Learning for impact Disaster Risk Reduction

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PUTTING VULNERABLE COMMUNITIES ON THE MAP:

A research report on what influences digital map-making with young volunteers in Bangladesh

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CARE INTERNATIONAL

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Foreword

The number and scale of disasters are continuing to grow across the world. These disasters are happening in more complex contexts than ever before, increasing the challenges for humanitarian response. In 2014 alone, 344 disasters were recorded, and that was the lowest annual figure for the decade. As climate change and conflicts continue over the coming years, we will see an increasing number of people in need of humanitarian assistance. We will need detailed maps to inform our aid and development operations and to support us to plan and monitor our activities. However, there are still many areas of the world which are unmapped.

Y Care International believes strongly in the power of local people and local organisations in responding to crises and carrying out development activities. Our partners across the world know the context, language and culture of the local area; many of our YMCA partners have been active in their countries for more than 100 years – quite a legacy. Young local volunteers played a vital role in our emergency response to the Ebola outbreak in Sierra Leone and Liberia and really showed the power that young people have in their own communities.

The staff and volunteers of our local partners, and the people in the communities they serve, also need to be able to access and use these maps. We need to ensure that the information that is important to them is represented. However, we recognise that in many of the countries in which we work, people have limited access to the internet and computer literacy, restricting the use of digital maps by local people. This is why we are exploring new approaches in digital mapping and we are pleased to be working with the Missing Maps project and with thanks to Médecins Sans Frontières and the British Red Cross for their collaboration.

In Bangladesh, UK and Bangladesh volunteers are working together to put vulnerable communities on the map. Y Care International volunteers, carrying out 10-12 week placements under the UK Government International Citizen Scheme (ICS) with Bangladesh YMCA, have combined their skills in Bangla and English, computer literacy and local knowledge, and map-reading to add detail to freely available OpenStreetMap maps online. These maps will help inform our health and disaster risk reduction (DRR) programme in Bangladesh which we run in partnership with the YMCA.

They will also help many others, from a local young YMCA volunteer planning DRR activities in their village, to international NGOs responding to crises. A well-mapped world is vital to support the new global frameworks agreed this year – the Sendai Framework for DRR and the Sustainable Development Goals – as well as the upcoming Climate Conference and World Humanitarian Summit outcomes.

Adam Leach

CEO

Y Care International

Acknowledgements

Acknowledgement from Y Care International

Y Care International would like to thank the people involved in this research and acknowledge the young people around the world who are engaged in disaster risk reduction (DRR) and mapping activities. Thank you to the Y Care International volunteers on the ICS programme, both from the UK and those in country, who have improved maps in the areas they volunteered. They were supported by the OSM community both in the UK and in Bangladesh, so thank you to you all too.

Thanks to King's College London for the valuable partnership and support which made this research possible. We hope to continue to work alongside Masters students at King's College London to carry out more research on young people, disasters and DRR; and learn, improve and deliver programmes for vulnerable young people worldwide.

Thank you to the National Council of YMCAs of Bangladesh and to the local YMCA branches of Birisiri and Chittagong for their time, dedication and efforts in supporting Carmen in this research study in-country. Thank you to British Red Cross and Médecins Sans Frontières for being so collaborative and open to piloting a new way of collecting mapping data under the incredibly important Missing Maps project.

Finally, Y Care International would like to say a big thank you to Carmen Sumadiwiria for her support, enthusiasm and research. This valuable piece of research will complement our learning from the mapping pilot and help us to support the role of young people in mapping for DRR in Bangladesh and across the world. Thank you Carmen.

Acknowledgements from Carmen Sumadiwiria

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Photography

All images Y Care International or Carmen Sumadiwiria as referenced.

List of acronyms

DRR	Disaster Risk Reduction
GIS	Geographic Information Systems
HOT	Humanitarian OpenStreetMap Team
ICS	International Citizen Service
MSF	Médecins Sans Frontières
OSM	OpenStreetMap
VGI	Volunteered Geographic Information
YMCA	Young Men's Christian Association

About

About Y Care International

Y Care International is the YMCA's international relief and development agency. We work in partnership with YMCAs and other local partners across the developing world to address the needs of the most disadvantaged young people. We empower young people to contribute to the development of their own communities through programming on enterprise and employability, health and well-being, disaster resilience, justice and participation.

We also provide young people in the UK with the opportunity to volunteer abroad alongside local young people for 10-12 week placements, contributing to international development across the world, through the International Citizen Scheme (ICS).

www.ycareinternational.org

About Bangladesh YMCA

Established in 1965, the Bangladesh YMCA movement seeks to unite young people to work towards building an eco-sensitive and just society, based on equal opportunity for all. The movement, comprised of 12 local YMCAs, is youth-led with strong youth involvement in governance and the planning and delivery of all activities. Their main programmes include non-formal education for disadvantaged children, vocational training for young people, healthcare, and youth empowerment and leadership development. The YMCAs work with all people irrespective of their religion or caste, with a view to uplifting their socio-economic condition.

About King's College London

King's College London is one of the world's leading research and teaching universities based in the heart of London. It is also one of England's oldest, founded in 1829. King's is dedicated to the advancement of knowledge, learning and understanding in the service of society. www.kcl.ac.uk

About the Missing Maps project

The Missing Maps project aims to map the most vulnerable places in the developing world, in order so that international and local NGOs and individuals can use the maps and data to better respond to crises affecting the areas. To do this, the Missing Maps project will support the Humanitarian OpenStreetMap Team (HOT). It was founded by American Red Cross, British Red Cross, HOT and Médecins Sans Frontières.

www.missingmaps.org

About Humanitarian OpenStreetMap Team

When major disaster strikes anywhere in the world, HOT rallies a huge network of volunteers to create, online, the maps that enable responders to reach those in need. HOT also supports community mapping projects around the world and assists people to create their own maps for economic development and disaster preparedness.

www.hotosm.org

A busy river crossing in Bangladesh Carmen Sumadiwiria

Executive Summary

Last year, 344 disasters triggered by natural hazards were reported worldwide, affecting 108 countries and nearly 142 million people[1]. That's 344 times that local communities and organisations, local and national governments, and international organisations needed geographic information on the affected area to inform a rapid and effective response. Unfortunately, there are still many places across the world which lack this basic geographic information, remaining unmapped.

