

# Hurricanes Eta and Iota – Central America

## Summary of Environmental Issues

Produced by  
WWF Environment and Disaster Management Program  
Issue 1: 14 December 2020

### Overview

This document summarizes key environmental issues in Nicaragua, Honduras and Guatemala related to recovery and reconstruction from Hurricanes Eta and Iota.

This summary focuses on:

- 0 to 6 months, identifying expected environmental issues to be faced as part of the continuing humanitarian response and initial recovery, and,

Issue 2 will focus on:

- 6 to 18 months, considering how recovery programming can incorporate ecosystem-based risk reduction to reduce future risk and vulnerability.

Hurricane Eta made landfall on the east coast of Nicaragua, near Bilwi, on 2 November 2020. It then traveled west and then north, passing over Honduras and affecting Guatemala and Belize, before heading to Cuba. Winds from Eta caused damage to property and vegetation, particularly in Nicaragua, and flooding and landslides in Honduras and Guatemala.

Hurricane Iota came ashore on 16 November 2020 just south of Eta's landfall in Nicaragua. The storm caused additional damage from high winds and, particularly in Honduras, from flooding. The map above provides the tracks for both storms and identifies flooded areas.<sup>1</sup>



<sup>1</sup> Latin America: USAID Response to Storms Eta and Iota, 11 December 2020, [https://reliefweb.int/sites/reliefweb.int/files/resources/2020\\_12\\_11%20USAID%20Response%20to%20Latin%20America%20Storms\\_0.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/2020_12_11%20USAID%20Response%20to%20Latin%20America%20Storms_0.pdf)

Damage assessments are underway, but information as of 4 December 2020 indicates that, for hurricanes Eta and Iota, in:

- Nicaragua, 1.8 million persons are reported as affected, disaster damage to infrastructure totals \$361 million, with 43,000 homes damaged or lost.
- Honduras, 3.8 million persons are reported affected and 61,000 houses damage or lost.
- Guatemala, 1.7 million persons affected, 79,000 homes damages or lost due to Eta and Iota.<sup>2</sup>

Both hurricanes affected rural and urbanized areas, particularly the San Pedro Sula metropolitan area, the hub of commercial and manufacturing in Honduras. Reported damage in rural areas includes landslides affecting settlements and roads, flooding damaging bridges, roads and communities and wind damage to buildings and food and commercial (particularly coffee) crops.

In the San Pedro Sula area, reports indicate that flooding affected many settlements, commercial agriculture (e.g., flowers and vegetables for export), and domestic food production. Significant flooding is reported to have affected a range of commercial enterprises and industrial sites, leading to the possible release of chemicals and loss of stocks.

While the official hurricane season ended on 30 November 2020 concerns remain that seasonal cold weather fronts descending from North America can trigger additional rainfall. If this rainfall comes while soils remain saturated and river water levels high, it could cause new landslides and additional flooding.

Some assessments were completed following Hurricane Eta<sup>3</sup>. Significant additional assessment work is needed however to define the combined impacts of Eta and Iota, particularly in the parts of Nicaragua, Honduras and Guatemala impacted by both events.

This summary is based on initial operational reports and a review of currently available information. The summary is, however, subject to revision and updating based on further analysis and field-based assessments. This report does not cover environmental review or permitting procedures that may be relevant to the rebuilding process.

## Anticipated Environmental Issues: 0-6 months

Disaster Debris Issues:

Recycle, Reuse and Repurpose: Eta and Iota likely generated significant volumes of organic debris, including from wind-damage to vegetation and from flooding. Clearing this debris is a first-order task in reestablishing access, shelter, commercial activities, and food production. Debris should be considered as an asset for recovery.

