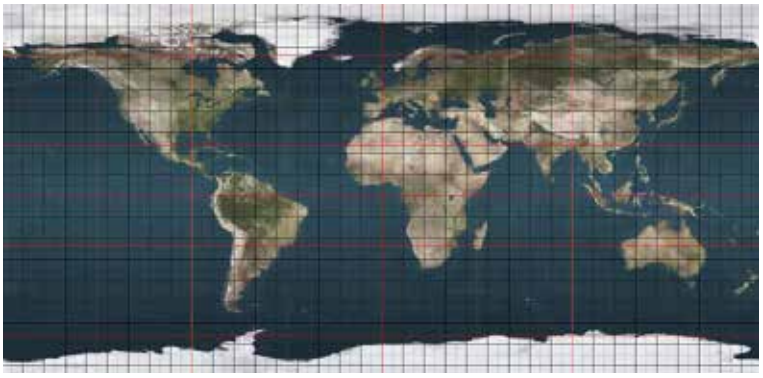
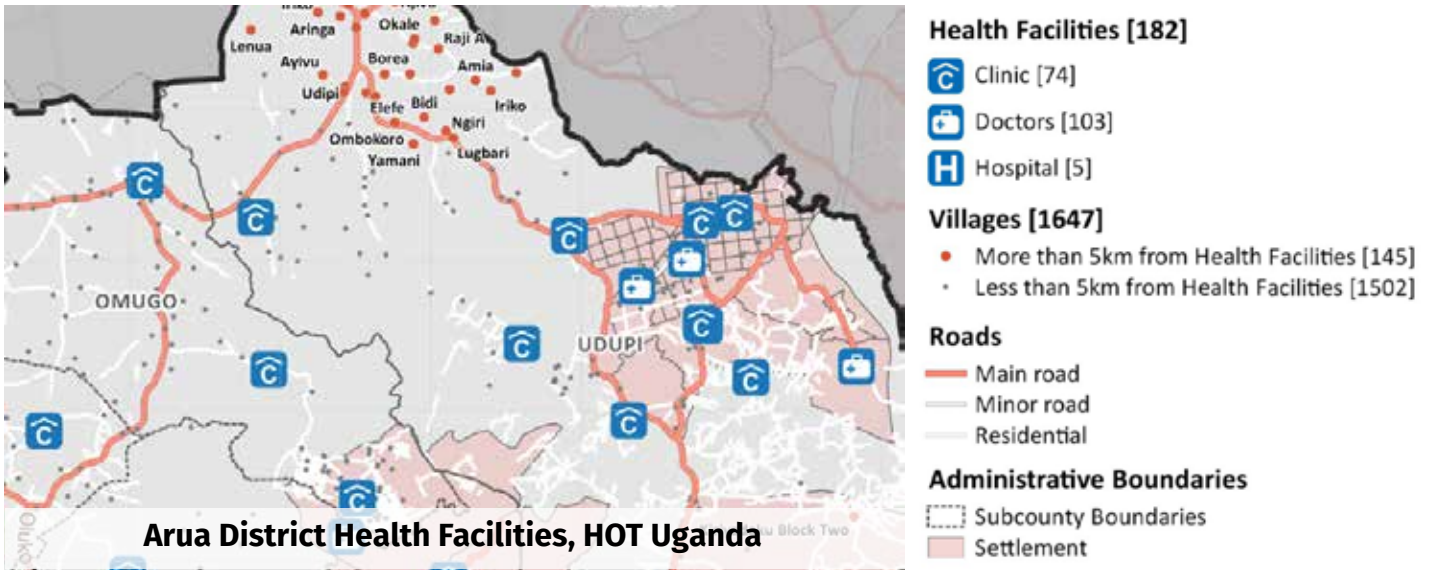
MAPS AND GEOSPATIAL DATA

Each disaster or humanitarian crisis is unlike any other. While characteristics vary widely, as humanitarians, we often ask the same basic set of questions prior to deployment or entry into a crisis: What happened (or is happening)? Where did it occur? Who and what is most affected? Which are the areas, populations, or sectors with the greatest need? An understanding of "place" or location is at the heart of planning and carrying out a response.