Detailed maps give individuals, organisations and governments' information to support them in planning DRR activities and preparing for crises. Detailed maps also help humanitarian response actors to get aid where it is needed most, by helping to understand the population size and density, as well as identify and address logistical challenges. Efforts are being made to address the lack of maps in the most neglected places.

Founded on the premise that high-quality maps can ensure a better humanitarian response, enable population estimates, and be used as invaluable tools for epidemiological studies, the Missing Maps project was conceived as a collaborative effort between Médecins Sans Frontières (MSF) UK, the British and American Red Cross, and the Humanitarian OpenStreetMap Team (HOT). The aim is to provide maps in the most vulnerable places in the developing world so that local and international NGOs and individuals have the information to better respond to crises there. The Missing Maps uses the OpenStreetMap (OSM) platform, an open-source software which is freely available online to access and edit. Y Care International recently joined this collaborative effort by piloting the involvement of their volunteers on International

[1] EM-DAT (2015)

Citizen Service (ICS) placements in map data collection efforts in three hazard prone locations in Bangladesh.

Bangladesh is one of the countries in the world most vulnerable to climate change, and experiences frequent flooding and cyclones, and landslides and droughts. Flooding happens on an annual basis during the monsoon season and is a part of normal life for many in Bangladesh. However, during times of flooding, education, livelihoods and access to healthcare and other services are disrupted making life an even bigger challenge for those living in poverty. Y Care International has been working with Bangladesh YMCA to provide training and support for young community volunteers on disaster risk reduction (DRR) across the country to build their resilience to disasters and climate change.

The aim of this study is to understand what factors influence the production of maps, both at the local level, and remotely, and how this impacts what is eventually represented in those maps. The study explores digital humanitarianism and volunteered geographic information (VGI) through the lens of the Missing Maps project and the role of young volunteers.

Y Care International hopes that the findings and recommendations from the research will help to inform future mapping activities and the involvement of local and UK young volunteers, in particular those volunteering on ICS.

Key recommendations

- Future digital mapping activities must build the trust and understanding of local communities in the map-making process by engaging them fully.
- NGOs involved in producing maps should conduct consultations throughout the map-making process with local communities on what their priorities are for data represented on the maps and how they could be supported to access and use them.
- Map-making activities should look at building linkages between local community volunteers with no, or limited, computer and internet literacy and map-reading skills, with volunteers with these skills. Field teams should be made up of members with a variety of skills and knowledge.
- Investment should be made in increasing the computer and internet literacy, and map-reading skills, of local communities, and local and national NGOs and government.
- Efforts need to be made to ensure women and those from different socioeconomic backgrounds, including those with low levels of education, are involved in the process of local map-making.
- More local volunteers should be mobilised to engage in OSM digital mapping and maintenance.
- The OSM community should agree and share clear and simple guidelines on the standards of accuracy required for digital mapping using the OSM platform.

A street in Chittagong, Bangladesh congested with traffic Carmen Sumadiwiria

1. Introduction

Last year, disasters triggered by natural hazards affected 108 countries and nearly 142 million people[2]. That's 344 times that local communities and organisations, local and national governments, and international organisations needed geographic information on the affected area to inform a rapid and effective response. Unfortunately, there are still many places across the world which remain unmapped.

This year a new global framework for disaster risk reduction (DRR) was agreed by all UN member states. The Sendai Framework for Disaster Risk Reduction 2015 – 2030 aims to prevent new, and reduce existing, disaster risk through a variety of measures that "prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience"[3]. However, without access to information on infrastructure, where people live, the location of health facilities etc., disaster risk is very difficult to manage. A lack of map data makes preparing for disasters a real challenge; increasing the vulnerability of those living in hazard-prone locations.

Detailed maps give individuals, organisations and governments' information to support them in planning DRR activities and preparing for crises. Detailed maps also help humanitarian response actors to get aid where it is needed most, by helping to understand the population size and density, and identify and address logistical challenges. Efforts are being made to address the challenge that a lack of maps presents in disaster situations.

Founded on the premise that high-quality maps can ensure a better humanitarian response, enable population estimates, and be used as invaluable tools for epidemiological studies, the Missing Maps project was conceived: a collaborative effort between Médecins Sans Frontières (MSF) UK, the British and American Red Cross, and the Humanitarian OpenStreetMap Team (HOT). The aim is to provide maps in the most vulnerable places in the developing world so that local and international NGOs and individuals have the information to better respond to crises there. The Missing

[2] EM-DAT (2015)
[3] United Nations (2015)

Maps project hopes that the process of producing these maps will become the 'biggest instance of digital volunteerism ever seen'[4].

The Missing Maps uses the OpenStreetMap (OSM) platform, an open-source software which is freely available online to access and edit. The Missing Maps project organises monthly 'mapathons', which bring together volunteers in the UK and other parts of the world to trace over satellite imagery in order to create base maps. The second stage of map-making involves data collection in the area being mapped, enhancing the base map that was created remotely with local data such as road names and points of interest.

Y Care International recently joined this collaborative effort by piloting the involvement of volunteers in map data collection efforts in communities in Bangladesh. So far, more than 570 volunteers from the UK and abroad have participated in 10-12 week placements abroad facilitated by Y Care International and as part of the UK Government International Citizen Service (ICS), so there is the potential for scaling up the activity to other areas. . Volunteers from the UK are joined by an equal number of local in-country volunteers in Bangladesh, Guatemala, Senegal, Sierra Leone, Togo and Liberia in collaboration with Y Care International's local YMCA partners in-country. Y Care International's mapping pilot, in collaboration with the Missing Maps project, was implemented in three hazard prone locations in Bangladesh to assess the feasibility of young ICS volunteers mapping an area during their placement. Volunteers on the ICS programme were provided with training from OSM Bangladesh volunteers, as well as the researcher, on digital mapping.

