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people and skills for disaster relief

# Ready to Respond

## *Skills gaps for responding to humanitarian crises in urban settings in the WASH and shelter sectors*

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# Executive Summary

This paper has been commissioned by RedR to identify gaps in skills, technology, and knowledge in urban humanitarian response in order to inform RedR's project Ready to Respond which is looking to address these gaps in two specific areas:

1. Water supply, sanitation, and hygiene
2. Shelter response to earthquakes

The report begins by considering the nature of the urban environment, the rural bias of Aid Agencies, and the differences between urban and rural contexts. It then considers the skills, technology, and knowledge gaps in the two specific areas of interest before examining what RedR could do.

Most of the world's population now live in cities, with the majority living in cities of less than 500,000 people. Cities are increasingly the scenes of humanitarian crises, and this trend is likely to continue.

Aid agencies normally have a rural rather than an urban focus. The reasons are complex, but include the historic marginalisation of rural populations as governments have focused on politically more important rural populations. Thus there are many effective technologies for use in a rural or camp setting, but relatively few for use in urban settings.

Cities are far more complex than rural settings as they represent not a single context but a mixture of different contexts. These contexts are defined by the level of services accessible to a part of the city, the age of the buildings in that part of the city, and the specific geography of that part of the city among other factors. Thus it can often be inappropriate to apply a single approach across the whole of a single urban environment.

Urban environments are different. They are more populous, more densely settled, and more important politically than rural areas. Many factors like scale, density, space, land tenure, rental patterns, multi occupancy, access, access to services, social structures, the pattern of inequality, demographics, behaviour, rapid change, power dynamics, politics, bureaucracy, planning controls, livelihoods, income levels, a monetised economy, and access to natural resources can all be very different from rural settings. Livelihoods can be radically different in urban settings. However, the specific context determines the extent to which these factors are different

Urban environments offer greater resources, particularly in terms of national staff, but also tend to be more expensive to operate in, demand greater management skills and time. They are more complex and complicated than rural settings. Urban development programmes rather than rural humanitarian response provide better sources of lessons for urban humanitarian response. Urban environments may also offer better access to resources such as national institutes and universities and their research.

The role of multiple levels of government from national to local level is often much stronger in urban settings than in rural settings and there is therefore a need for agencies to work closely with the authorities.

Gaps in the WASH sector in urban response arise because of the scale of operations, the scale of water treatment works, water transport and distribution systems. Humanitarian engineers rarely have an adequate knowledge base for such systems. Other aspects of WASH, including hygiene promotion, water tankering, excreta disposal, and drainage all demand different skills from those applied in rural areas.

Gaps in the post earthquake setting include the capacity to manage large-scale projects, the knowledge needed to build back better, the ability to survive the disaster, and effective disaster risk reduction. Assessing damage, building assessment and remediation are all gaps. Housing, land, and property issues are a recurrent issue.

Some of the gaps identified are broader systemic issues rather than gaps that fall within RedR competence. Gaps that RedR could seek to address include:

1. Maintaining a roster of persons/teams with particular skill sets. The roster could operate with a field posting for a short period, supported by a team back in the office.
2. A pre-disaster assessment service to increase the likelihood that Agencies would not be shut-down by a disaster.
3. A technical support services covering a broader range of topics.
4. Pre-disaster training on working in urban environments.
5. Post disaster training consisting of simple short training courses on-the ground post-disaster targeted at 1) national non-specialised staff; 2) specialised staff

# Introduction

This paper has been prepared as a background paper for the identification of the gaps in skills, technology, and knowledge required by Aid Agencies to effectively respond to disasters in urban environments in two specific areas:

1. Water supply, sanitation and hygiene
2. Shelter response to earthquakes

Other types of disaster, such as complex emergencies and conflict or post-conflict settings, raise many other issues that are not specifically considered here.

In natural disasters the key focus of the affected population is often on restoring livelihoods, whereas Agencies may concentrate more on relief. In complex emergencies, or in slow onset disasters like droughts, the relief phase can be prolonged (it may be decades in the case of complex emergencies). It is typically much shorter in sudden-onset natural disasters. There is a blurring between relief and recovery in many natural disasters.

This report begins by considering the nature of the urban environment and why it is important that Aid Agencies are equipped to respond to humanitarian crises in urban environments. It briefly examines the rural bias of Aid Agencies. It then considers what is different about the urban environment that makes it more difficult for Agencies to respond in urban settings. It then considers the specifics of water and sanitation and post earthquake shelter in urban environments. Finally the report considers how RedR might strive to address some of these gaps

This report is based on:

1. a document review of nearly 300 reports, evaluations, journal articles, and books;
2. a series of interviews with key informants
3. an online survey with over 60 responses

# The Nature of the Urban Environment

Since 2010 the majority of the world's population have lived in cities and by 2050, 70% of the world's population will live in cities. Urbanisation is leading to the rapid growth of cities. The majority of those in cities live in ones with less than 500,000 people.

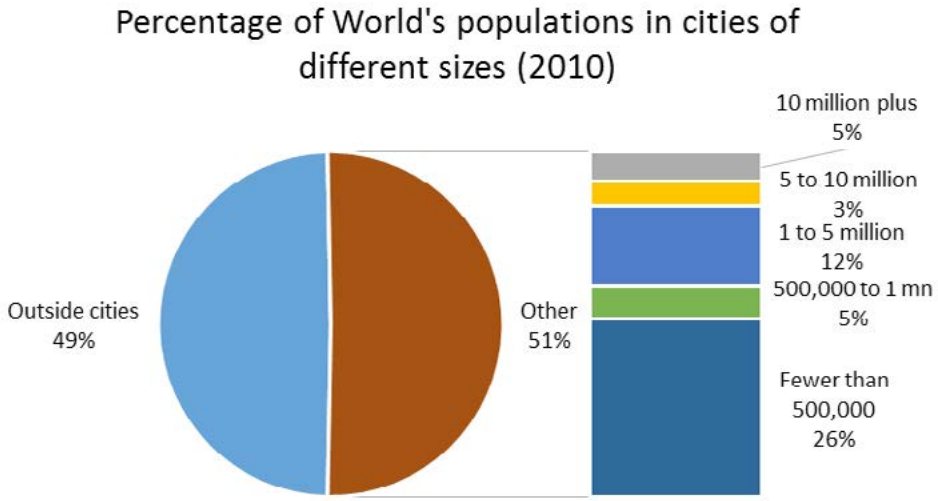


***Figure 1: Percentage of World's population in cities of different size, and outside of cities (source: UN Habitat UrbanInfo database)***

Part of the problem of approaching working in urban environments is that they may have very different contexts and settlement patterns. For example, the same city may contain a mix of:

1. The formal "cement" city, serviced by roads, power, water and sewerage. These areas are planned, and buildings may be engineer or architect designed. Depending on the context such area may be high density or low density (for the very rich).
2. The partially developed peri-urban areas, which may have some services. The services may include piped water to stand-posts, but no piped sewerage. Typically unplanned, these areas may be former slums or shanty towns that have been upgraded.
3. The shanty towns with no public services where the very poorest dwellings are built in part from salvaged materials.

