Global Water Security Center

HAITI, 2035: Flooding Exacerbates Food Insecurity and Violence, Leaving Children Vulnerable to Gang Recruitment

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BLUF

Compounding disasters, food insecurity, and violence increase displacement and open opportunities for gangs to recruit.

PATHWAY TO INSTABILITY

NATURAL DISASTERS: Compounding disasters hinder recovery and deepen economic instability.

- Haiti has experienced below-normal rainfall (<847mm) 7 out of the last 8 years (2018-2023, 2025), impacting crop growth.
- Even with below-normal annual rain, heavy rain days – projected to increase from 8 to 16 days annually from 2010 to 2035 **(Figure 1)** – can trigger flooding and landslides that damage roads and crops.
- Compounding disasters (e.g., hurricane and drought in 2016[1]) amplify the underlying political and economic struggles Haiti faces and deplete communities' ability to recover, deepening economic instability.

FOOD SECURITY: Decreased crop production and increased violence strain livelihoods and create food insecurity.

- Two-thirds of Haiti's population relies on agriculture for their livelihoods[2], and over half the population is severely food insecure[3].
- Natural disasters, price of inputs, and violence have hindered food production nationwide. Production of corn, rice, and sorghum – Haiti's main crops – has declined[4] and the country depends heavily on imports[2].
- Farmers face violence and looting of agricultural products on the way to market, reducing their incomes and limiting community access[5,6] **(Map 1)**.

DISPLACEMENT: As people search for opportunity, rapid rural-to-urban migration has strained urban infrastructure.

- The movement of people is increasingly survival-driven[7]. Displacement increased 36% in 2025 due to food insecurity and violence[5]. Over 1.4M people are displaced[5].
- Water supply and sanitation services have not kept up with urban migration, leading to contaminated water and the transmission of waterborne diseases[8,9]. Displaced families struggle to meet basic needs.

GANG RECRUITMENT: Displaced children are vulnerable to gang recruitment out of fear and desperation.

- The UN estimates that 30-50% of armed groups in Haiti are children[10]. Often, gangs offer money and food to the children and their families, becoming a source of survival[11].

Map 1: Gang violence has increased outside the capital, especially in Artibonite and Centre.

Gangs control ~90% of Port-au-Prince and seek control of areas along critical agricultural roads in central Haiti[12,13]. Border violence continues along the Massacre River (See Related GWSC Product).

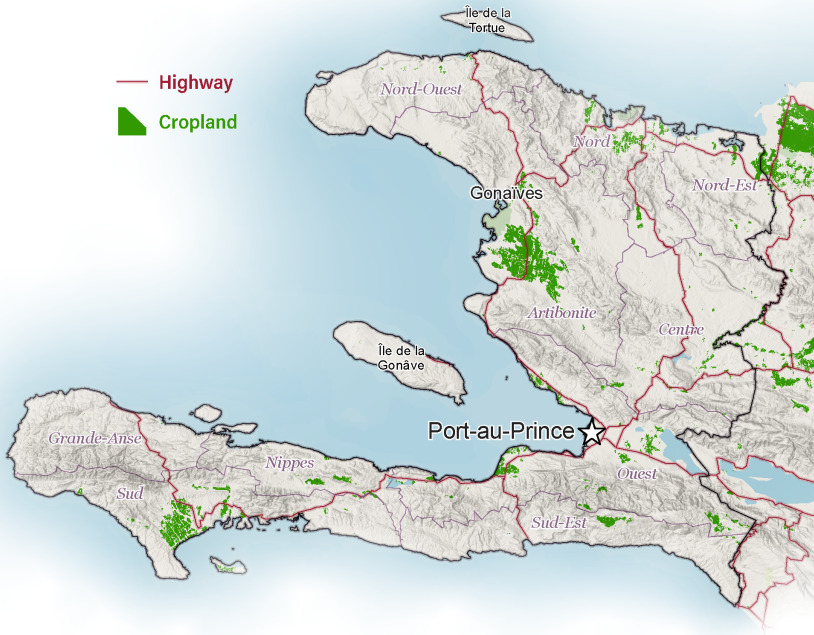
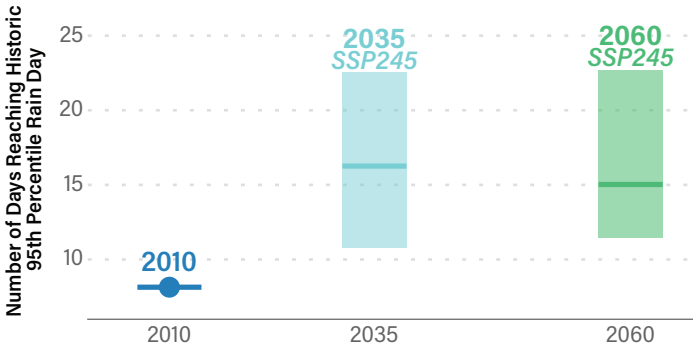