Expected outcomes

Despite the recent increase of digital mapping initiatives, the phenomenon is still in its infancy and academic engagement has been sparse. The aim of this study is to understand the impact that influence and bias have on the production of maps, both at the local level, and remotely. The study will explore digital humanitarianism and volunteered geographic information (VGI) through the lens of the Missing Maps project and the role of young volunteers in this process.

As the fields of digital humanitarianism and VGI continue to grow and expand, we need to reflect on the new types of information emerging out of this vast network of professionals and volunteers alike. These open-source digital maps are repositories of knowledge and power. Understanding that the information represented on them has been created through a process that may not be neutral or free from bias, will allow those that use them to make more informed decisions.

Y Care International will endeavour to use the findings and recommendations of this research to inform future project design and continue to support the role of local young people in digital humanitarianism, DRR and emergency response. Y Care International believes in empowering young people to improve their own lives and those of their peers, families and communities across the world.

[4] MissingMaps (2014)

An OSM volunteer mapping in Birisiri, Bangladesh Carmen Sumadiwiria

2. An overview: disaster resilience, risk perception and prioritisation

2.1 Digital humanitarianism

Digital Humanitarianism is a relatively new movement and as such lacks a commonly accepted definition. Definitions refer to social and institutional entities enabling unrestricted numbers of people – both remote and on the ground – to collaborate through digital technologies to support humanitarian responses to crises[5]. The relationship with humanitarian response means that "disaster-affected communities are increasingly becoming 'digital communities' as well" and when disaster strikes, the digital humanitarian system springs to action[6]. This suggests that in an emergency or humanitarian crisis there is an instantaneous activation process that can deliver fast and accurate information on the reality on the ground. However, the work of the Missing Maps project and Y Care International differs from this sort of response; their mapping activities are more pre-emptive and, particularly Y Care International's work, aims to inform disaster preparedness planning and long-term disaster risk reduction (DRR) interventions.

However, to date there has been a lack of critical research on what kind of data are being produced by those involved in digital humanitarianism or VGI. An analysis of VGI as a suitable tool for mapping both in advance of, and during, a humanitarian crisis is essential. Additionally, an analysis of the integration of hazard-prone or disaster-affected communities into the VGI process is crucial; along with scrutiny of bias, power, privacy, ethics and security in the process. There is a lack of academic engagement in

[5] Burns (2014)
[6] Meier (2015)

the latter[7] and some suggest VGI goes beyond a data type and should be engaged with as a new social practice with power relations influenced by political economic relationships[8].

2.2 Volunteered Geographic Information (VGI)

In essence VGI is geographic data provided voluntarily by individuals, often through free and accessible platforms such as OpenStreetMap or Wikimapia. Other terms used for this kind of activity are 'crowdsourcing' or 'collective intelligence'. Local, unofficial, user-generated content creation has its challenges such as mistakes and inaccuracies in the information. There is the possibility that users will deliberately enter incorrect information; either for malicious purposes or to challenge authority by, for example, re-labelling official road names. However, the assumption about this kind of knowledge production is that errors will be identified by those involved in producing it and/or using it. Therefore, with enough contributing users, mistakes and inaccuracies are likely to be corrected. While this is a concept under much scrutiny, VGI's credibility is on the rise[9].

There is growing evidence that VGI maps can be very accurate compared to ordnance surveys for example[10]; remarkable given that the creation of geographic information has been a function reserved to official agencies for centuries[11]. Another strength of VGI is its ability to shed light on the local level even in areas unnoticed by international media[12], including providing information beyond what maps have traditionally included.

Additionally, given that VGI using online platforms such as OpenStreetMap relies on access to the internet and a certain level of computer literacy, the 'digital divide' plays a role in which areas are mapped or not. Maps with a high level of detail, on platforms such as Google, tend to be utilised in more affluent regions. This generally, can be linked to wider access to internet, higher education levels and the influence of businesses who gain financial benefit from detailed mapping. Considering who is included or excluded from creating or using VGI is essential for understanding it better; for example, less than 10% of the population of Bangladesh have accessed the internet in the last 12 months compared to 92% in the UK[13]. The Missing Maps project highlights this divide.

2.3 Digital mapping

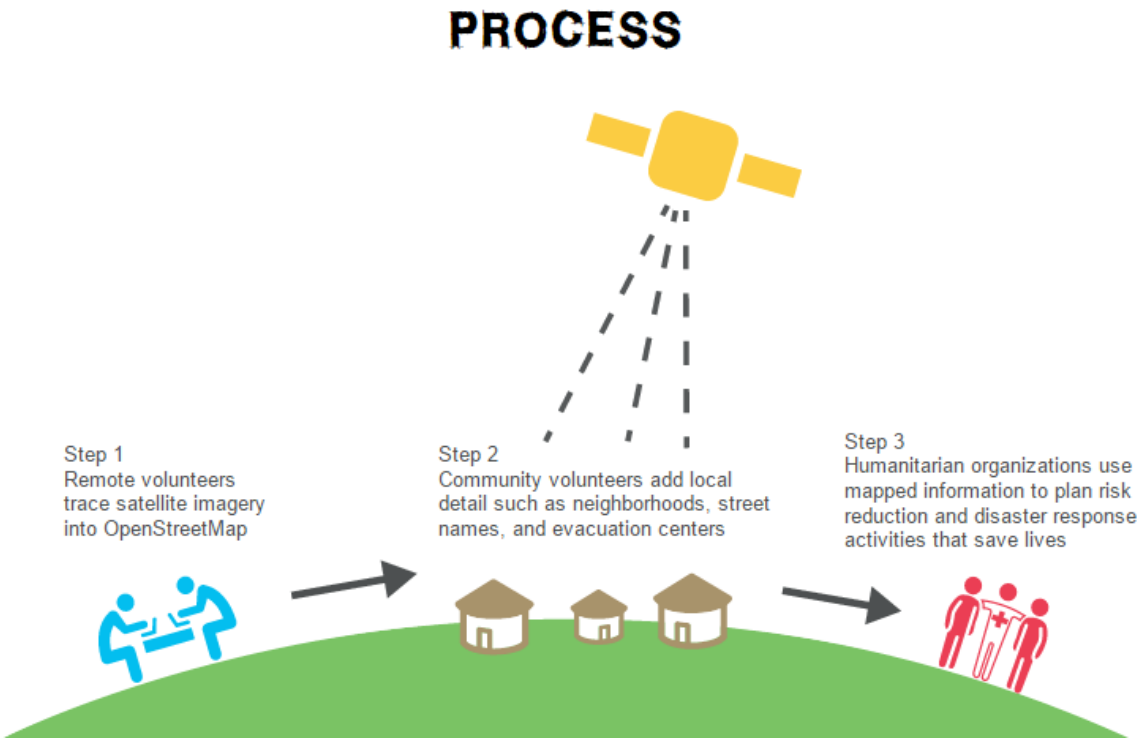
Following the Haiti earthquake in 2010, a variety of digital actors emerged, one of which was the Humanitarian OpenStreetMap Team (HOT), whose aim is to provide open-source[14] maps and data for humanitarian response and economic development. HOT works primarily through the OpenStreetMap (OSM) platform, a project that relies on volunteered geographic information (VGI) to create freely re-usable geospatial data;