Whether the areas outside the formal city are categorised as slums depends on the context. Some 46% of the urban population in the developing regions were classed as living in slums in 2012 (Habitat, 2012, p. 150). However the values ranged from 32.4% in Southern Asia to 80.3% in Latin America and the Caribbean.

While these three areas can be conceived as concentric rings with the formal city at the centre surrounded in turn by the partially services area and the un-services area, the actual patterns are more complex in real cities with unserviced areas intermingled with services areas

The distinction between the serviced, partially serviced, and unserviced areas is important for humanitarian response as different technologies may be appropriate for use in the different categories. In many cases the technologies used to support the unserviced and partially services areas may be closer to the methods used for rural populations. For example, while water borne sewerage may be the norm in the serviced city, cess pits or pit latrines may be the norm in unserviced areas. Similarly, the serviced city will benefit from household water connections, and the other areas from public standposts or water tankers.

Other differences between serviced and unserviced areas is that while services areas may have benefited from urban planning, this is uncommon in spontaneously settled unserviced areas. The lack of planning shows up in the absence or very limited number of green or open spaces in spontaneously settled areas.

Typically the serviced parts of the city are served by large scale infrastructure, such as complex water abstraction and treatment systems. But the partially serviced and unserviced parts of the city may also depend on this large-scale infrastructure. For example, water tankers operating the in the unserviced parts may fill at the main water works, or at pipeline pumping stations.

The relative density of settlement in the serviced, partially services, and unserviced areas depends on the context. With time, the population density of a particular section of the city can be expected to increase, as further building are fitted into the available space or low-rise buildings are replaced by high-rise buildings. This localised increase in density may be undone by slum-clearance or other development.

As a general rule, the population density of built-up area in developing countries are double those in Europe and Japan, and such densities in Europe and Japan are double those of the United States, Canada, and Australia (Angel et al., 2011, p. 3). Typically, densities are highest at the centres of cities and decline towards the peripheries. However, the areas of cities are growing faster than the population, giving a trend for reducing density overall. At present rates, urban land cover will double in 19 years while it will take 43 years for the urban population to double (Angel et al., 2011, p. 3). Such urban sprawl creates major problems for the provision of services to the whole city.

Mega cities are cities of over 10 million population. There were 19 megacities in 2007 but these will increase in number to 26 by 2025 (UN Habitat, 2008). The majority of megacities are in Asia, but Africa will have three by 2025 (Cairo, Lagos, and Kinshasha).

| Megacities in | 2007 | 2025 |
|---|---|---|
| Africa | 1 | 3 |
| Asia | 11 | 16 |
| Europe | 2 | 2 |
| Latin America | 3 | 3 |
| North America | 2 | 2 |
| **Total** | **19** | **26** |

***Table 1: Megacities in 2007 and 2025***

Although currently the focus of planners has switched from megacities to mega-regions, mega cities in earthquake prone areas are of particular interest to humanitarian planners because of the potential scale of casualties in a major earthquake. Half of the world's megacities lie in areas vulnerable to earthquakes (Jackson, 2006, p. 1919). This makes an earthquake with over a million fatalities a real possibility (Bilham, 2004).

There is some evidence from Africa of the slowing of urbanisation where urban poverty and livelihood insecurity have led to declining economic opportunity (Potts, 2009). However, this runs counter to the much stronger global trend in urbanisation.

# The Non-Urban Bias of Aid Agencies

International NGOs are largely focused on non-urban contexts in developing countries. The reasons for this are complex, and probably include the historic marginalisation of rural populations in national budgets, as well as the scale of interventions. The journal Development carries many articles about development from NGO staff. Searching for the keyword "urban" reveals only 16 hits against 526 hits for the keyword "rural." This contrasts with the journal Disasters where the coverage between rural and urban is much more balanced (with 644 results for "urban" and 682 for "rural").

As UN Agencies work very closely with governments, their programmes generally don't have such a strong rural bias (as government's often prioritise the urban sector). Some UN Agencies specifically have a mandate which leads to a rural focus (e.g. the Food and Agriculture Organisation of the UN). However the focus of working primarily outside urban areas can also be seen in some UN Agencies that don't have a specific rural mandate.

UNHCR's 1997 Urban Refugee Policy was essentially to regard urban refugees as self-settled and not in need of assistance. The policy adopted by UNHCR in 2009 was in marked contrast to this and recognised the intrinsic rights of refugees to international protection whether they are in camps or cities (Bottinick and Sianni, 2011; Morand and Crisp, 2013; Riiskjaer and Bonnici, 2011; Rosi et al., 2011). This was partly because of the UNHCR recognition that more and more persons of concern to UNHCR (refugees, returnees, and IDPs) were living in cities (UNHCR, 2010).

The rural bias of international NGOs is particularly important because they are normally at the cutting edge of the international humanitarian response. The UN Agencies with the biggest humanitarian involvement often use NGOs as their implementing partners in humanitarian response. The rural bias is also reflected in postings to ReliefWeb[1]. The keyword "rural" occurs nearly twice as often as the keyword "urban" in ReliefWeb postings.