Maps and map data serve as a fundamental tool in answering these questions. While fully understanding a location goes far beyond physical geography, basic maps and geospatial data can assist in developing a shared understanding among humanitarian actors in a response. Maps help us answer the question of "where" by indicating areas of forced displacement and areas where resettlement is occurring. They help us answer the question of "who", indicating which communities and populations have been affected or are in need.

While maps often serve as a navigation tool for responders (and, more recently, refugees) navigating their new environments, they go far beyond this: in an era of limited humanitarian resources, they help us accurately prioritize, assess, and deliver. Physical geography is combined with human need to more effectively target response efforts and deliver on or exceed minimum humanitarian standards. If done right, the power of participatory mapping ensures that these standards are met, and that key protection principles are embedded within the response.



Arua District Health Facilities, HOT Uganda

What is GIS and GPS?

The toolkit focuses primarily on the use of geographic information systems (GIS) to achieve these goals. A GIS is a computer system designed to collect, store, edit, analyze, share, and display spatial or geographic data. It relies on a coordinate system, that defines the location of a point - such as the Global Positioning System (GPS)*. This is a satellite-based navigation system, that can work in any weather condition, anywhere in the world, 24 hours a day. GIS therefore helps represent data from the real world in the form of an informative, understandable and accurate map with the help of mapping software.

***Note:** You cannot receive GPS signals indoors. GPS receivers are able to receive signals outdoors, unobstructed by trees, buildings etc. from the visible portions of the sky.

WHAT IS PARTICIPATORY MAPPING?

Participatory mapping is the creation of maps by, and using input from, local communities. In a refugee context it is a way to incorporate **protection principles** and promote meaningful access to information.

Participatory maps are visual representations of what a community perceives as its place and the significant features within it. They are based on the premise that local communities possess expert knowledge of their environments.

Often different organizations support this process, but an emphasis is put on providing skills for the community to create maps themselves in order to represent the spatial knowledge of community members.

1. **Prioritize safety and dignity and avoid causing harm** - by gathering information directly with and for refugees there is regular communication about the impact of interventions, minimizing any negative effects to people's vulnerability.
2. **Meaningful access** - open data is a philosophy that advocates certain data to be freely available to everyone without barriers, enhancing access to assistance and services. This is in contrast to data sets that are collected in proprietary systems that are not easily accessible.
3. **Accountability** - participatory mapping is a practical mechanism that can keep service-providers accountable. Refugees themselves are able to directly report on the adequacy of services and address concerns openly.
4. **Participation and empowerment** - this is the heart of participatory mapping. Community members build their own self-protection capacities and claim their rights by being both producers and users of data. Participatory mapping itself is a tool for empowerment.

Given that there are many components of participatory mapping, it is best to think of it as a kind of lifecycle. Revolving around the Community it involves Remote Mapping, Field Mapping, Quality Assurance, and Map Creation. Although there is a general process to mapping, you can begin at different points depending on your needs.

The toolkit enables humanitarians to mainstream protection in their operations because the principles of participatory mapping reinforce and ensure the principles of protection.

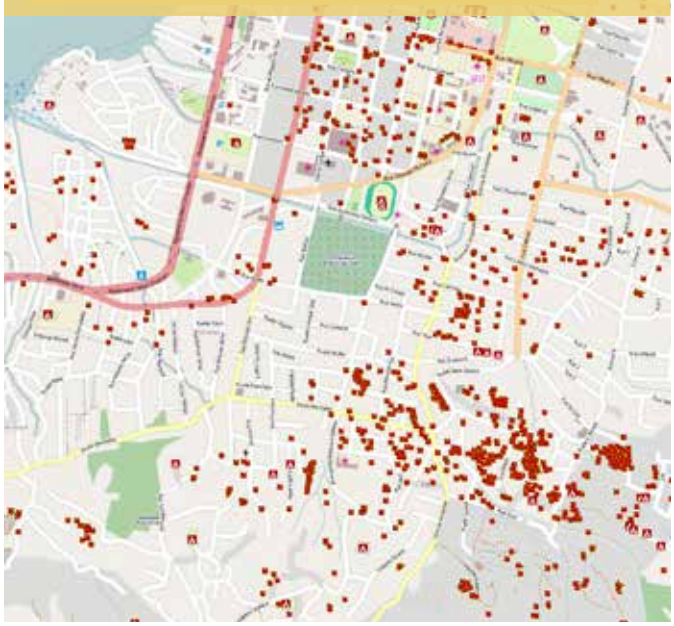
OPEN MAPPING AND OPENSTREETMAP

Open mapping is a global movement to create free and open geographic data. The platform used for this is OpenStreetMap (OSM) – a free, editable map of the entire world being built by its users.