[7] Sandvik et al. (2014)
[8] Elwood et al. (2012)
[9] Flanagin & Metzger (2008)
[10] Haklay (2010) and Middleton et al. (2014)
[11] Goodchild (2007)
[12] Ibid.
[13] World Bank (2015)
[14] Open-source software in computing is that which the original source code is made freely available and may be redistributed and modified.

OSM ultimately aims to provide an entirely free map of the world. Together, HOT and OSM have been activating large groups of online or remote volunteers to collaboratively trace over high-resolution satellite imagery in order to create maps of parts of the world which may never have been mapped before. Another of HOT's main activities is the training of local volunteers in project areas, who are then able to collect map data in the field. The result is an open-source, freely accessible, digital online map with key features such as roads, health facilities, schools and other points of interest.

The process of producing a map of an unmapped area is outlined in Figure 1 below. The usefulness of these crowdsourced maps has attracted a lot of media attention in recent years; particularly during high-profile disasters. As a result more individuals and organisations are keen to support the process.

Figure 1: The Missing Maps Process



Source: MissingMaps

A flooded community in northern Bangladesh Y Care International

3. Bangladesh

Bangladesh is one of the countries in the world most vulnerable to climate change, and experiences frequent flooding and cyclones, and landslides and droughts. Flooding happens on an annual basis during the monsoon season and is a part of normal life for many in Bangladesh. However, during times of flooding, education, livelihoods and access to healthcare and other services are disrupted making life an even bigger challenge for those living in poverty. Y Care International has been working with Bangladesh YMCA to provide training and support for young community volunteers on disaster risk reduction (DRR) across the country to build their resilience to disasters and climate change. Much of the research data collection was carried out in two project locations of Chittagong and Birisiri where community mapping led by Y Care International and OSM Bangladesh volunteers was observed and focus group discussions held. Interviews were also held in Dhaka, Bangladesh and London, UK.

Dhaka

Interviews with OSM Bangladesh volunteers were conducted in Dhaka and informal discussions took place with NGOs working in mapped areas of Bangladesh.

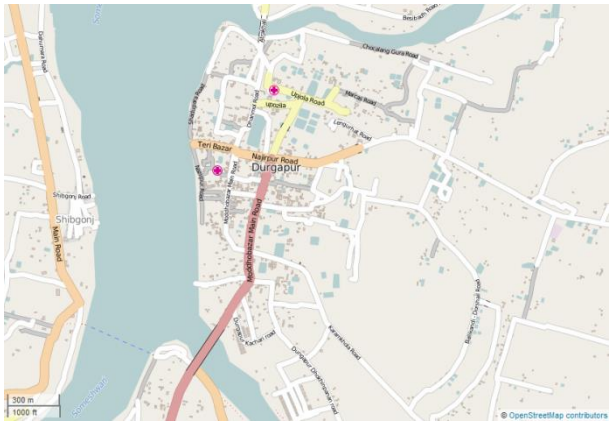
Birisiri and Chittagong

Birisiri is a village located in Netrokona District in the north of the country along the Someshwari River, see Figure 2 below for the OpenStreetMap map. Birisiri experienced serious flooding in 2014 and many people had to temporarily leave their homes for higher ground. The YMCA is located in Birisiri and mapping by Y Care International volunteers extended beyond Birisiri covering Durgapur also.

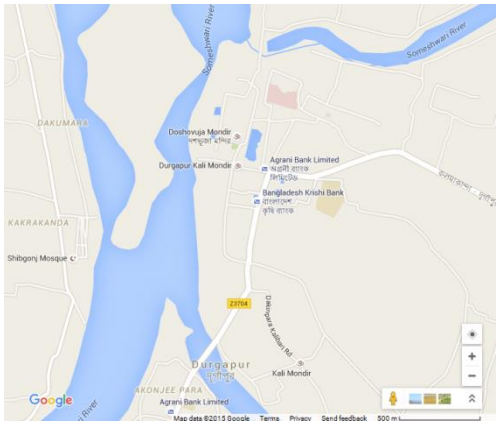
Chittagong in south-eastern Bangladesh is a coastal city with a population of 6.5 million; the second largest in the country after Dhaka, see Figure 3 below for the OpenStreetMap map. The area is affected by cyclones, including most recently Cyclone Komen in July 2015 which brought strong winds and heavy rains, and is in a high seismic risk zone making earthquakes a high possibility. The YMCA is located in the city and mapping by Y Care International volunteers focused on an area in the south of Chittagong on the east bank of the river where flooding is common.

Below are maps of the Birisiri and Durgapur and Chittagong from OpenStreetMap and Google to compare the difference in detail.

