

★ KEY HIGHLIGHTS

The Federated States of Micronesia (FSM) is exposed to a range of natural hazards. The country is primarily affected by storms, typhoons, drought, floods (as seen in figures below), and also from other hazards such as landslides, earthquakes, tsunami, fires, sea level rise, and storm surge. Its location on the southern edge of the Pacific “typhoon belt” increases its risk to tropical cyclones, and it has experienced severe storm damage. The country’s location within the Pacific “Ring of Fire” also puts FSM at increased risk from seismic activity and tsunami.

- **Climate:** tropical, with little seasonal variation in mean air temperatures annually. Heavy rainfall occurs year-round, especially in the eastern islands of Kosrae, Pohnpei, and including Chuuk, particularly during the wet season. Islands in the west receive additional rain due to the West Pacific Monsoon.¹
- The wet season runs from May to October, to a drier season which runs roughly from November to April.²
- FSM is particularly vulnerable to weather changes such as the El Nino Southern Oscillation (ENSO). ENSO brings drought and excessive rainfall as associated with the warm and cold phases of ENSO, respectively.³ El Nino events have typically brought long dry spells to FSM.

Vulnerability Factors

FSM depends on surface, underground and rainwater for freshwater supply. Especially vulnerable are small, low-lying islands that rely on rainwater and shallow wells.⁴ The lack of adequate water storage capacity on outlying islands increases vulnerability to the impacts of drought. Additionally, as many communities rely primarily on subsistence agriculture, hazards and disasters can disrupt food supplies.

FSM relies on assistance from the U.S. under the Compacts of Free Association (COFA). Its remote location, limited infrastructure and transport, and economic challenges exacerbates vulnerability. FSM is vulnerable to hazards such as storm surges and coastal flooding because of its low-lying islands and atolls and because most of its population, infrastructure and cultural sites are in coastal areas with little scope to move inland.⁵ FSM is also vulnerable to prolonged periods of drought due to El Niño. FSM’s remote location, widely dispersed islands and limited transport pose a logistical challenge for disaster responders.

Impact on Communities

Storms and typhoons have destroyed and damaged homes, critical infrastructure such as power supplies, disrupted livelihoods, and destroyed vital food crops. When Typhoon Maysak struck FSM in 2015, the storm destroyed hundreds of homes and 90 percent of crops and fruit trees in Chuuk and Yap states.⁶

Flooding hazards such as storm surges and coastal flooding can lead to saltwater intrusion and water damage which have impacted food crops, freshwater supplies, housing and infrastructure.

FAST FACTS



Geography: Located in the western Pacific, FSM is comprised of four states (Yap, Chuuk, Pohnpei, and Kosrae) over 607 islands, of which 74 are inhabited, covering the largest area of the greater Micronesian region. The capital, Palikir, is in Pohnpei. The islands of FSM are widely dispersed with some 1,700 miles (2,700 kilometers) between islands in the western-most state of Yap and islands in the eastern-most state of Kosrae.⁸ The total land area is only 271 square miles (436.1 km), but its exclusive economic zone (EEZ) covers an area over one million square miles (1,609,344 km). Islands vary from low coral atolls to high mountainous islands.



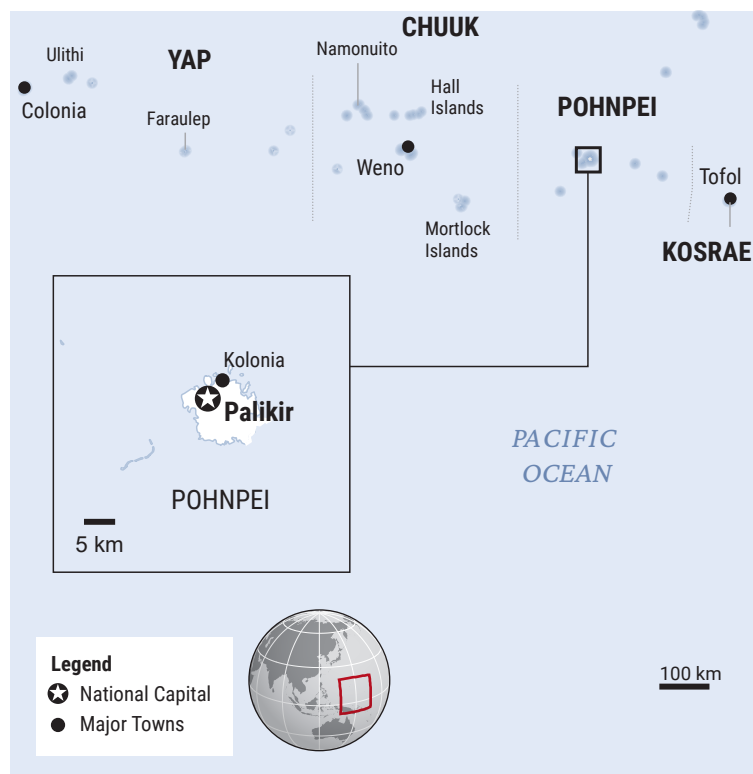
Population: 99,603 (2024 est.) Chuuk is the largest populated state.