You can think of OSM as the "Wikipedia of maps" – it is an online database and global community of over 4 million registered users. This community collaborates to build a free and open map of the world to which anyone can contribute and which anyone can use in their own context.

The first organized use of OSM in disaster response was following the 2010 Haiti Earthquake. As high-resolution imagery of the affected area was made available to the public, over 600 individuals from the global OSM community began digitizing the imagery and tracing roads and other infrastructure. They made what quickly became the most detailed map of Port-au-Prince in existence, which was then used by search and rescue teams to help route supplies around the devastated capital and to coordinate many other aspects of the response and reconstruction effort.

Haiti Earthquake Damage on OSM



It became clear that open mapping could be of tremendous benefit for humanitarian purposes. The experience of OSM Haiti demonstrated that volunteers who collaborate around open data can quickly create accurate and trusted information. Now, that theory is being put into practice by HOT teams in countries around the world, and in refugee contexts such as Uganda and Turkey.

OSM allows organizations to engage in participatory mapping, creating a bridge between communities and services. Maps are simply a means of conveying information and of communication – when used in refugee contexts they can help expand the amount of protection space available to vulnerable populations.

Getting an OSM Account

Some of the tools in this kit require an OSM account. To sign up, go to OpenStreetMap.com and click the Sign Up button. Most people use their email to sign up, but you may also use a third party to log in. You then need to choose a user name and a password. You will then be asked where you reside in the world, and be given an option to make your contributions part of the Public Domain. Once you've read the agreement click Agree. You will be sent a confirmation email – sign in and click the link. Now you'll be taken to a welcome page with some helpful information. Now you can start mapping!

"Two Minute Tutorial: Signing up for OpenStreetMap"
https://youtu.be/suk8uRpIBQw

WHY USE OSM?

The most common question people ask is: *Why would you use OpenStreetMap if there is Google Maps?* These platforms have many similarities and address the same basic human need of knowing where things are. In short, OSM represents an open approach to how data is collected and distributed, which makes it fast, free, and flexible; an ideal combination for humanitarians.

Fast: In the case of Haiti, the OSM community needed just a few hours to map earthquake affected areas from satellite imagery, in contrast to commercial maps that had no way of responding in such a short period. The thousands of active volunteers around the globe are what made this possible, and the fact that every update is immediately visible to all other users and is version controlled. In many cases, the OSM community has been able to achieve even higher detail than any other map source.

Free: The very idea behind OSM was to solve the problem of restriction by using a Wikipedia model. Each edit you make in OSM is owned by you and the community, whereas each change made in Big Name map providers is owned by them. Data in these other maps is copyrighted and so it can be subject to licensing fees and contractual restrictions. Advertising companies use geographic search results and location information for marketing purposes – they choose which data is relevant to you rather than displaying what is actually around you. OpenStreetMap is, and always will be, available for free.

Flexible: Finally, OSM is ready for any kind of operation. Many major organizations are choosing OSM for their maps because it allows for customization based on need. It has been used to collect functioning and nonfunctioning water facilities in northern Uganda, to map hundreds of thousands of shelters in Bangladesh, and to plan logistics for a Yellow Fever campaign in the Democratic Republic of Congo. It allows access to all of the map offline and can be formatted in local languages.

More to the point, these features of OSM make it appropriate for a refugee context where communities and people affected by crisis should be at the center of humanitarian action. This approach has been phenomenally successful at creating maps in under-mapped places, serving critical needs.

TRUSTING THE INFORMATION

Perhaps the second most common question is: If anyone can access and edit data, how can you trust the information? There is both the fear that people with bad intentions will make malicious edits, as well as the fear that new mappers will enter incorrect data. These are valid concerns and the quality of data is essential to its utility.