Figure 2: Maps of Birisiri and Durgapur

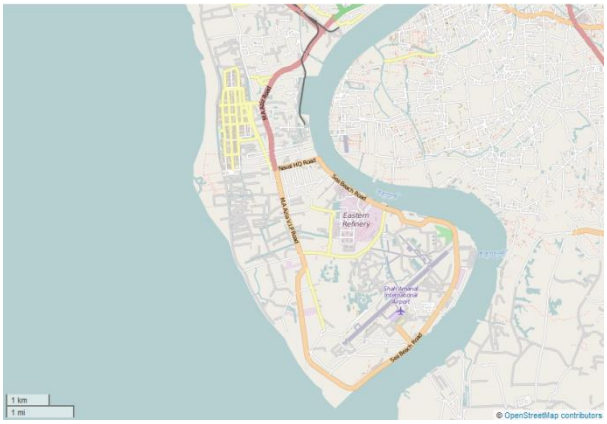


Source: OpenStreetMap contributors

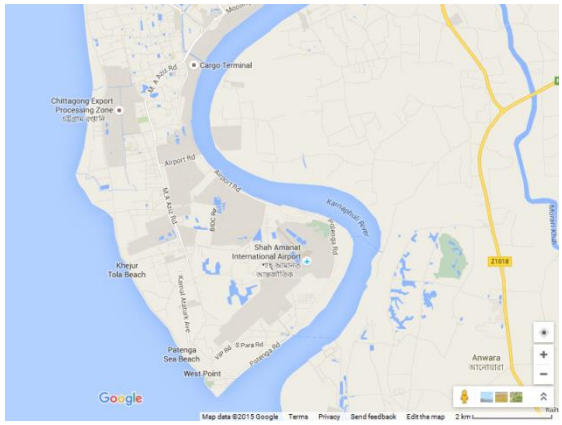


Source: Google

Figure 3: Maps of Chittagong



Source: OpenStreetMap contributors



Source: Google

London

All interviews with digital humanitarian experts were held in London, many of them being based in the UK. This included the interviews held with project coordinators whose main focus was in Zimbabwe. London is also a hub for NGOs and humanitarian organizations in the UK alongside think-tanks, academic institutions and donor agencies. As a result, digital humanitarianism is gaining a lot of traction in the UK's capital city.

OSM Bangladesh volunteers mapping a riverine area Carmen Sumadiwiria

4. Methodology

Data collection

To allow for in-depth analysis, the research methods consisted of semi-structured interviews, focus group discussions, and observance of a practical mapping exercise and visits to projects in Bangladesh. All those consulted in the study were involved with the Missing Maps project to some degree. In Bangladesh, a snowballing technique was used to identify OSM Bangladesh volunteers and health-care workers willing to be part of the study, with the OSM Bangladesh GIS expert as gatekeeper. In the UK, the researcher already had links with those involved in the Missing Maps project and was able to identify key informants for interviews. A total of 41 people (21 male; 20 female) were consulted throughout this research in July and August 2015 in Bangladesh and the UK; 80% of these were young people[15]. A variety of methods were used as outlined below.

Seventeen semi-structured interviews were held with digital humanitarian experts working at NGOs, OSM Bangladesh volunteers and healthcare workers in Bangladesh; 10 of these were carried out in Bangladesh. UN agencies and NGOs are in a position to request maps of certain areas from the volunteer mapping community and as such expert staff from Doctors without Borders / Médecins Sans Frontières (MSF) were interviewed about their approach to digital humanitarianism and VGI. Some of the interviews with digital humanitarian experts in London were held before the field trip to Bangladesh and some after meaning that the interviews did not necessarily cover the same questions to the same level of detail. Similar themes were discussed with all interviewees while allowing enough flexibility and space for an open discussion which identified new angles on the subject.

Four focus group discussions were held with the ICS volunteers in Bangladesh, all of whom were young people, in the two research sites. The participants of the focus group discussions were encouraged to speak between themselves as opposed to solely answering the questions of the facilitator. This allowed the researcher to see diverging and converging opinions of the group.

[15] Y Care International define young people as those aged between 15 and 24, however due to the long process of ethical approval for conducting research with those under 18 years old, this study includes only those who were 18 and above. The upper age limit has been increased to 35 based on Bangladesh's youth policy defining youth as 18-35 years.

The researcher also observed two practical mapping exercises in Birisiri and Chittagong, Bangladesh from beginning to end – part of OSM, Missing Maps project, and Y Care International pilot activities. The mapping exercise was facilitated by 5 volunteers from the Bangladesh OpenStreetMap Team who provided training to 40 Y Care International and YMCA volunteers from the UK and Bangladesh. After 3 days involved in the practical mapping exercise, the volunteers were asked about their experience in the four focus group discussions mentioned above. This gave a good insight into the experience of mapping for three distinct groups of young people: UK ICS volunteers new to mapping, Bangladesh ICS volunteers new to mapping, and Bangladesh OSM volunteers experienced in mapping.

Finally, a healthcare project implemented in Dhaka, Bangladesh by a medical NGO was visited by the researcher to understand how useful detailed maps had been, or would be, in their work. Contextual differences were explored by including two Missing Maps project coordinators who had primarily worked in Zimbabwe in the interviews.

Challenges

The following challenges were encountered during the research. Monsoon rains presented a logistical challenge during the field visit in Bangladesh which resulted in a limited time available for map data collection and some areas for mapping became inaccessible.

The field research also coincided with the Holy Month of Ramadan which limited the length of time available for mapping activities due to constraints around eating and drinking in public.

All participants in the research were proficient English speakers, but on occasion translation was necessary from Bangla into English; therefore some detail or nuance might have been lost in translation. Additionally, in focus group discussions with ICS volunteers, UK volunteers were more outspoken and willing to voice concerns than their in-country counterparts.

Research questions

Literature reviewed through this research has identified that VGI and digital humanitarianism need to be treated as a ‘new social practice’ and more critical approaches are being encouraged. However, this research primarily focuses on the dynamics between the NGOs involved in mapping, OSM, the volunteers involved, and the local residents of areas being mapped. Three research questions were formulated:

1. In the process of making a map, when are decisions made that can alter the data and knowledge represented on that map?
2. How do the actors that work together to make the map interact, and does that have an influence on what is represented on the map?
3. What forms of knowledge representation are achieved through digital humanitarian and VGI initiatives?