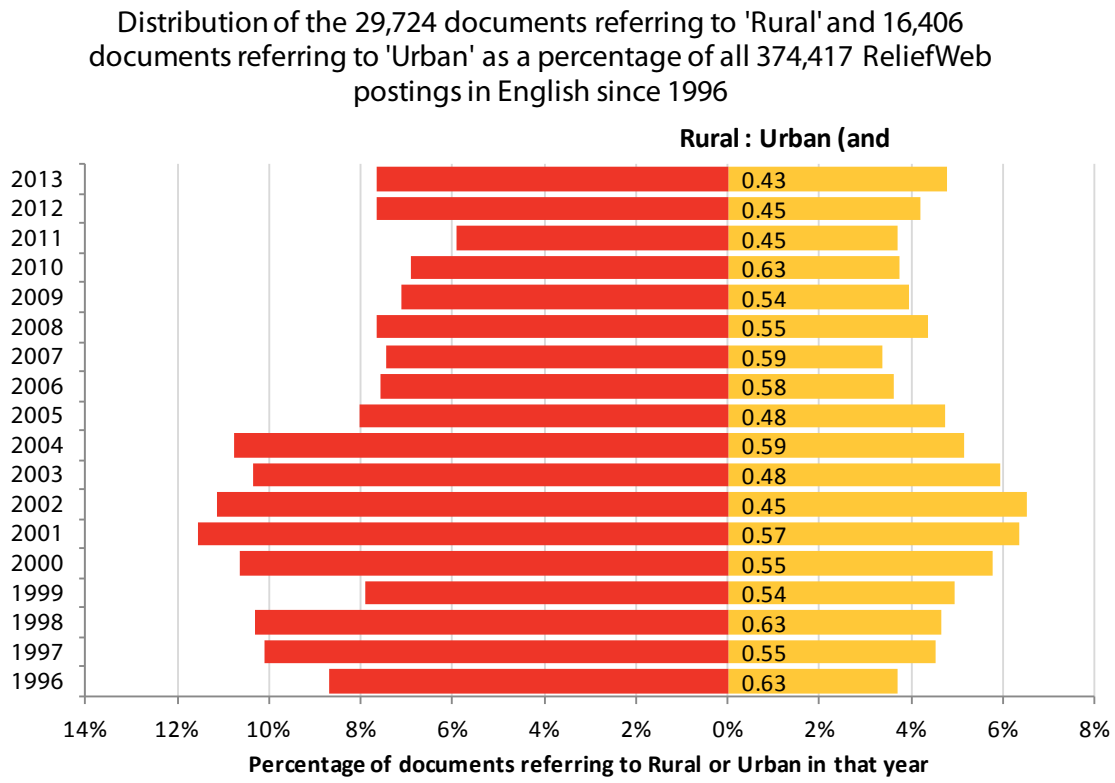


*Figure 2: References to the keywords Rural and Urban in ReliefWeb postings from 1996 to 29 August 2013*

One consequence of this rural bias is that much of the technology and approaches of the humanitarian community is oriented towards rural settings. Thus the Oxfam Water Kits are designed around a module of 5,000 persons rather than 50,000. There is no Oxfam Kit for boosting pressure in multi-story buildings (a common problem in urban environments). Even where Agencies have developed technologies that might be suitable for the urban or high density environment, such as the British Red Cross's sanitation module (Fortune and Rasal, 2010), these are relatively little known compared to solutions such as plastic latrine slabs.

## What model for urban humanitarian response?

A number of key informants made the point that urban humanitarian response may be able to draw more lessons and methods from urban development programmes, especially slum clearance, than from rural humanitarian response programmes.

Interventions in urban areas are more expensive than in rural areas (partly because of the higher expectations of urban populations) and so the economic costs of inappropriate interventions are higher. High costs and a more restrictive bureaucratic setting mean that the affected population in

1 ReliefWeb is an OCHA run website which each year posts 35,000 to 40,000 reports, updates, and news releases of interest to the humanitarian community.

urban areas may find it harder to convert less sustainable inputs into more sustainable inputs. This means that urban interventions have to pay greater attention to sustainability than interventions in non-urban contexts have to.

# What is Different about the Urban Environment?

The differences between urban and rural environments vary with the context. Some factors (such as settlement aspects) vary less with the context than to other factors. However, of the aspects identified for the on-line survey, all but one of the factors identified were considered to be significantly different in most, almost all, or all contexts by the majority of respondents. The one exception was prior engagement by Agencies.

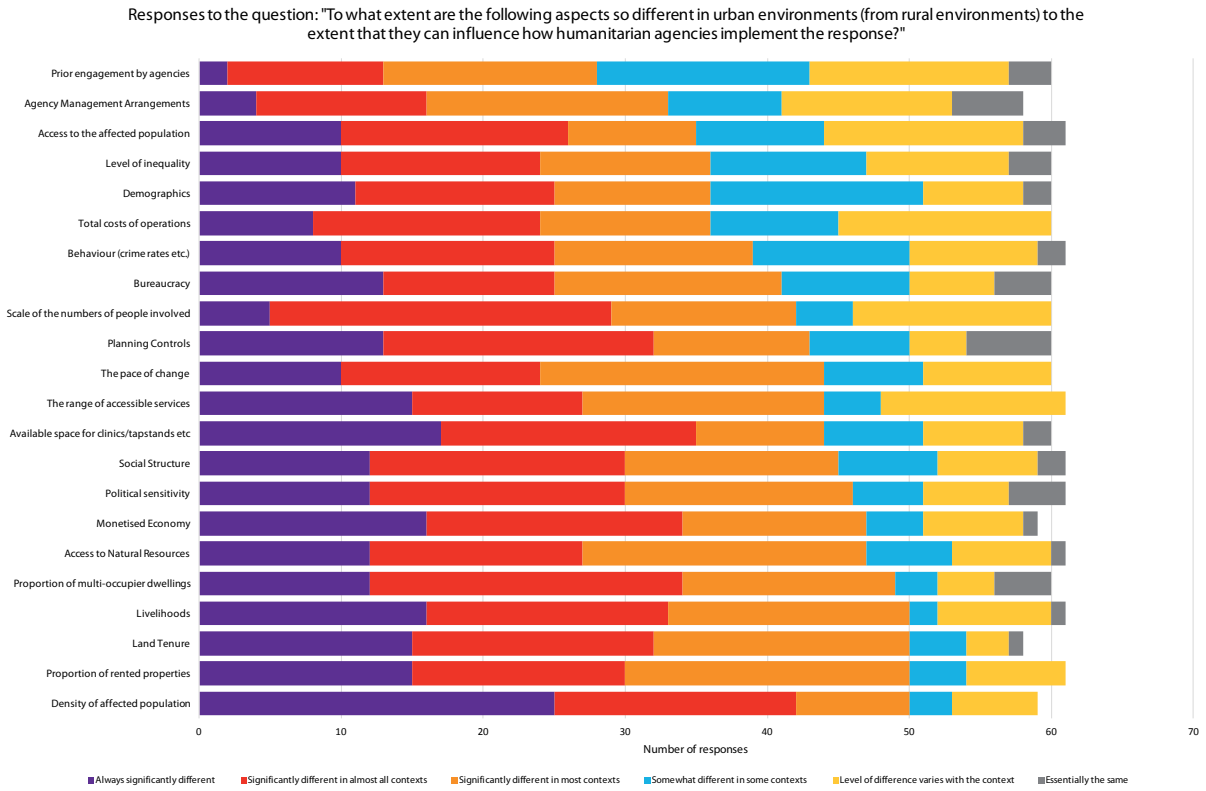


*Figure 3: Response to the survey question on the extent to which different aspects are significantly different in the urban environment*

## Settlement patterns

### *Scale*

The most obvious difference between the urban and rural settings is the scale. Assistance in rural settings may be focused on small communities. Even though the rural programme may be targeted at millions of beneficiaries, the division of the target group into lots of small clusters aid in programme management by allowing a phased approach. In the urban environment, the basic administrative units contain many more people than administrative units in a rural setting do. Of course, in some urban environments, communities may organise themselves into self-administered neighbourhoods that control some of their own services including security.