Population of Palikir (Capital): 7,000 (2018)



Administration: 4 states: Chuuk, Kosrae, Pohnpei, Yap⁹

Long periods of drought exacerbated by El Nino events have impacted water and food supplies. For example, while the main island of Yap possesses adequate groundwater sources, during prolonged droughts such as the 1997-98 event, water sources have dried up.⁷



Source: OCHA/ReliefWeb. Government of the Federated States of Micronesia. 07/10/22. <https://reliefweb.int/report/micronesia-federated-states/federated-states-micronesia-humanitarian-coordination-structure-07-october-2022>



OVERVIEW OF NATURAL HAZARDS



Tropical Cyclones (TCs)

The islands of FSM, especially the western states, are generally affected by storms and TCs.¹⁰ Known as Typhoons in the Northwest Pacific, typhoon season for FSM typically runs from June to December,¹¹ however, an El Niño year may lead to an increased risk of TC activity as early as March.¹²

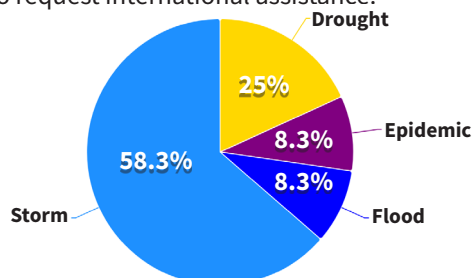
El Niño tends to increase the number of TCs eastward away from western Micronesia and towards the Dateline. This increases the risk of TC activity in the eastern states of Pohnpei and Kosrae from March-July and October-December of El Niño years. Eastern FSM is also a common area for typhoons to form during El Niño years.¹³ For the western states of Yap and Chuuk, this makes for increased risk of typhoon activity from March-July in an El Niño year, but a reduced risk from October-December.¹⁴ There is a lower frequency of cyclones during La Nina years.¹⁵ During a La Nina, the development region for TCs shifts to the west and the odds of being affected by a TCs are reduced for most locations in Micronesia.¹⁶

In 2015, FSM was affected by three storms in succession, highlighting the risk that the islands face. Chuuk was first hit by Typhoon Maysak on 29 March, and the typhoon made its way west making landfall on Ulithi in Yap on 1 April. The storm was upgraded to a Super Typhoon and brought damage to homes, infrastructure and agriculture (as seen in photo at right). Over 35,000 people were affected in Chuuk and Yap and five deaths were reported in Yap. It was reportedly the worst disaster to hit FSM in some 20 – 30 years. Maysak was then followed by Typhoon Noul and Tropical Storm Dolphin. Noul did not cause major damage but disrupted relief efforts for Maysak. Dolphin passed to the northeast of Pohnpei and damaged infrastructure, crops and more than 246 homes and left one person dead.^{17, 18}

Major typhoons include:

- **2019:** Typhoon Wutip passed over Pohnpei, Chuuk and Yap States between 19 and 22 February, causing damage to infrastructure and agricultural production of 30 islands, leaving 11,575 persons food insecure. Wutip left a total of 136 homes destroyed and 42 buildings damaged.^{19, 20}
- **2004:** On 9 April, Typhoon Sudal hit Yap state, causing major damages to infrastructure and food crops on Yap and affecting the outer islands of Ulithi and Fais. At least 1,000 people were left homeless and 700 homes were destroyed, while almost all the remaining homes were damaged.^{21, 22}
- **2003:** Typhoon Lupit affected Yap state from 23-25 November, with Ulithi, Woleai and Fais suffering significant damage, sparking the government to request international assistance.²³

Average Annual Natural Hazard Occurrence for 1980-2020



Source: World Bank. Federated States of Micronesia: Average Annual Natural Hazard Occurrence for 1980 - 2020. <https://climateknowledgeportal.worldbank.org/country/micronesia-fed-sts/vulnerability>