Figure 1: An increase in heavy rain days may threaten agricultural production and erode economic stability.

Haiti already experiences drought, hurricanes, and earthquakes. These may compound with increased heavy rain days to challenge households' ability to recover and meet basic needs.



Sources:

1. McGreevy, J. R. 'When the Rain Falls': Adaptation to Compound Disasters and Climate Unpredictability in Natural Resource Dependent Communities of Rural Haiti. ProQuest Dissertations and Theses (University of Georgia, United States -- Georgia, 2022).
2. Sawaya, N. From crisis to cultivation: Haiti's farmers build resilience one seed at a time. UN News https://news.un.org/en/story/2025/08/1165600 (2025).
3. Integrated Food Security Phase Classification. Haiti: Acute Food Insecurity Situation for September 2025 - February 2026 and Projection for March - June 2026. (2025).
4. Moyo, S. Situation Update: Haiti Agriculture. https://ipad.fas.usda.gov/highlights/2024/04/Haiti/index.pdf (2024).
5. International Organization for Migration (IOM). Haiti — Information Sheet on the Displacement Situation in Haiti — Round 11 (September 2025). https://dtm.iom.int/reports/haiti-information-sheet-displacement-situation-haiti-round-11-september-2025?close=true (2025).
6. WFP Editorial Team. 'Unseen and unheard': Haiti weathers hunger, gangs and climate extremes. World Food Programme (2023).
7. International Organization for Migration (IOM). Haiti Crisis Response Plan 2026. https://crisisresponse.iom.int/sites/g/files/tmzbdl1481/files/appeal/pdf/2026_Haiti_Crisis_Response_Plan_2026.pdf (2025).
8. Curtis, A. J. et al. Enhanced Risk for Epidemic Cholera Transmission, Haiti. Emerg. Infect. Dis. 31, (2025).
9. Jérôme, Y., Alexis, M., Telcy, D., Saffache, P. & Emmanuel, E. The Challenge of Water in the Sanitary Conditions of the Populations Living in the Slums of Port-au-Prince: The Case of Canaan. in Environmental Health (ed. Otsuki, T.) (IntechOpen, 2021). doi:10.5772/intechopen.96321.
10. Coto, D. UNICEF warns that child recruitment by armed groups in Haiti tripled last year. UN News (2026).
11. Dickinson, D. 'Alarming increase' in recruitment of children into gangs in Haiti. UN News https://news.un.org/en/story/2026/02/1166954 (2026).
12. Office of the High Commissioner for Human Rights. Spreading gang violence poses major risk to Haiti and Caribbean sub-region. United Nations Human Rights https://www.ohchr.org/en/press-releases/2025/07/spreading-gang-violence-poses-major-risk-haiti-and-caribbean-sub-region (2025).
13. Human Rights Watch. Haiti Events of 2025. World Report 2026 https://www.hrw.org/world-report/2026/country-chapters/haiti (2026).

Related GWSC Product:

- Global Water Security Center. Haiti and Dominican Republic Massacre River. Quicklook. University of Alabama. 2024. https://ir.ua.edu/handle/123456789/16790.

