

Stentor: How earth observation helps humanitarian organisations save lives

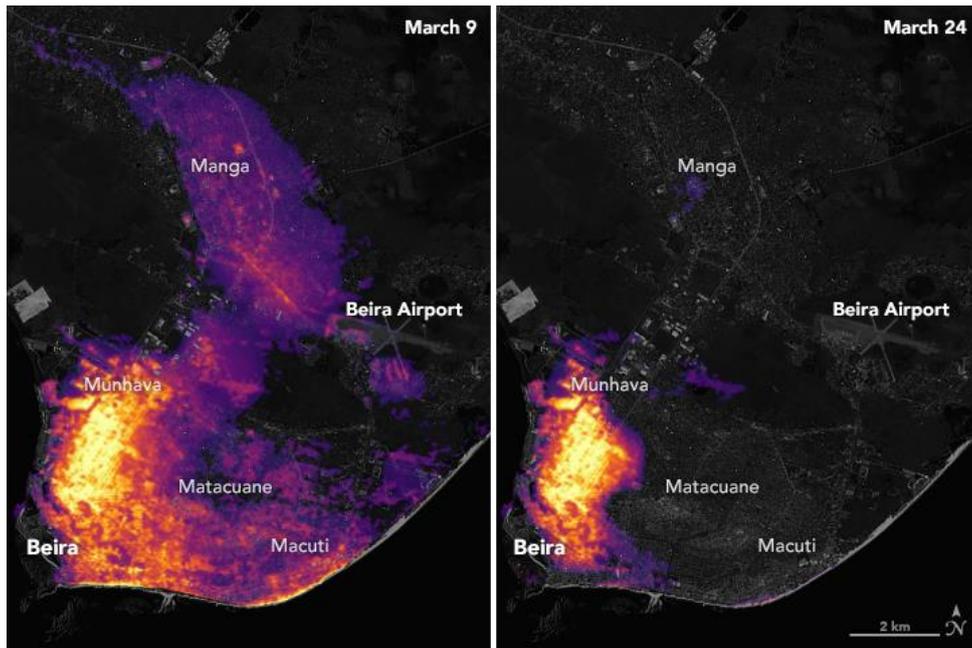
In the last decade, a total of 3,755 catastrophic events have affected a yearly average of 175 million persons. Moreover, armed conflicts such as in Yemen or Ethiopia, also force millions to flee their home. In many of these situations, earth observation can directly support the action of humanitarian organisations, vastly improving the efficiency and effectiveness of the response.



Control centre of the Emergency Response Coordination Centre (ERCC) in Brussels. Image: Alexandros Michailidis

How earth observation is used by humanitarian organisations

Some of the most common applications of Earth observation satellites are performing damage assessments following a catastrophe, such as an earthquake or storm, and identifying locations of gathering sites or camps of displaced people. However, there is a wide variety of applications, and for almost all disaster types, satellite images are used at some point of the disaster management (prevention, mitigation, response, or recovery phase).



Comparison of the light emitted by human activities over the city of Beira, before and after the Cyclone Idai in 2019. Image: NASA

Since very high spatial resolution satellite images became more widely available to civil organisations in the early 2000s, major conflicts such as in Syria are also being monitored by various humanitarian organisations, including UNOSAT, Amnesty International and Human Rights Watch.

Images from these satellites help detect possible human right violations which would have been impossible to identify or ascertain by workers on the ground. The most common application is the assessment of damaged or destroyed buildings, such as schools, hospitals, and cultural/religious buildings, which are strong indicators of human rights abuse. Satellite images can also provide confirmation of information received from local sources, such as evidence of burned villages or the presence of mass graves.



Satellite images analysed by Human Rights Watch of a Rohingya village in Maungdaw Township, Burma. Image: 2017 Digital Globe and Human Rights Watch.

New trends in the field

The field of Earth observation is in constant evolution and there is a continuous stream of innovative applications. One example is the monitoring of infrastructure reconstruction with the help of satellite image in regions where security constraints restrict the planning and execution of assessment missions, such as Somalia. Another example is the monitoring of wood consumption and deforestation and its impact on the local environment of camps for displaced people – a major source of local tensions and massive denudement of the territory.

The use of machine learning technology, small satellites, satellite constellations and a bigger involvement of giant tech companies such as Google, Facebook, Microsoft and Amazon have also vastly increased the choice of applications and widened accessibility of satellite images to a larger audience, including humanitarian organisations.

First steps to start using Earth observation for humanitarian purposes

Inter-agency cooperation in this field is already successfully established, and examples are The International Charter Space and Major Disasters, the Emergency Management Service from the European Copernicus Program or the Humanitarian OpenStreetMap Team. These organisations, and others, freely provide data and maps elaborated from satellite imagery analysis.

Incorporating satellite images in the workflow of a humanitarian organisation requires the field teams to evaluate the limitations of such a technology, the cost inherent to the acquisition of satellite imagery and the training of employees. Various organisations can help, such as CartONG (NGO specialized in supporting the use of GIS by other NGOs) or the United Nations Institute for Training and Research.

Satellite images for humanitarian assistance is here to stay and operational agencies can boost their effectiveness and performance by incorporating these new applications in their preparedness, prevention and response activities.

Report on the use of satellite data in humanitarian settings

Our recently released report provides detailed information on the use of satellite-based earth observation methods in various humanitarian settings. This report has been prepared by researchers working in disaster epidemiology and geography in UCLouvain.