Debris management should follow the guidance set out in the [Disaster Waste Management Guidelines](#). Where possible, debris should be reused or repurposed to support the recovery process (e.g., damaged trees processed into timber for use in rebuilding) or recycled through, for instance, composting, to

---

<sup>2</sup> Central America & Mexico, 2020 Hurricane Season - Situation Report No. 5, As of 8:00am EST 26 November 2020, OCHA, <https://reliefweb.int/report/honduras/central-america-mexico-2020-hurricane-season-situation-report-no-5-800am-est-26>

<sup>3</sup> Honduras: Flash Appeal – Tropical Storm Eta, 19 November 2020, OCHA, <https://reliefweb.int/report/honduras/honduras-flash-appeal-tropical-storm-eta-november-2020>.

improve soil quality and crop production. The Pan American Health Organization guidance document, **Solid waste** management in disaster situations<sup>4</sup>, incorporates regional experience accumulated after various kinds of natural phenomena, which have affected populations in the region in recent decades. In the region, most waste ends up in open landfills which are linked to health and environmental issues.<sup>5</sup> For example, of Honduras' 298 municipalities, only 30 have appropriate disposal sites, meaning 268 municipalities have open landfills where trash is incinerated in the open air. Landfills are often close to rivers which leads to water pollution. In addition, in Honduras, many low-income settlements are located nearby rivers, which increases the risk of waste and/or homes being washed downstream during the hurricane season.<sup>6</sup>

Hazardous Chemicals: Improper hazardous chemical disposal could increase the risk of groundwater pollution. Household and commercial buildings likely contained varying quantities of hazardous chemicals (e.g., clearers, pesticides, paints, etc.) which need special handling when removed. Debris management teams need to be trained in safe removal requirements and plans made for the safe processing and disposal of hazardous chemicals.

The requirement for safe management of hazardous chemicals also applies to industrial sites, which may contain significant quantities of hazardous chemicals and pre- or post-storm contaminated buildings and ground. The Fast Environmental Assessment Tool (FEAT) results for Eta and Iota, developed by the UNEP/OCHA Joint Environment Unit, provide a quick guide to which hazardous chemicals may be associated with which types of industrial or commercial facility.<sup>7</sup>

Asbestos: Despite having banned the use of asbestos<sup>8</sup>, the Honduras National Institute of Statistics reported more than 70K houses with asbestos roof in Tegucigalpa in 2019<sup>9</sup> most of which were constructed in the 1960s and 70s. Guatemala and Nicaragua have not banned asbestos use. Additional detailed information on the past and current use of asbestos, for roofing and in industrial settings, is limited for the three countries. Pending more detailed information, any possible handling of possible asbestos should follow current good practices.<sup>10</sup>

---

<sup>4</sup> Solid waste management in disaster situations, Pan-American Health Organization, 2003, [https://www.paho.org/disasters/index.php?option=com\\_docman&view=download&category\\_slug=publications&alias=2507-gestion-residuos-solidos-situaciones-desastres-7&Itemid=1179&lang=en](https://www.paho.org/disasters/index.php?option=com_docman&view=download&category_slug=publications&alias=2507-gestion-residuos-solidos-situaciones-desastres-7&Itemid=1179&lang=en)

<sup>5</sup> Municipal Solid Waste Management in Latin America and the Caribbean: Issues and Potential Solutions from the Governance Perspective, 10 May 2018, Hettiarachchi et al., <https://www.mdpi.com/2313-4321/3/2/19>

<sup>6</sup> Waves of Pollution in Honduras: Understanding Poor Waste Management and Natural Disaster, December 2020, Kawas Arita, <https://www.wilsoncenter.org/publication/waves-pollution-honduras-understanding-poor-waste-management-and-natural-disaster>

<sup>7</sup> FEAT data can be accessed from the Joint Environment Unit by emailing [ochaunep@un.org](mailto:ochaunep@un.org).

<sup>8</sup> El asbesto, una epidemia todavía por controlar, September- October 2017, Alfonso Accinelli & Lidia Marianella López, <https://www.gacetasanitaria.org/es-el-asbesto-una-epidemia-todavia-articulo-S0213911117301231>

<sup>9</sup> En la capital de Honduras todavía hay 71 mil casas con el dañino asbesto, 4 June 2019, <https://www.elheraldo.hn/tegucigalpa/1290464-466/en-la-capital-de-honduras-todav%C3%ADa-hay-71-mil-casas-con-el>