A goal of the open data movement is that certain data should be freely available, but this does not mean at the expense of accuracy or levels of control. In order to trust information, it should be validated – it should undergo review to ensure that it is correct and useful.

Organizations can choose the degree to which they validate data, before ever uploading it into OSM or making a map. For example, after data is collected in the field it can be evaluated offline and cleaned before being uploaded. In the tools below we explain several ways of doing this.

Within OpenStreetMap changes aren't forever. Any errors can be undone, and there are historical backups of the data. All edits made to the map are recorded in the database with the ID of the user making the change along with a timestamp. Users that vandalize the map can have their editing rights suspended or removed entirely. Overall vandalism is extremely rare, and the large user base means that the OSM community is largely self-correcting.

With more participants the map data becomes better over time. Private sector companies – including some of the largest technology firms – are moving to OSM. Therefore, there is increased incentive and tools being used globally to monitor changes and correct errors. With more commercial use the map will become that much better for humanitarians.

Above all, the strength of participatory mapping is in local knowledge. Ultimately the data is coming from local communities who are best able to represent their own information and provide more accurate information than could be created by an outsider to that community.

ACCESSING AND USING THE DATA

So now you want to get the data. There are many ways to download the data from OSM, but it is important to consider how much you want to access and which tool suits your purposes.

In theory, you have access to the entire planet - but this is a huge amount of data. You can download the full dataset by going to **Planet OSM**, but more likely you will select a specific area for download.

For instance, you can export data directly simply by clicking the Export button on OpenStreetMap. If you do this you are given the option of arranging a bounding box around the area you are interested in downloading by clicking "Manually select a different area." This is then downloaded as an .OSM file.

There are lots of excellent export resources developed by third party providers - in the tools section we will cover three of these in depth: the Export Tool, Humanitarian Data Exchange (HDX) and Overpass Turbo. All of these allow you to make a more targeted selection of the area you would like to export data for, and export to various well-known and widely used file formats, such as ESRI shapefile and **GeoPackage**. Once you have downloaded the data there are an equal amount of tools for actually using the data - from analysis to creating maps.

The information collected and added to the OpenStreetMap platform is distributed with the Open Database License (or **ODbL**). This allows anyone to freely copy, distribute, and adapt OSM data. The only requirement is that OSM be given credit in any adapted works, and if the original data is altered, the result should be made available under the same license.

For more information
https://wiki.openstreetmap.org/wiki/Downloading_data

DATA PROTECTION

The first protection principle states that organizations 'do no harm' as a result of their actions. Therefore, when collecting data and creating maps, organizations must ensure the data security for vulnerable populations.

Some data is more sensitive than others and projects may lessen the issue upfront by avoiding the collection of **personal data** altogether. Organizations cannot share someone's personal information – they do not have this right. However, even with generic data collection, organizations should be aware of the meaning of data protection and act with sensitivity.

The basis of a refugee's right to privacy and data protection is enshrined within international human rights law. Article 12 of the Universal Declaration of Human Rights *guarantees a refugee's right to protection from any arbitrary interference with their privacy.*

Refugees are especially vulnerable. Having been forced to flee persecution they remain vulnerable throughout their journeys and even when settling into a new environment. They have had their personal information digitally collected and processed many times over by humanitarian agencies. From camps, processing centers, NGO offices and programs, registration of those assisted is common practice.

If data gets into the wrong hands, it could represent a threat to refugees' safety and wellbeing. The realities of humanitarian operations are such that organizations often bend to the will of their host states, with government priorities overriding humanitarian concerns.

We recommend organizations adopt codes of conduct and operational procedures for the ethical and principled use of information, especially personal data. Perhaps the easiest way to do this is by adopting principles for the use of information in humanitarian crises.

Throughout the toolkit we keep these principles in mind. Data protection is a human right.

For more information see the Handbook on Data Protection in Humanitarian Action
https://www.icrc.org/en/publication/handbook-data-protection-humanitarian-action

Personal Data: Any information relating to an identified or identifiable individual, whether by a number or other factors specific to the individual.