Two ICS volunteers mapping with support from an OSM Bangladesh volunteer Carmen Sumadiwiria

5. Results

5.1 Map use

International NGOs

In interviews with staff from MSF about their approach to digital humanitarianism and VGI it became clear that what was required from the maps that they requested was that they contained data which was fit for their purpose. 'Fit-for-purpose' for these MSF representatives meant that the data, or maps, contained the information relevant for their use at that time. Data needed for their medical interventions would be different for planning a cholera vaccination programme than for responding to medical needs after an earthquake.

For Y Care International, information requested on maps in three project areas in Bangladesh were primarily of infrastructure (roads, homes etc.), rivers and water bodies, and health facilities. This information was needed to inform and shape activities and advocacy on health and DRR implemented on the ground by their partner in Bangladesh, the YMCA.

For one digital humanitarian expert interviewed, the number one priority for mapping was accurate information on public health infrastructure to inform operations. They said that wherever possible maps should be made *with* local people, but where the capacity for mapping was difficult to build due to conflict or violence, maps would be made *for* them.

Local NGOs or branches

Anecdotal evidence showed that NGOs active in Bangladesh found the maps useful for coordination, but generally local workers, active in the community, did not use / need the maps for navigating the area. This suggests that the maps primarily fulfil the needs

of NGOs and higher-level operational decision making, and that they bring little added value to local community workers.

Local communities

One use for improved maps locally is to provide local residents with the information they need to locate services such as health facilities, and understand natural hazard risks such as areas close to the river. But, 50% of interview respondents – Bangladeshi healthcare workers, OSM Bangladesh volunteers, and ICS volunteers – said they believed the majority of people living in the Y Care International project areas being mapped would not be able to read a map. One of the barriers to this is that data entered onto the OSM platform by the Missing Maps project is primarily in English.

Through the Y Care International Missing Maps project pilot, data such as names of roads and mosques were collected by ICS volunteers in Bangla as well as English and handwritten onto hard copy 'field papers'. These data were then transported back to the UK to be digitised onto the OSM platform and in this process the data in Bangla does not get entered into the database. The reason for field papers coming back to the UK for data entry is mainly due to the fact that there are more volunteers in the UK with digital mapping skills and access to laptops and the internet who can digitise the data quickly. They are also supported by an organised volunteer structure making uploading large volumes of data more convenient in London. Unfortunately data in Bangla is not entered into the database through this process as the majority of UK volunteers cannot read or type Bangla. Therefore maps with names / labels in Bangla are not available online, making the maps undecipherable for the majority of people living in these locations.

The aim to provide people living in unmapped areas with accessible and useful maps through the Missing Maps project has thus not been fulfilled at this point. The maps are fit for purpose for the UN, NGOs and others who speak English but are a demonstration of the digital divide mentioned earlier in the report. They show the influence that NGOs have on knowledge production; maps are fit for their purpose but not for local residents of the area. One Bangladeshi interview respondent said:

"Those data, those maps are for the NGO. By the NGO, for the NGO. And people don't even know that there is a map that they can use, and they don't know where to find it, because it is not promoted that I am doing a map."
A 35 year old male OSM Bangladesh volunteer

The level of engagement of local communities seems to vary from project to project and the NGO perspective clearly shapes knowledge production when it comes to digital mapping. However, that does not necessarily mean that local knowledge is side-lined or omitted from the process. In fact, NGOs would rather maps reflected how populations describe their location themselves, for example using local and commonly used names of landmarks and streets. For navigation and coordination purposes this is useful for non-locals – whether they be from another area, country or continent – as well as for local people, organisations and governments. Participatory initiatives which include a high level of local community engagement in the mapping process are often

called ‘community mapping’ and allow more flexibility to ensure local knowledge is represented.

5.2 Map creation

The involvement of local people

There are clear benefits of local engagement in the creation of maps. In the table below only the local OSM community, OSM Bangladesh in the case of this study, fulfils all functions in digital map creation and maintenance.

Table 1: Humanitarian Mapping and Local Communities[16]

	Remote mapping	Field mapping by ‘outsiders’	Field mapping by locals	Local OSM community
Database of geometrics and assumptions based on imagery	x	x	x	x
Database of ‘on the ground’ data		x	x	x
Database of local knowledge			x	x
Maintained database of local knowledge				x

Where local communities are empowered to lead, manage or influence the mapping process themselves, knowledge production will be less affected by the digital divide. The table shows that engaging the OSM Bangladesh community might be more effective than engaging remote mappers in the UK to create maps of Bangladesh in terms of ensuring local knowledge is represented. OSM Bangladesh volunteers are able to create maps in Bangla and understand more of the cultural and social norms of their country, but they would not necessarily be able to understand the local subtleties of an area they are not familiar with or be able to challenge those cultural or social norms.

The best solution then might be for members of the OSM Bangladesh community to train local residents on mapping and the use of OSM. The in-country ICS volunteers engaged in the Y Care International Missing Maps project pilot demonstrate this approach. Throughout the focus group discussions there was a general consensus that the in-country ICS volunteers had the best profile to carry out mapping in their

[16] Vyncke (2015)

community. The only caveat one focus group discussion participant pointed out was that, because local residents are familiar with their local area, there is the danger that they will map only what they already know, potentially overlooking other areas that a non-local data collector might include.

Building the capacity of local OSM communities also meets the humanitarian and NGO requirements; consistently maintained maps reflecting an up to date situation on the ground and showing how local residents view their local area.

Representing how local residents view their local area is important and does not necessarily fit into western ways of describing location. In Bangladesh, all respondents said that describing the location of a house for example would not involve just giving a street name and number as many places do not have documented names. Giving an address would be in relation to the surrounding area and might include a description directing someone to an area between two mosques or locate a road based on a prominent family or landmark. It might also include reference to an influential person, but should such personal information be put on freely accessible open-source maps? And can such descriptions be translated and digitized effectively? It seems that there is a strong push from both the digital humanitarian and VGI communities, to maintain a consistent type of data representation. This may not be compatible with the 'relational geography' described above and common in many countries.

Those consulted for this research who had carried out mapping activities in community talked about local residents meeting them with a mixture of curiosity, suspicion and sometimes fear. Respondents reported that occasionally there would be confusion from local residents about the reason for making a map of the area. In general respondents said, once sufficient information was provided about the purposes of the mapping activities, local residents would be reassured and support the process. Taking the time to explain the purpose of the mapping to local residents and building trust in the process ultimately improves the quality and amount of data that can be collected and manifests itself on the map.

