by the poor transport infrastructure, further hindering the delivery of humanitarian aid (AHA Centre 08/04/2025; Logistics Cluster 08/04/2025). Future flooding and landslides are likely to damage transport infrastructure or temporarily render roads and bridges inaccessible.
- **Electricity supply and communications have been disrupted by earthquake-related infrastructure damage.** Compounding this, communications have been under SAC control since 2021, and internet shutdowns have since been recurrent, also constraining the humanitarian response. Myanmar experienced more internet shutdowns than any other country in the world in 2024, with at least 130 internet shutdowns across 82 different townships. This impedes people's access to warnings about impending air strikes or upcoming cyclones and environmental hazards (Reuters 09/04/2025; UNHRC 12/03/2025).
- **The SAC has prohibited relief teams from operating in the affected areas without their authorisation, delaying the response** (RFA 07/04/2025). This is characteristic of increased SAC scrutiny of and attempts to control the humanitarian response as conflict escalated across Myanmar, including the 2022 Organisation Registration Law, which imposes burdensome bureaucratic requirements on INGOs and NGOs (CLD 21/08/2023). During Cyclone Mocha in 2023 and Typhoon Yagi in 2024, the military obstructed relief efforts in armed resistance group-held areas (BBC 03/04/2025).

Conflict

Escalating conflict and divided territorial control in Myanmar will likely aggravate the upcoming monsoon season's impact on affected populations, particularly in armed resistance-controlled areas, where communities have constrained access to services and humanitarian assistance. Clashes, checkpoints, and air strikes impede humanitarian aid to affected communities and confine people in areas with little to no access to essential services.

Conflict in Myanmar has escalated since the February 2021 coup, as pre-existing ethnic armed organisations have formed alliances with each other and with newly created armed resistance groups. This includes People's Defence Forces, which are armed units created or recognised by the National Unity Government (ACLED 26/11/2024; OCHA 15/11/2023; ICG 17/11/2023). In 2025, armed resistance group operations have escalated in parts of central Myanmar that have typically not seen conflict, including Ayeryarwady, Magway, and Mandalay, although the SAC maintains control in much of that area (ACLED 26/11/2024; The Irrawaddy 21/03/2025). For comprehensive and updated information on conflict in Myanmar, please visit our analysis on the ACAPS website.

Contested and divided control has aggravated the impacts of prior climate hazards, including the 2024 monsoons and Typhoon Yagi, with the SAC denying assistance to affected communities under armed resistance control (RFA 19/09/2024; The Irrawaddy 16/09/2024). While some armed resistance groups and their political wings, particularly more established ethnic armed organisations, provide varying levels of assistance and services, these are limited by resource and capacity constraints. As a result, many communities in non-SAC-controlled areas, particularly IDPs in remote areas, experience constrained access to health and other basic services and live in inadequate shelters (ACAPS 21/03/2025; Protection Cluster 20/02/2025; ICG 30/05/2024). This will likely worsen the impact of heavy rainfall, flooding, and associated shelter and livelihood damage and health risks.

EARTHQUAKE-RELATED DAMAGE TO DAMS

There is a risk that the earthquake has affected or damaged the infrastructure of large-scale dams, potentially disrupting water access for nearby communities. There are several dams in Sagaing, including the Thaphanseik and Zi Chaung Dams (Reuters 28/03/2025; The NRI Nation 29/03/2025). Local media report earthquake-related damage to the Paunglaung Dam in Nay Pyi Taw, with cracks on its earthen walls (MITV 09/04/2025; MEM 02/04/2025; Daily Mail 28/03/2025). Satellite imagery indicates that Sedawgyi Dam may be the most severely affected, with visible signs of poor maintenance. The dam is located in a highly inaccessible and potentially contested area, with suspected landmine contamination, further complicating assessment and response efforts. Intense and prolonged rainfall during the monsoon season may overwhelm weakened dam structures, increasing the risk of dam failure and downstream flooding.

RESPONSE CAPACITY

- A lack of clarity and limited information on existing coordination mechanisms are hindering the response, increasing the risk of overlapping efforts among humanitarian responders.
- State response capacity and preparedness remain limited, as the country, despite experiencing annual monsoon seasons, lacks the operational capacity to manage concurrent crises. The recent earthquake has stretched local resources and response systems, significantly reducing the ability to address additional shocks, such as flooding and landslides. State restrictions and insecurity issues also constrain humanitarian capacity.
- Affected communities may possess vastly reduced coping mechanisms to deal with the effects of monsoons after the impact of the earthquake.
- Information on preparedness and coping capacities in contested areas or those with limited access is scarce, hindering effective planning and response. There is also limited capacity in terms of climate forecast information in non-SAC-controlled areas.
- **There is limited information on humanitarian needs in some areas that responders cannot access.** Reports about food insecurity have been censored by the SAC and are not available in the public domain. The Integrated Food Security Phase Classification, a food security monitor, has removed information about Myanmar from its website because of safety concerns (UNHRC 12/03/2025; Reuters 16/12/2024). In 2024, WHO reported a lack of real-time epidemiological data and limited humanitarian presence in Myanmar, challenging and hindering effective assessment, planning, and response, particularly to prevent the spread of waterborne and communicable diseases (OCHA 19/02/2025; WHO 20/11/2024).
- There is limited information on which areas are currently affected by heavy rains and are at high risk of further monsoons and cyclones. Impacts are expected in riverine areas, but there is uncertainty on which other areas are the most exposed after the earthquake.