The scale of cities influences the disease pattern as the population may be large enough to sustain a low background rate of infection between epidemics.

### *Density*

Population densities can be quite high in cities. Dhaka in Bangladesh has a built-up area density of

555 persons per hectare in 2000 (Angel et al., 2011, p. 17). This contracts with the sphere indicator of a maximum of 222 persons per hectare (45 square meters per person) for planned or self-settled camps (Sphere Project, 2011, p. 257). There is a general pattern of density decline in cities, facilitated by metro systems and motor transport. In 1830 Mania in the Philippines had 1,400 person per hectare (Angel et al., 2011, p. 17), but in 2000 this had fallen to just over 200. City densities peaked at the end of the 19th century (1894 ±15 years) and have been falling since (Angel et al., 2011, p. 25).

Within the city, Slum areas may have high densities. In 1876, the tenth ward of New York had 708 person per hectare (Angel et al., 2011, p. 24). This was over three times the average for New York then and contrasts with New York's current built-up area density of just over 20 persons per hectare (Angel et al., 2011, p. 20).

Population densities have implications for the provision of assistance. Distributions in rural areas can use distance to the distribution point as a means of encouraging self-selection, but this strategy cannot be used in cities. Similarly, programmes of work can be interrupted by the activities of other Agencies as people on work project try to take advantages of a distribution by another Agency in an adjoining area.

High densities also give the opportunity for communicating with many more people at once. However, many Agency approaches to social communication are based around presentation to small groups. Other methods may be more appropriate for the communication of social messaging in the dense urban environment.

Density influences patterns of disease development by allowing the very rapid spread of diseases when there are outbreaks. However, this density also allows health messages to be communicated much more rapidly and permit much more active disease case finding.

## *Space*

Many humanitarian technologies rely on having available open space. The most obvious one is the tent, but even water tanks and tapstands need space to allow their installation and use. Latrines, laundry and washing areas demand even more space and are often more difficult to fit in as a result.

Every urban area includes some open space. This can range from 40% of the built up area being open space in Los Angeles to 180% in Zhengzhou in China (Angel et al., 2011, p. 30). However informal settlement leads to reduced amounts of open space, as these are colonised by the informal settlers.

The pattern of informal settlement in Haiti led to a severe lack of space for camps, for transitional shelter and for other facilities (Bhattacharjee et al., 2011, p. 26; Carine Clermont and Spraos, 2011, p. 24; Fortune and Rasal, 2010; Hicyilmaz and Kathy Gibbs, 2010, p. 54; Hidalgo and Théodate, 2012, p. 24; Kliest et al., 2011, pp. 83, 90, 95; Sphere Project, 2011, p. 18). The problem has also been noted in other urban responses but nowhere to the same extent as in Haiti. Even where there is open space, the owners normally have some other (and more profitable) use planned for the space than for housing camps or other services.

## *Health and Safety during construction*

One consequence of the limits on space is that facilities such as pits or pipe trenches may be built next to existing structures. Additionally, the materials excavated may not represent a relatively stable coherent soil, but a mixture of soil and discarded waste. Obviously this raises the risk of collapse during construction, and more conservative approaches will be needed to shoring during construction etc.

## *Land tenure*

Land tenure is a major problem in urban areas. Although rural communities may not have legal tenure, they frequently have customary tenure and mechanisms for resolving land disputes. In urban areas the problem is far worse and the lack of tenure is a very significant source of vulnerability in cities (Ievers and Pacaigue, 2010, p. 5; Urban Programming Initiative, 2009). This lack of tenure complicated recovery and may make some types of assistance illegal2.

2 For example, in Kabul the Government forbids the construction of permanent infrastructure in informally settled sites around the city.

Issues around land tenure may make it difficult to acquire suitable sites for community service infrastructure. The can act as a major constraint on construction as in Haiti (IASC, 2010, p. 18; Kliest et al., 2011, p. 97).

### *Rental and multi-occupancy*

Half of the population in urban areas may be living in rented accommodation. Renting can also occur in rural areas but is far less common. Aid Agencies do not really have a useful repertoire of support for renters, whether they are displaced from owned accommodation or rented accommodation.

Multi-occupancy is rare in rural areas, but common in urban areas where buildings (and especially multi-floor buildings) are occupied by several unrelated families.

### *Access*

Access is often a problem in rural areas with long journey times over difficult roads (or even no roads, as in Nepal) to reach villages. The access problem in urban areas is different. Access to unserviced areas by vehicle may be difficult and traffic congestion can be a major problem. The lack of culverts or properly drained roads may make access difficult in the wet season.

Disaster waste can be a significant constraint on access in urban areas either in the form of debris from floods or rubble from collapsed buildings. While in rural areas you may have opportunity to divert around obstacles, this is often not an option in urban contexts.

Traffic congestion can be a major problem even in the non-disaster setting – in Mauritius, traffic congestion in cities is estimated to cost the economy 1.3% of GDP (Habitat, 2012, p. 60). Such congestion can be a big constraint on water tankering or latrine desludging (Cocking and Bastable, 2010, p. 21), as it increases vehicle cycle times and increases costs. Traffic congestion is expected to delay the restoration of water services in the event of a major earthquake in Japan (Iwasaki, 2003, p. 37).

### *Access to services*

Urban populations may enjoy greater access to services such as education, health, and family planning than rural populations. However, access in the urban area may vary greatly between the services, partially services and unserviced areas.

### *Drainage*

In urban contexts drainage can be a very serious issue as settlement patterns are spread out on all sides of the drainage network. Typically, there is no planned drainage network in unserviced areas, and the unplanned nature of settlement may hinder effective drainage or place shelters in areas threatened by flooding.

The increased levels of runoff caused by the conversion of agricultural land to housing can promote gulleys and other soil erosion features. These can be a constraint on vehicular access in affected areas.