<sup>10</sup> A Brief Guide to Asbestos in Emergencies: Safer Handling & Breaking the Cycle, 03 March 2010, ProAct & Shelter Center, <https://www.humanitarianlibrary.org/resource/brief-guide-asbestos-emergencies-safer-handling-breaking-cycle-0> and Disaster Waste Management Guidelines, 01 March 2011, OCHA, <https://www.unocha.org/publication/disaster-waste-management-guidelines>

**Agriculture Pesticides:** Particularly in the agriculture-export focused areas of the San Pedro Sula valley in Honduras, but also elsewhere across the region such as in Guatemala, it is likely that flooding has affected on-farm, point-of-sale and wholesale stocks of pesticides. These sources of environmental pollution and human health threat need to be assessed and remediated with appropriately trained and equipped teams. It is not clear if facilities for the disposal of pesticides exist in Honduras or Guatemala.

**Vector Control:** Malaria, Dengue and other vector-borne diseases are endemic across the hurricane-affected countries. Vector control efforts will need to increase given the existence of new vector habitats and the establishment of displacement centers. While chemical control may be necessary as an emergency measure, vector control should shift to an integrated pest management approach as quickly as possible. See *Reducing Environmental Impacts of Vector Control Chemicals in Emergencies*<sup>11</sup> for operational guidance.

**Water and Sanitation:** Rainfall, flooding and landslides triggered by Eta and Iota have likely had significant impacts on water supplies, including damage to storage and distribution systems, contaminating water, and blocking springs and other sources. These events also likely damaged sanitation systems, including filling wastewater holding tanks. In Guatemala, particularly in Alta Verapaz,<sup>12</sup> entire communities are still flooded due to the geology and soil characteristics of the area. In Honduras and Guatemala, most of the water supply systems outside urban areas, use gravity.<sup>13</sup> Chlorination is a commonly used method for treating water in the region.<sup>14</sup> Still a large percentage of the population in the region lacks access to safe water.<sup>15</sup>

Restoring water supplies, and ensuring adequate treatment of water, are clear priorities from disease prevention and hygiene perspectives. Where water supplies repairs may need to be temporary however, this work should consider the potential for further flooding or landslides to avoid having to make additional near-term repairs.

Repairs to wastewater systems should consider further flooding or landslides and undertake work in a way which reduces the need for repeated repairs. Safe disposal of wastewater holding tanks needs to include safe disposal of the effluent to avoid the contamination of water courses used for human water supplies or irrigation.

**Food Security:** Initial reports indicate that Eta and Iota damaged both food and cash crops, the latter including coffee and vegetables production for export. In Guatemala, palm oil, banana and cardamom

---

<sup>11</sup> *Reducing Environmental Impacts of Vector Control Chemicals in Emergencies*, 21 March 2019, C. Kelly, <https://ehaconnect.org/wp-content/uploads/2019/05/Reducing-Environmental-Impacts-Of-Vector-Control-Chemicals-In-Emergencies-2019.pdf>.

<sup>12</sup> Guatemala continúa inundada, un mes después de huracanes, 9 December 2020, teleSur, <https://www.telesurtv.net/news/continuan-inundaciones-guatemala-mes-huracanes-20201209-0037.html>

<sup>13</sup> *Designs of potable water supply systems in rural Honduras*, 2003, Nathan W. Reents, <https://www.mtu.edu/peacecorps/programs/civil/pdfs/nathan-reents-thesis-final.pdf>

<sup>14</sup> *Source Book of Alternative Technologies for Freshwater Augmentation in Latin America and the Caribbean*, 1997, UNEP, <https://www.oas.org/dsd/publications/unit/oea59e/ch23.htm>

<sup>15</sup> *Progress on household drinking water, sanitation and hygiene 2000-2017*, Joint Monitoring Programme, 2019, WHO/UNICEF.

were also heavily affected<sup>16</sup>. This damage is likely to put immediate pressure on rural and some urban residents to find alternative sources of subsistence food and income (to cover basic needs).

In turn, livelihoods and food security efforts may put pressure on natural resources, particularly near cities and towns. While the provision of food and cash support can reduce pressure on local resources to some degree, support will need to continue for up to six months to provide sufficient time for crops to be harvested. The sudden discontinuation of support too quickly can increase uncontrolled natural resource harvesting, leading to future risk.