However, 42% of OSM Bangladesh and ICS volunteers consulted felt that the pressure of acquiring information swiftly clashed with the aim of sufficiently informing residents of the mapping activities. Many of the respondents also felt like they were 'extracting' information from the local communities, as opposed to giving something back. One mapping data collector said that local residents in Dhaka would believe that the mapping activities were to benefit NGOs only:

"What information can be given, should be given to the community. That also sensitizes the community to help you properly. Otherwise people will think okay, you are doing it because you will have fund from somewhere else, for your benefit. I don't have any benefit from you"

All respondents who had carried out mapping activities in community reported positive reactions from local residents when they had asked them about the names of features in their local area. Many mappers reported that local community members would take

time out of their day to help with the data collection and openly share their knowledge of road names and their local area.

No respondent reported negative attitudes towards mapping activities in communities. But some reported instances of local residents being uncooperative and withdrawing consent to being put on the map. The most common reasons for this lack of cooperation are summarised below.

Illegal Settlements/Slums

Many parts of Dhaka that were being mapped included slum settlements which were unplanned and 'illegal'. As with many slum areas, local residents were tenants of local 'land owners' who collected rent while not having any legal ownership of the land. All OSM mappers consulted for the research said that they had been mistaken for government officials on occasion and that they had experienced suspicion from local residents while mapping these areas. It is not then surprising that mapping in slum settlements in Dhaka often led to distrust about the purpose of the maps with some local residents potentially feeling that being mapped would give the government and local authorities more information and could lead to evictions.

In interviews with Missing Maps project coordinators in Zimbabwe, they highlighted another situation whereby mapping of houses with details on the building materials used could increase the risk of eviction for those living in houses made with mud. This is due to the fact that, in general, owners of houses made of mud would have no tenancy rights. However, the information was collected as part of the Missing Maps project for MSF to identify addresses of patients to follow up on TB and HIV infected patients. Good detailed maps are very helpful in allowing MSF to locate the addresses of patients and therefore reach more vulnerable people. But the maps are freely available online and so others also have access to this information, including those who have the power to evict residents from their home. Another dynamic to take into consideration is the possibility that by mapping these buildings, they gain legitimacy in a way that they wouldn't have done before. In this case, all the houses were mapped, but their building material was not labelled.

More discussions are needed about how ethics and consent are considered in producing knowledge for digital humanitarian and VGI projects. One expert digital humanitarian said that not enough people are paying attention to the ethical issues around mapping. As a general rule, understanding context and communicating openly with local residents is key to making ethical decisions about mapping data collection.

Private land

Another reason given for a lack of cooperation in local mapping was given by ICS volunteers collecting map data in one of the project areas. Some local residents did not want particular streets to be put on the map. On one occasion this was because a local landowner had invested money in ensuring new road construction gave easier access to their home. The road was considered private land by local residents and there was fear that if the road was made visible on the map, more people would use it, resulting in increased maintenance requirements and costs. Focus group discussions

with ICS volunteers from Bangladesh highlighted that many roads are built through private initiatives in Bangladesh and that over time they become publicly used.

Bias

What local knowledge is represented in these maps is influenced by the OSM contributors to the map; they can steer knowledge production. One respondent from the OSM Bangladesh community said it would be more practicable to involve local residents from different backgrounds in mapping and it would also change the type of knowledge and information included in the map.

However, there is an over-representation of a 'wealthy, powerful, educated and mostly male elite' who disproportionately influence the digital representation of places[17]. One disproportionately represented group within the OSM Bangladesh community is university students. Their engagement is likely to be linked to their technological expertise and map-literacy skills.

Even though this study did not investigate the OSM community in-depth, the issue of unequal gender representation in the map data collection phase was also demonstrated. Despite attempts to identify female digital humanitarian experts, there were few that met the sampling criteria. In addition, recruiting in Dhaka for OSM Bangladesh volunteers to support training in two of the Y Care International project locations, no female OSM Bangladesh members put themselves forward. Some female OSM volunteers told the researcher that their families would not allow them to leave Dhaka. This is relevant for mapping outside the local community and representative of broader societal gender norms in Bangladesh, but it may also represent a gender digital divide[18]. There is a gap in the literature on digital mapping on understanding why the creation of knowledge within the VGI and digital humanitarian community is primarily driven by men.

Conversely, participants in one of the focus group discussions observed that the majority of the local residents present at the time of mapping in the rural areas were women. This means that in most cases only the views of women were taken into account in this mapping process; a dynamic that also needs to be understood better.

Inaccuracies

Many respondents mentioned that local residents often believed that as an NGO was collecting information in their area, they were going to provide goods or services. On occasion, respondents reported that this led to false or inaccurate information being given during the mapping process. One ICS volunteer from the UK said that on one occasion local people believed that if they did not disclose the location of two nearby schools, Y Care International would build one in their village. Managing expectations is an important aspect of communicating with local residents about the intentions and purpose of map-making.

Some respondents from the OSM community mentioned that they are concerned about the lack of standards on accuracy that many digital humanitarian initiatives are

[17] Budhathoki et al. (2010)
[18] Gras-Velazquez et al. (2009) and Huyer (2006)

importing into the OSM database. Maps with some inaccuracies may still allow many NGOs to work with them effectively; however, throughout this research it was suggested that the OSM community may be more interested in the accuracy of maps than NGOs.

It is important to remember that the findings in this report may not be demonstrable of the experience in other countries, for example where the written language is English, access to the internet is better, there are higher levels of computer literacy, and the population is used to reading maps.

Carmen and two fellow digital mappers at a Mapathon in London Y Care International

6. Conclusion, recommendations and further research

The research looked at how the data and knowledge represented on an OpenStreetMap map produced through the Missing Maps project is influenced by the actors involved in the process of producing that map. It also looked at what point decisions are made that influence this production in terms of what is included and omitted in the map. Following are the research conclusions and some key recommendations in bold.