Tsunami

Tsunami remains a risk for FSM however, the last recorded large tsunami was in 1899, preceded by large tsunamis in 1849 and 1837. Out of the states, Yap has the highest probability of a tsunami, however, there have been no recorded instances of significant damage.²⁴ Around a third of residents live in low-lying islands or in low-lying coastal areas, putting them at risk. FSM leaders have in the past outlined the challenges facing the nation regarding mitigation efforts including a lack of a warning system and potential population relocation issues.²⁵

FSM faces a medium risk of tsunamis, according to GFDRR's ThinkHazard! Tool, which indicates a more than 10% chance of a potentially damaging tsunami in the next 50 years. Additionally, sea-level rise can increase the risks associated with tsunami. Out of the states, Yap lies closer to the Ring of Fire and thus may be more susceptible.²⁶



Ladies work at a house covered by plastic tarp at Falalop Island, Ulithi Atoll, Dec. 7, 2015. Typhoon Maysak passed directly through Ulithi, tearing houses from their platforms and damaging almost all infrastructure. Source: DVIDS. U.S. Air Force photo by Osakabe Yasuo/Released. <https://www.dvidshub.net/image/2328811/operation-christmas-drop-2015-islander-recovers-typhoon-maysak-devastation>



Landslides

Landslides can be triggered by heavy rains, earthquakes, and floods, and are a common hazard during typhoon season. As deforestation is expected, the probability of landslides is increased. All the islands are at risk of landslides; however, Chuuk is at high risk due to its steep topography and exposure to heavy rains.²⁷ On July 2, 2002, landslides caused by heavy rains from Typhoon Chata'an in Chuuk triggered more than 30 landslides and mudslides, killing 47 people and injuring hundreds. The typhoon displaced around 1,000 people and destroyed hundreds of homes and food crops. At the time it was described as the deadliest disaster in the state's history.^{28, 29}



NATURAL HAZARDS (CONT.)



Floods

Flooding caused by rainfall events such as typhoons and heavy rains pose a significant risk, especially when the typhoon or rainy season overlap. Rainfall is high on Kosrae, Pohnpei, and Chuuk primarily during the wet season. Yap receives the least rainfall compared to the other main islands.³⁰ Pohnpei is vulnerable to increased rainfall periods as it has inadequate drainage infrastructure to manage current waterflows.³¹

Coastal flooding, king tides, sea level rise, and coastal erosion have damaged agriculture and infrastructure along the coast, which is generally the most developed areas. Saltwater inundation from flooding can also damage crops and contaminate freshwater supplies. King tides have occasionally affected FSM since 2000.³²

Sea level rise increases the risks of storm surge, wave driven flooding and coastal erosion. Flooding by high sea levels have occurred, for example in early December 2008, Kosrae experienced seawater washing in some 100 meters, damaging buildings, while in Pohnpei, almost all of Nukuoro Island was affected by some 200 meters of inundation. Additionally, 29 small islands were inundated and submerged under 2 feet of seawater.³³

More frequent and extensive coastal flooding is anticipated. This will threaten infrastructure, housing, drinking water, and transportation, as well as agriculture, ecosystems, and cultural sites.³⁴ Degradation of the coastal environment, including the cutting of mangroves, which can help reduce the effects of hazards such as storm surges, has increased the vulnerability of coastal communities.³⁵

Major floods include:

- 2018: In mid-March, Tropical Depression Jelawat brought heavy rainfall to Pohnpei resulting in a state of emergency, one death, flooding, landslides, and damage to infrastructure.³⁶



Drought

Drought conditions have plagued FSM in recent years. On 11 March 2023, a state of emergency was declared due to severe drought conditions across the country, with the most affected states being Yap, Pohnpei and Chuuk. The conditions persisted through most of the year, with rain catchment and rivers running dry. The drought impacted 22,700 people, or around 20 percent of the population.³⁷ According to the Emergency Events Database (EM-DAT), the worst two disasters to affect FSM have been droughts. In 1998, drought associated with El Niño affected some 28,800 persons. The 2015-16 El Niño induced drought, was estimated to have affected about 96% of the total population.³⁸

Major drought events include:

- **2019-2020:** FSM experienced drought due to a drier-than-normal seasonal trade-wind pattern that prevailed over the region and to ENSO-neutral weather conditions and abnormally warm water near the dateline. Dry conditions first affected Yap in October 2019 and eventually affected the rest of the country.³⁹
- **2016-2017:** On 20 February 2016, an emergency was issued in Pohnpei due to severe drought damage to crops and a water shortage, which was followed by emergency declarations by the other states. More than 40 wildfires were reported in Pohnpei.⁴⁰
- **1998:** An El Niño-induced prolonged drought depleted food supplies and left many areas without water or on water rations. Rivers dried up and wells were low with increased levels of salinity. The President declared a state of emergency and requested international assistance.⁴¹



Extreme Weather Events

Much of the population is at risk to extreme weather events due to dependence on subsistence agriculture, challenges with freshwater supply, other natural resources and limited adaptation capacity. As exposure to natural hazards are likely to increase as well with projected increases in intensity and frequency of extreme weather events, communities are likely to face significant disaster risk.^{42, 43}

DISASTER MANAGEMENT STRUCTURE

- National Disaster Committee (NDC): Provides policy development and coordination in the event of a disaster. Primary decision-making responsibility lies with the President under the advice of the NDC
- National Disaster Coordination Team (NDCT): The NDC operates through and is supported by the NDCT
- President: Oversees overall Disaster Risk Management (DRM) coordination; designates an agency to manage DRM at the operational level
- National Coordination Working Groups (CWGs): Four CWG's function like the UN cluster system and are each led by a government agency. They are Deployment and Assessment, Livelihood, Social Support, and Infrastructure. All report to the NDCT
- State Disaster Committees are responsible for planning for disasters and providing management of response under each Governor. Committees are chaired by the Disaster Management Officer (DMO) and comprised of state Secretaries and agency heads. Each state has different DRM organizational and institutional arrangements
- Local Disaster Management Committees may operate under the state level. Local customary leaders play a significant role
- The NDC has oversight for all hazards through five departments including the Dept. of Environment, Climate Change and Emergency Management (DECEM), which currently manages DRM at the operational level^{44, 45}



US PACOM DISASTER RESPONSE



US PACOM has supported U.S. government response efforts to assist FSM following disasters and for disaster preparation. After Typhoon Chata'an hit Chuuk in July 2002 U.S. military forces delivered supplies and assisted with medical transport missions under the coordination of

the Federal Emergency Management Agency (FEMA). A total of 24 military airlifts of food, water and medical supplies were delivered from Guam.⁴⁶ Additionally, the U.S. Navy's Civic Action Team 40-21 assisted the Palau Red Cross with delivering supplies via a Navy C-130.⁴⁷ Two years later, U.S. Air Force members supported FEMA after Typhoon Sudal devastated Yap in April 2004. Two C-130 aircraft and crew members flew 11 missions over five days to deliver passengers and supplies.⁴⁸ More recently, U.S. Marines and Sailors distributed over 2,000 bags of rice and 3,000 cases of water to Chuuk's outer islands as part of Exercise Koa Moana 24 in July 2024 in support of disaster response preparations for outlying communities.⁴⁹

MAJOR ACTORS IN A DISASTER RESPONSE

National:

- NDC
- NDCT
- President and Governors
- DECEM
- National CWGs and Leads
- National and State Emergency Operations Centers (NEOC and SEOC) manage operations during disasters
- Micronesia Red Cross Society
- A state of disaster is declared by the President upon request by a state Governor and with the advice of the NDC
- National and state coordination teams operate alongside the Disaster Committees to manage disaster relief under the direction of the national or state Disaster Coordination Officers
- The NDCT and the NEOC operate under NDC and are activated during emergencies. NDC oversees access to international and regional support while NDCT oversees relief assets

International:

- UN Agencies: International Organization for Migration (IOM) coordinates a network of national and international stakeholders; UN Country Team (UNCT), UN Children's Fund (UNICEF), UN Office for the Coordination of Humanitarian Affairs (UNOCHA), and the World Food Program (WFP)
- International Federation of Red Cross and Red Crescent Societies
- International NGOs (e.g., Salvation Army)
- Pacific island nations
- Bilateral donors: European Union, Japan
- FSM relies on the U.S. government's support through the COFA agreement, including disaster assistance^{50, 51}

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Center for Excellence in Disaster Management & Humanitarian Assistance

456 Hornet Avenue, Building 76, Ford Island Joint Base Pearl Harbor - Hickam, Hawaii 96860-3503

Tel: 808.472.0518 DSN: 315.472.0518 Email: cfe.dmha.fct@pacom.mil

<https://www.cfe-dmha.org> [f @cfedmha](https://www.cfe-dmha.org)