Shelter and Settlements: Nicaragua alone reports 34,000 houses damaged or destroyed. Flooding in the San Pedro Sula urban area of Honduras likely affected many housing units. Rural communities across eastern Guatemala and Honduras also likely experienced significant damage to housing.

The housing damage contributes to three primary environmental issues:

1. Flood-damaged housing will generally contain a range of debris which requires environmentally sound disposal. This debris will likely include stoves, refrigerators, and electrical equipment, all of which require well planned disposal programs incorporating recycling and reuse.
2. Replacing lost or damaged housing units will require extracting natural resources at considerably greater levels than under normal conditions, risking damage to the environment from overexploitation. In some places throughout the region, mudbrick (adobe) is a material traditionally used for construction, however, the use of concrete blocks and bricks is more prominent in modern architecture. In Honduras, for example, concrete was the material most used for housing and commercial buildings in the last few years<sup>17</sup>.
3. It is unlikely that most of the damage or destroyed housing units will be repaired or rebuilt in less than 12 months, leading to a need for transitional shelter arrangements, including camps. In addition, there may be arrangements where the affected live near or next to their home while it is being repaired. These transitional shelter arrangements need to be planned so they are in locations as safe as possible from flooding as they will continue to be utilized through the next hurricane season, if not longer. Transitional shelter planning needs include the provision of services such as water and sanitation, schooling, health care, markets, and shelter-based economic activities to ensure that rebuilding process places as limited as possible demand on neighboring natural resources.<sup>18</sup>

---

<sup>16</sup> Hurricane Eta destroys harvests, increases food insecurity concerns, 11 November 2020, Teresa Welsh, <https://www.devex.com/news/hurricane-eta-destroys-harvests-increases-food-insecurity-concerns-98524>

<sup>17</sup> Conozca los materiales de más usas en la construcción en Honduras, 18 November 2017, Luis Rodriguez, <https://www.elheraldo.hn/economia/1127319-466/conozca-los-materiales-que-m%C3%A1s-usan-en-la-construcci%C3%B3n-en-honduras>

Evolución de la vivienda en Guatemala, 27 July 2014, Ana Lucia Gonzalez, <https://www.prensalibre.com/revista-d/vivienda-en-guatemala-normativa-sismo-resistente-materiales-construccion-0-1181281992/>

<sup>18</sup> See The Programmatic Environmental Impact Assessment for the IOM Temporary Relocation Program In Haiti, 29 December 2010, Sun Mountain International, <http://www.smtn.org/wp-content/uploads/2016/05/PEA-1Temp-Relocation-Haiti-29-Dec-2010.pdf>

## Additional Information Sources for Environmental and Disaster Information and Guidance

1) Environment and Disaster Management @ WWF - <http://envirodm.org/about>

The WWF Central America office and the Environment and Disaster Management [Help Desk](#) are available to respond to requests for information or guidance on the environment and the response to Hurricane Eta and Iota.

2) EHA Connect - Connecting Environment and Humanitarian Action - <https://ehaconnect.org/>

3) Key Local Environmental Organizations:

- a) In Honduras, [the CONROA](#) is a coalition of more than 30 environmental, agricultural, and other related organizations which work together on several issues including agroecology, mining, water, and forests protection, among others. Members of the CONROA include: [Instituto para el Desarrollo Ambiental de Honduras \(IDAMHO\)](#), [Movimiento Madre Tierra \(MMT\)](#), and [Asociación de Mujeres Defensoras de la Vida](#).
- b) Other relevant organizations include Fundación Vida who work on water and climate issues.
- c) In Guatemala, the National Association of NGOs of Natural Resources and Environment (ASOREMA) is a network that includes some of the key environmental organizations, including [Defensores de la Naturaleza](#), [Amigos del Bosque](#), and IDEADS.
- d) In Nicaragua, [FUNDEINC](#), CEDAPRODE and [Centro Humboldt](#) are organizations working on climate, water and natural resources issues. Centro Humboldt work includes environmental aspects of disaster risk reduction.

Authors: Charles Kelly, Luz Cervantes, AnaVictoria Rodriguez, Anita van Breda