Debris can block natural drainage channels and lead to post disaster flooding. While the need for effective drainage is often overlooked in camps (as in some of the large camps built near the coast in Albania during the Kosovo crisis) the consequences in urban areas can be far more severe.

## Social factors

### *Social structure*

Urban contexts are much more culturally diverse than rural contexts. Many different ethnic and cultural groups may be intermixed in urban areas. Wilder notes in regard to the 2005 Pakistan earthquake that "as in most countries there are major cultural differences between urban and rural areas, and along lines such as ethnicity, class, ideology, and sectarian affiliation" (Wilder, 2008, p. 32). Populations may also be subject to rapid change due to the continued flow of migrants to the city.

Both of these factors (diversity and change) may lead to lower levels of trust between residents and

greater difficulty in promoting cooperative approaches with deferred benefits. Tearfund reported that organising collective labour after the Padang Earthquake (Goyder, 2010, p. 11) proved more difficult in urban than in rural areas, as many people in urban areas were engaged in paid labour.

### *Literacy*

Literacy levels are typically higher in urban areas allowing a wider used of written messaging than is possible in rural areas. However, levels of literacy may vary greatly from section to section of the city.

### *Inequalities*

The gap between the poorest and the richest may be very different in urban areas than in rural areas. In Africa, there may be greater inequalities in urban areas than in rural areas, but this may not be true in societies where rural areas feature rich landowners and a large class of landless labourers.

### *Demographics*

There may be significant differences between urban and rural demographics, depending on the context. Migration to the city in search of work can lead to significant differences in urban and rural population pyramids. In some contexts, there may be significant gender imbalances (in opposite directions) between urban and rural areas, as one gender (typically male) is more likely to travel to the city in search of work.

Gender imbalances are important as gender is an important predictor of the likelihood of surviving disasters. Complex emergencies kill more males, but natural disasters kill more females. The bigger the natural disaster, and the greater the difference between the socio-economic status of men and women, the bigger the difference between male and female mortality (Neumayer and Plümper, 2007, p. 551).

### *Behaviour*

Differing social contexts and varying levels of social control may result in differences in behaviour between urban and rural settings. All sorts of behaviour may be different, including crimes such as theft and murder. Extreme forms of behaviour, such as suicide can also vary significantly between urban and rural areas. For example, in China, rural suicide rates are three times higher than urban suicide rates (Phillips et al., 2002a, p. 837)[3]. The ready access to insecticides, rodenticides and other poisons in rural areas had been suggested as one factor for the differing rates (Phillips et al., 2002b, p. 1735).

Disasters may affect such behaviour. After the 1999 Taiwan earthquake, one study found that the suicide rate was 42% higher during the 26 months following the earthquake (Yang et al., 2005, p. 442). Another study showed that urban rates were lower after the earthquake (Chou et al., 2003, p. 1011). However, a study of the aftermath of the Kobe found a reduced suicide rate in the earthquake affected area. (Nishio et al., 2009, p. 247).

### *Rapid change*

Rural environments change relatively slowly when compared to urban environments. The constant arrival of migrants and changes in neighbourhoods make the urban environment a rapidly changing one.

## Power

### *Relative power*

In rural areas Agency budgets and resources may greatly exceed the resources of state actors. This can give Agencies a great deal of informal power. In urban contexts, Aid Agencies are unlikely to dominate in this way.

3 In China suicide accounts for 18.9% of deaths in the 15-34 age group). It is the leading cause of death for women in the 15-34 age group, and is second only to motor vehicle accidents for men in this age group, non both urban and rural areas (Phillips et al., 2002a, p. 837).

## *Politics*

Commonly, urban areas are far more politically important than rural areas. This is because ruling elites are often based in cities, and because cities are often of vital national economic importance. In terms of government overthrows, the majority of revolutions are urban based, only a few start as rural movements, and even these are often led by members of the urban elite (e.g. Nepal). Political power is concentrated in urban areas, and this may make interventions in urban areas more politically sensitive than interventions in rural areas.

## *Bureaucracy*

In an urban setting the smallest administrative unit is often much larger, in population terms, than the smallest administrative unit in a rural setting. The most able and senior government staff are usually concentrated in urban settings. This means that bureaucratic rules are more likely to be enforced in urban settings.

Working with government can be frustrating for Aid Agencies and poor communication between different levels can slow things down (Humanitarian Initiatives UK et al., 2001a, p. 9). While such delays can occur in both rural and urban areas, as in the case of the delays caused by the "No Objection Certificate" system in Pakistan (Cosgrave and Nam, 2007, p. 96) they are much more severe in urban areas, where control may be disputed between different state Agencies and parts of government.

## *Corruption*

Corruption is a problem in many developing countries. The greater power of bureaucracies in urban settings provides greater scope for corruption, but this depends on the context. It may happen that stronger oversight, or better access to advice in urban setting prevents abuses that are typical in rural areas.

## *Planning controls*

Planning controls may be almost non-existent in rural settings but a major constraint in urban environments. Planning controls are essential in urban areas as developments in one area may have an immediate effect on adjoining areas. In the rural environment, the separation between settlements moderates the impact of developments in one settlement on other settlements.

Planning controls introduce delays for reconstruction. The time required for easements and to deal with encroachments slowed down reconstruction after the 2001 Gujarat Earthquake (Jha et al., 2010, p. 140). Disputes about planning led to demonstrations in Gujarat (Nakagawa and Shaw, 2004, p. 18). Planning controls slowed down reconstruction after the Kobe earthquake

The Earthquake Reconstruction and Rehabilitation Authority's report one year after the earthquake gives some idea of the range of measures needed to implement a reconstruction programme, including establishing the institutions, conducting assessments, setting up databases, and establishing guidelines (ERRA, 2006).

After major disasters have destroyed large areas, there are often attempts to redesign cities, or rezone them, or make other complex changes. This is as true today as it was after the great fire in Rome during Nero's reign in 64 or the great fire of London in 1666. Such planning measures can slow down reconstruction. In Kobe, the government imposed a two month moratorium to facilitate planning and policy development for reconstruction (Olshansky et al., 2006, p. 353).

New town development to replace damaged urban areas can be particularly slow. Two years after the Pakistan Earthquake the Earthquake Reconstruction and Rehabilitation Authority reported that land acquisition was in progress for the Muzzaffarabad satellite town and the New Balakot City and that detailed planning was in progress for Rawalakot and Bagh (ERRA, 2007). Rural reconstruction has proceeded much faster, with 547,164 eligible rural households (98%) having already received the first two instalments of the reconstruction grant.