Map Sources:

- Airbus, USGS, NGA, NASA, CGIAR, NLS, OS, NMA, Geodatastyrelsen, GSA, GSI and the GIS User Community. "Terrain: Multi-Directional Hillshade". October 28, 2024. https://elevation.arcgis.com/arcgis/rest/services/WorldElevation/Terrain/ImageServer
- Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community. "World Topographic Map (WGS84)". September 16, 2024. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_GCS_v2/VectorTileServer
- Karra, Kontgis, et al. "Global land use/land cover with Sentinel-2 and deep learning." IGARSS 2021-2021 IEEE International Geoscience and Remote Sensing Symposium. IEEE, 2021.

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Data Analysis Methods:

DATASETS: Historical Weather Data from ERA5 [1950-2024] - daily values for precipitation and average temperature, daily maximum temperature & daily minimum temperature. Future Weather Data from CMIP6 downscaled by NASA Earth Exchange Global Daily Downscaled Projection (NEX-GDDP-CMIP6). Scenario: SSP245 and/or SSP585 [2025-2045 & 2050-2070, historical 1975-1995 & 2000-2020]. 17 models: ACCESS-ESM1-5, BCC-CSM2-MR, CanESM5, CMCC-ESM2, FGOALS-g3, GISS-E2-1-G, MIROC-ES2L, MPI-ESM1-2-HR, MRI-ESM2-0, NESM3, NorESM2-MM, CNRM-ESM2-1, EC-Earth3-Veg-LR, GFDL-ESM4, INM-CM5-0, IPSL-CM6A-LR, KIOST-ESM.

CALCULATIONS: Baseline (sometimes called "normal") and representative future values for each year of interest are calculated using 21-year time intervals around the date of interest. Our historic normal is based on the year 2010 (2000-2020) using ERA5 data. To bias correct future values, we calculate the difference or ratio between NEX-GDDP-CMIP6 modeled future [2035 (2025-2045) and/or 2060 (2050-2070)] and modeled historic [2010 (2000-2020)] values and add this difference to the historic baseline value or multiply the ratio by the historic baseline value for each metric of interest. All calculations are spatially distributed (quarter-degree grid cells) and aggregated as the final step.

Important note: Values reported are median values based on the 17 model outputs. Error bars are the 95% confidence interval around the median.

Precipitation
Mean Annual Precipitation: The sum of the total daily precipitation for each year, averaged over the time period of interest. Also referred to as the "normal precipitation" for the time period of interest.
Total Annual Precipitation: The sum of the total daily precipitation for each year.
Annual Deviation from Normal: The total annual difference between total annual precipitation and the 2010 normal precipitation, calculated on an annual time step.
95th Percentile Precipitation Day Count: The number of days reaching the 95th percentile of historic daily precipitation events, excluding days with less than 1 mm of precipitation. For future extreme precipitation, we calculated the average number of days that reached or exceeded the historic 95th percentile value. This was also calculated by season (defined above).

REFERENCES

- Hersbach H, Bell B, Berrisford P, et al. (2020). The ERA5 global reanalysis. QJ R Meteorol Soc. 146: 1999–2049. https://doi.org/10.1002/qj.3803
- National Directorate of Civil Aeronautics/ Directorate of Meteorology and Hydrology. Average height of the Paraguay River level at the Alberdi station. Sistema de Información del Agua Paraguay. https://siaparaguay.ine.gov.py/indicadors/detalle/50. Accessed June 10, 2025
- R Core Team (2023). _R: A Language and Environment for Statistical Computing_. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/
- Thrasher, B., Wang, W., Michaelis, A. et al. (2022) NASA Global Daily Downscaled Projections, CMIP6. Sci Data 9, 262, https://doi.org/10.1038/s41597-022-01393-4
- Tye, M. R., Ge, M., Richter, J. H., Gutmann, E. D., Rugg, A., Bruyère, C. L., Haupt, S. E., Lehner, F., McCrary, R., Newman, A. J., and Wood, A. (2023) Evaluating an Earth system model from a water user perspective, EGUsphere [preprint], https://doi.org/10.5194/egusphere-2023-2326\