Conclusions and recommendations

From the very beginning of the map production process, knowledge politics is exercised. This is primarily, in the case of the Missing Maps project, a result of NGOs requesting maps or data to inform their activities. This means NGO's choose which places are mapped, and determine the features to be included. They also influence who is involved in the data collection and have their own standards for map accuracy. The latter being an issue raised by an OSM volunteer through this research. In projects run collaboratively between NGOs and local OSM communities, which features are to be mapped should be discussed prior to and during the mapping. Standards for mapping and editing should be agreed upon communally. **The OSM community should agree and share clear and simple guidelines on the standards of accuracy required for digital mapping using the OSM platform**. Where a young or

new OSM community is being developed, key resources such as the OSM Wiki should be discussed, updated and amended to improve consistency and accuracy of mapping data.

NGO influence on map making is motivated by the fact that detailed maps support them to carry out and monitor their aid and development activities more effectively. Maps can play a vital role in ensuring vulnerable populations are reached; for disaster risk reduction, disaster response and development activities. For this purpose, the maps should also serve local communities, local NGOs and community-based organisations (CBOs), and local and national Government. It is not enough to be freely accessible online; they also need to represent local realities. Investment should be made in increasing the computer and internet literacy, map-reading skills and knowledge of local people involved in mapping activities, including local NGOs. For example, even where an NGO is planning to collaborate only on the data collection process with local people, the entire process of mapping should be explained and presented, including how to export OSM data. It is unrealistic to expect a non-computer user to learn geographic information system (GIS) software, but to understand that the map data they contribute to is available for free to anyone is fundamental.

The involvement of local communities in the process not only means maps represent the local reality on the ground more accurately,, including the features and places most important for them, but also they are more likely to be used, maintained and updated in the future. Local priorities for what information is mapped may not necessarily be the same as those identified by NGOs; the involvement of local community members ensures maps are context specific. It also allows local people to raise concerns over contentious or sensitive issues such as mapping illegal settlements. It is vital that, whatever the specific objectives of an NGO in a project, that local people are left with the skills to continue to map what is important to them.

This research also found that those involved in the digital mapping process in Bangladesh – digital humanitarians or those involved in VGI – overwhelmingly come from a homogenous group: male students. No female OSM Bangladesh volunteers accompanied the researcher to the field. The overrepresentation of male, educated OSM volunteers may well have an influence on what information is mapped. **Efforts need to be made to ensure women and those from different socioeconomic backgrounds, including those with low education levels, are involved in the process of local map-making**.

The involvement of local communities in the process of making a map is challenged by the ‘digital divide’ which restricts those living in areas or countries with limited access to the internet and limited computer literacy from the map-making process at all stages. OSM and other local volunteers can play an important role in bridging the gaps between local communities and NGOs and ensuring maps represent the knowledge and priorities of both. For this, **building the trust and understanding of local communities in the map-making process is vital; sufficient time and effort should**

be invested in engaging local communities. Linking volunteers with local knowledge, and volunteers with computer literacy skills, will also help to reduce the digital divide. **More map-making programmes should build links between local OSM and other local volunteers; and between those with no, or limited, computer and internet literacy and map-reading skills, and those with these skills**. Field mapping teams should be made of members with a variety of skills and knowledge. In addition, an emphasis should be placed on peer to peer training, so that all those involved in mapping are learning all elements of the mapping / data collection process. More local volunteers should be mobilised for this and support should be provided to increase internet access and computer literacy skills of local community members where possible.

The process, purpose and benefits of making a map of the local area should also be explained clearly to those living there, local people must be consulted on what features or information they would like included, and they should be asked how they would refer to locations, places, areas. Many people do not refer to locations or navigate in the same way that traditional maps support. There are many people across the world who have never used a traditional map and many more who have never used a digital one. **NGOs involved in producing maps should conduct consultations throughout the map-making process with local communities on what their priorities are for data represented on the maps and how they could be supported to access and use them**. By engaging with local communities to truly understand their way of navigating, digital maps may be able to represent knowledge and data useful for an international NGO keen to support disaster risk reduction, and a local community member interested in identifying a safe location to build a new home. **Printed materials explaining digital mapping, the purpose and what OSM is, should be available for distribution to all mappers**. This should include a contact for the NGO involved and, where appropriate, a method of contacting the local OSM community.

Areas of further research

The findings of this study suggest a number of directions for future research:

1. An analysis of the effect that digital humanitarianism and VGI might have on the nature of humanitarian response and international development in the future; for international, national and local NGOs and governments.
2. Studies on how accurate maps are which are produced remotely by non-locals, and the extent to which these maps which lack local knowledge are useful for all users.
3. An investigation into the most effective ways to engage a representative sample of local people in the production and use of maps to overcome the ‘digital divide’.

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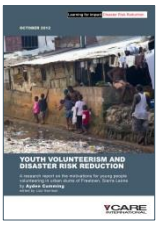

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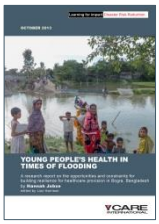

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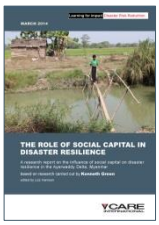

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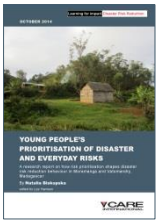

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Available online from: www.ycareinternational.org/publications

Y Care International supports youth-focused programmes of action and advocacy that meet the needs of disadvantaged and vulnerable young people across the world. One of Y Care International's areas of focus is disaster resilience and we are committed to increasing our understanding on how disasters impact on young people and their communities as well as what their capacities are to deal with them, and reduce theirs and their community's vulnerability to them. Disaster resilience is essential for sustainable development and Y Care International believes young people must lead on, and participate in, disaster risk reduction activities across the world, and be involved in humanitarian response activities.

This report summarises the findings from Carmen Sumadiwiria's research in hazard prone communities in Bangladesh in 2015. The report outlines and analyses how volunteered geographic information is produced, in this case mapping using OpenStreetMap as part of the Missing Maps project. The recommendations will inform Y Care International's projects and volunteering programme to increase the impact of our work.

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