# Economy

## *Livelihoods*

Household studies in rural areas often reveal the livelihoods are very different from the assumption that rural populations depend solely on agriculture (Ellis, 1999, p. 1). Urban livelihoods are though more complicated than rural livelihoods as there are potentially more livelihood sources. One study in Accra, Ghana found that individuals were engaged in as many as seven or eight different livelihood sources in a 12 month period. What is very different though is the greater influence of the cash economy in the livelihoods of the urban poor when compared with livelihoods of the rural poor (Meikle et al., 2001, p. 1).

The nature of urban livelihoods is different for that of rural livelihoods. In rural livelihoods, the strong seasonality of agricultural labour may lead to periods when communities are readily available for long daytime meetings with Aid Agencies. This is not the case in urban areas who may be engaged with a range of different livelihood activities during the day. The urban environment offers many different sources of entertainment, and meetings with Aid Agencies do not have the same attraction that they do in rural environments. These factors mean that meetings with urban populations are much harder to organise than with rural communities.

## *Income*

Although cities can be found in the poorest countries, bigger cities are more common in middle-income countries than in the least developed countries. Traditionally Aid Agencies have concentrated on the least developed countries. However, urban poverty in middle-income countries may be worse that overall poverty in the least developed countries.

Poverty rates can vary significantly between rural and urban contexts even in a relatively small area. For example in Aceh in 2006, 30.1% of rural households were classified as poor versus 14.7% of urban households (Brusset et al., 2009, p. 54). However, in other contexts, especially with rising food prices, poverty may be worse in urban than in rural areas.

We do know that those with lower incomes are more likely to die in earthquakes. One study after the 1999 Taiwan earthquake found that those with an income of less than approximately USD600 per month were twice as likely to die in the earthquake than those with an income of over USD 1,200 per month (Chou et al., 2004, p. 690)[4].

## *Monetised economy*

With a few rare exceptions[5], urban economics tend to be largely monetised. This contrasts with rural environments where barter may be a significant form of exchange. Cash and markets are a key part of urban livelihoods (Kyazze et al., 2912, p. 25). The ready access to markets in urban areas and the level of monetisation means that cash grant programmes may be far more appropriate than other types of assistance in cities.

## *Access to natural resources*

The lower population density in rural areas means that the population has greater access to natural resources than an urban population does. Demand for natural resources often leads to the area around large population centres being stripped of firewood, construction timber and other resources.

However, even in rural areas, access to natural resources is not necessarily free. Even using nearby soil for sundried bricks may involve considerable expense in labour or the transport of water. In urban areas, populations have greater access to forms of solid waste (cardboard, scrap timber, salvaged building materials) that may be used for shelter.

4 The results were controlled for demographics, health status, and area characteristics.

5 Exceptions are where currencies are so devalued that they are replaced by other tokens of value.

# Operations

## *Community rather than individual focus*

Humanitarian assistance programmes normally focus on the family as the target of assistance. This makes sense in a rural environment, where each family lives in a separate dwelling. Aid Agencies sometimes make a significant effort to target needy families within the community.

This is a lot more difficult in the urban environment where dwelling may be multi-occupancy, or where there are many single men and women rather than complete families, and where indicators such as the number and type of animals owned or the number of hectares owned are not available.

Again having a community focus may be more appropriate in urban environments. This echoes development practice, which normally focuses on communities rather than on individual families.

## *Agency management arrangements*

The dispersal of rural populations invites a decentralised Agency management structure that mimics the geographical pattern. The concentration of population in one area sometimes invites a centralised approach. This may lead to Agency managers dealing with far larger teams of staff than they would normally manage directly. This can lead to problems where Agency procedures are more appropriate for a dispersed staff team than a centralised one.

## *HR factors*

Urban areas offer access to a more highly skilled (if more expensive) labour market. This can facilitate staffing the response. However, given the low profile that Aid Agencies have in cities compared with rural areas, staff newly employed in urban areas may have far less understanding of how Agencies work than their rural colleagues.

## *Access to information and advice*

Universities and research institutes are usually concentrated in urban areas, making them much more accessible for information and advice. Such institutions may have conducted as yet unpublished research in the city which may be useful for informing the response. Middle-income countries especially are likely to have a rich network of such institutions.

## *Complicated and complex*

The urban environment is more complicated and more complex than the rural environment. It is more complicated in that there are a larger number of actors than in the rural environment, and more complex in that it is far harder to predict the likely outcome of actions in the urban environment because of the conflicting agendas of the large number of actors.

This complexity emerges also in progamming approaches. An intervention in one sector can, in the urban context, quickly create a knock-on effect in other, apparently unrelated sectors. For example, the rates paid for staff in one sector may influence the rates across all the other sectors. Responses in the urban space need to take inter-sectoral issue into account. The stove-piping of humanitarian assistance into clusters or sectors can decrease the attention paid to issues which impact across sectors.

## *Costs and budgets*

Related to the question of scale is the issue of costs and budgets. The international humanitarian community often overestimates the impact of its contribution to the disaster response. The DEC evaluation of the Gujarat earthquake makes the point that the relative contributions of the UK Government, the DEC, and the Indian Government were £10 million, £24 million and over £1 billion (Humanitarian Initiatives UK et al., 2001a, pp. 3-4). Obviously lower income countries will not have the resources that the Indian Government do, but even there, the resources available to the national government, through international financial institutions like the World Bank, can be very substantial.

Where the budget available to an NGO or a UN Agency can be very significant when compared to the

resources available to the administration at the rural level, these budgets can be seen as relatively small for an urban setting.

Even in contexts where there is generous national government assistance for rehabilitation, NGOs may still play a useful role through supporting vulnerable communities and individuals to access assistance. This was the case after the 2005 Pakistan Earthquake, where the Norwegian Refugee Council's Information, Counselling, and Legal Advice programme provided information on the available assistance helped vulnerable persons get identity documents, a prerequisite for accessing government assistance (Cosgrave and Nam, 2007, p. 39). This was a good example of an NGO leveraging their input to achieve a larger impact. This contrasts with the traditional Aid Agency response of directly providing assistance. Similarly in Gujarat, Oxfam found that monitoring government tankers was more important than direct water supply (Humanitarian Initiatives UK et al., 2001b).

Several respondents and key informants made the point that programming in the urban context can be expensive. Staff salaries are higher, operating costs are higher, and the expectations of the affected population are higher (e.g. household water connections rather than stand posts). These factors can make urban response significantly more expensive than rural response.

## *Prior Engagement*

One of the assets that NGOs bring to the table in humanitarian response is their context knowledge. NGOs only possess such context knowledge when they are already working with communities and have some insight into community priorities, constraints, livelihoods, and decision-making processes. This they gain from their existing development or other work with communities.

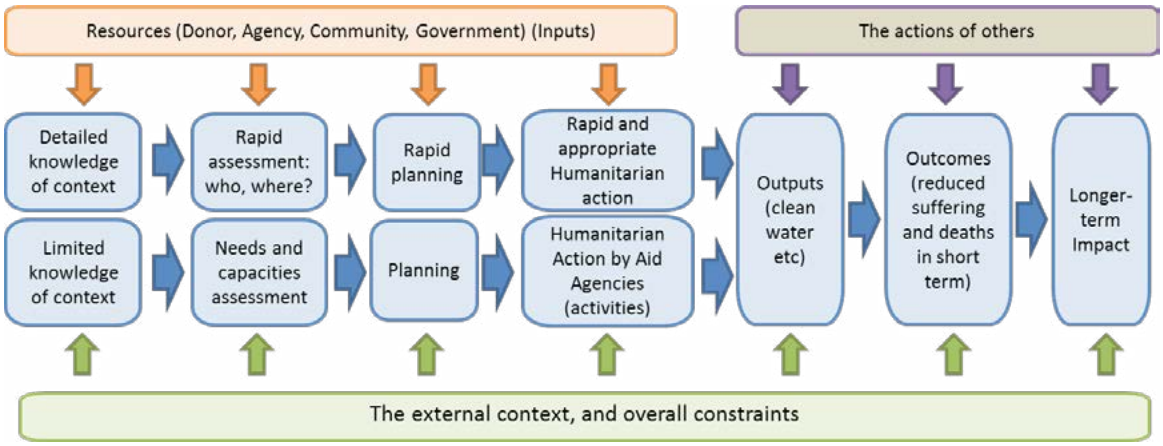


*Figure 4: The impact of context knowledge on the speed of humanitarian response*

Donors sometimes limit humanitarian funding in new emergencies to implementing partners who have already got operational programmes (and thus relevant context knowledge)[6]. Collaborative funding arrangements like the Disasters Emergency Committee also prioritise context knowledge through the policy of not paying for the start-up costs of new entrants in a particular emergency.

Context knowledge is also important in facilitating rapid appropriate humanitarian response. Where Agencies already have a detailed knowledge of the context, they are in a position to being responding to humanitarian crises almost immediately. The bias of Aid Agencies towards working in non-urban settings limits their context knowledge of urban environment and may constrain their ability to work effectively with the range of partners in urban settings.

6 For example, DFID often follows this policy.

## Conclusions on the differences between urban and rural contexts

1. One significant conclusion is that there is no single urban context. Instead any given urban environment is a mix of contexts. The aspects of different contexts within a single urban setting may include, among others:
    - The level of services available – whether fully serviced as in the formal "cement" city, partially serviced as in well established peri-urban areas, or unserviced as in squatter settlements.
    - The age of the area. Shelter of a particular age may have been subject to different building regulations and may be more or vulnerable to particular hazards.
    - The geography of the area; whether low-lying or not.
2. While some factors, such as density, scale, and political importance are always features of the urban environment, many other factors will vary with the context and may be more or less marked than in the rural context.
3. Urban development experience may provide a more reliable guide for urban humanitarian response than extrapolating from rural humanitarian response. Urban disasters bring the same sorts of problems that can be seen in development settings[7] but in more intense ways.
4. The role of different levels of government is often much stronger in urban areas, meaning that agencies may be more effective in a facilitating role than in trying to implement directly without close collaboration with the local authorities.

# Skill Gaps in Water and Sanitation

## Management

Key informants and survey respondents often referred to management issues as being the key gap in current urban responses. This included:

1. The ability to work with existing WASH and local authorities in a constructive way.
2. The ability to manage engineering projects of the scale needed.

Key informants and survey respondents also referred to specific technical gaps, generally around the lack of NGO staff experience with municipal scale water and sewage systems.

## Scale of water works

Water works in urban settings are very different both in scale and technology from water treatment in rural or small town settings. Not only is the scale different, but nature and cost of systems is also very different. Many larger waterworks fittings are not held in stock, but are made to order. They are also very expensive when compared to the fittings that humanitarian engineers are used to dealing with.

Humanitarian water and sanitation engineers typically do not have the skills necessary to work on municipal scale systems and will need to bring in outside contractors or consultants. Even where the water authority has had the necessary skills key staff may have fled conflict or been killed or injured. Depending on the context, the staff of municipal systems may not always be aware of the latest technology.

## Water treatment works

Water works and water supply systems are vulnerable to earthquake damage. In Osaka, the 1995 Kobe earthquake led to a two week interruption in supply (Osaka City Waterworks Bureau) and full

7 For example, upgrading slums to the extent that the original residents can no longer afford to live there or using "slum-clearance" not to provide social housing for the most vulnerable, but to displace them from proximity to more affluent areas.

restoration of supplies to 1.3 million people took three months (Iwasaki, 2003, p. 27). Water works may see such damage as collapsed header tanks, cracked treatment tanks, and damage to internal piping and channels. The publications of the American Lifelines Alliance provide some guidance on assessing vulnerability based on previous experience (Eidinger et al., 2001a, 2001b).

However there is a broader issue in that humanitarian engineers normally work only with a few water treatment processes (chlorination, and sometimes basic sedimentation and filtration), whereas urban water works may have far more sophisticated processes including flocculation, pH correction and others. Again in this situation Aid Agencies will need to bring in outside consultants or contractors.

## Water distribution systems

Water distribution systems are also liable to damage. There were over 1,000 pipeline failure in both the 1994 Northridge earthquake and the 1995 Kobe earthquake (Heubach and Steenberg, 2003, p. 287). Pipes can be damaged either by peak ground accelerations or permanent ground displacements. However, Oxfam noted that damage to pipelines was less than expected (Cocking and Bastable, 2010, p. 21)

The vulnerability of pipeline depends on the pipe material and the joint type and material. Cast iron and asbestos cement joints are the most vulnerable and welded steel pipes or ductile iron pipes with earthquake resistant joints are the least vulnerable (Heubach and Steenberg, 2003; Osaka City Waterworks Bureau). Butt-welded HDPE pipe is also suitable for even the highest pipeline design category (Eidinger et al., 2005, p. 55). Again the American Lifelines Alliance provides guidance on the design of earthquake resistant pipelines (Eidinger et al., 2005).

However, humanitarian water and sanitation engineers normally have little experience with the size and type of pipe used in the transmission lines for urban water, or even the main distribution lines. They may also not be very familiar with the types of pipes and joints used for larger lines, or the types of repair options suitable for such systems. In Haiti Oxfam addressed this gap by hiring a French engineering company that had previously worked on the system to assist with repairs (Cocking and Bastable, 2010, p. 21).

## Hygiene promotion

Although Aid Agencies have well developed hygiene promotion approaches, most of these are designed for rural contexts where hygiene messages are spread through intensive person to person or person to small group contacts. The urban environment makes such approaches difficult because the communication targets have many other calls on their time.

Higher levels of literacy and more extensive media penetration may make mass communication more effective at spreading hygiene promotion messages than the intensive methods used in rural areas. Humanitarian WASH specialists may not have much experience of using methods other than the intensive hygiene promotion approaches used in rural contexts.

## Tankering and water selling

While the services and partially serviced city will be fed by water mains, the unserviced city will usually be supplied by tankers or vendors from the informal market8. In the case of Haiti, the population were used to buying bagged drinking water or water from kiosks. Only 15% or so of the population were served by the piped network (Cocking and Bastable, 2010, p. 21). Water kiosks were re-established quickly and water sales of water from reverse-osmosis treated water were initially free and later sold at a subsidised price (IASC, 2010, p. 6). Typically those in the unserviced area have to pay more for their water than those in the serviced areas (Cocking and Bastable, 2010, p. 22; Maxwell et al., 2000, p. 24; Pantuliano et al., 2011, p. 11).

In many unserviced urban areas better off residents may install ground cisterns which they fill by tanker and then resell some of the water to other residents. Earthquakes may damage ground cisterns

8 Water tankers can also serve as part of the rural water supply system as in the case of Gujarat (Humanitarian Initiatives UK et al., 2001c, p. 9).

and increase the leakage for them, or increase the risk that they will be contaminated by surface flows. Damage to some parts of the system can dramatically increase the cost of hiring water tankers due to increased demand.

Humanitarian engineers may be familiar with tankering operations, but not of the scale needed in an urban setting.

## Excreta disposal

The Humanitarian Innovation Fund published a gap analysis in emergency water, sanitation, and hygiene promotion earlier in 2013 (Bastable and Russell, 2013). Of the 12 gaps identified five were related to excreta disposal problems commonly found in urban environments (Bastable and Russell, 2013, p. ii)9.

Excreta disposal often poses a bigger problem than water supply. Typically, a lower proportion of the population is serviced by piped sewerage than by piped water supply. Families may rely on cess pits, or on pit latrines, or even on "flying latrines" – so called because people defecated into a plastic bag which is later thrown somewhere convenient for the thrower (possibly flying over someone else's fence when thrown away).

In Haiti, excreta disposal was a major problem. Pit latrines and elevated latrines (both used as rudimentary cess pits) and portable toilets were used but desludging proved difficult because of the limited number of desludging vehicles, traffic congestion, and the cost (Cocking and Bastable, 2010, p. 21).

A number of Agencies undertook innovative approaches in Haiti. One example was the use of the Mass Sanitation Module by the British Red Cross (Fortune and Rasal, 2010). Other innovative approaches included Oxfam's use of plastic bag latines and Peepoo® bags10, and World Vision's use of the Canadian-produced AZAcomp enzyme to speed decomposition (Sun Mountain International, 2011, p. 18).

There are currently a number of research efforts on toilet options, including composting toilets, for urban environments, but we are still far from having packaged solutions as we do for rural areas without high water tables.

## Drainage

Drainage is often a problem in cities even in a non-emergency context. Heavy rains may wash large amounts of silt onto roads, deepen gullies, and create small scale floods, all leading to access problems. Traffic chaos after heavy rainfall is a common feature in many developing countries.

Post-earthquake rubble, or post flooding debris can worsen drainage by blocking drains or creating temporary dams that lead to localised flooding. Humanitarian WASH engineers will have little experience of large scale surface drainage issues.

## Other sanitation

Another sanitation problem that is seen more often in the urban than the rural environment is the disposal of solid waste. Solid waste management is a problem in urban areas in many developing countries even before any disaster occurs (Habitat, 2012, pp. 94-95). Port au Prince suffered from the lack of an effective solid waste management system before the earthquake (Kliest et al., 2011, p. 42) and it was worse after.

Vector control can be more important in cities because of the concentration of population. This can be a particular problem if previous vector control systems have been disabled by the disaster (as in the case of insecticidal fogging being disrupted in Iraq, leading to a surge in mosquito borne disease).

9 Latrines were pits not possible; Latrine emptying and desludging; urban alternatives for excreta disposal; final sewage disposal after treatment; and further development of non-toilet options.

10 Plastic bag latrines may use simple plastic bags or double lined bags for collecting faeces. Peepoo® is a biodegradable double lined plastic bag containing urea to speed the safe decomposition of faeces.

The collapse of previous WASH systems can raise concerns about potential epidemics of faecal-oral disease. However, it should be noted that epidemics in the wake of geophysical disasters are relatively rare (Floret et al., 2006). The outbreak of Cholera in Haiti is an exceptional case and it could be argued that this was related more to the complex emergency in Haiti than to the earthquake. Epidemics are much more often found in conflict or post-conflict settings.

In urban areas the anonymity of the city means that there may be no family to claim bodies. This means that a formal system of dead body management may be needed. The dead who have not died from disease do not normally pose a threat of physical disease contamination (Morgan, 2004), but their presence can impose severe psychological strains on survivors. Good advice is available on handling dead bodies (Morgan et al., 2006; Pan American Health Organization, 2004).

Post-earthquake rubble is sometimes lumped into the solid waste issue, but such rubble can be important economically, in that individual blocks and other building materials can be salvaged from it. The use of salvaged material is sometimes overlooked in responses (Humanitarian Initiatives UK et al., 2001b, p. 44). In Bam, house owners were encouraged to salvage materials before site clearing began (Ghafory-Ashtiany and Hosseini, 2008, p. 235). The ARUP team report to Oxfam emphasised the need to salvage building materials in any planned demolitions (Hicyilmaz and Kathy Gibbs, 2010, p. 29).

However, such rubble can contribute to constraining access, as well as to blocking drainage, leading to flooding.

# Skill Gaps in Post-disaster Settlement

## Management

Key informants and survey respondents focused on the difficulties that Agencies had with working with settlements in the urban context. There are relatively few shelter experts in the whole humanitarian system. Interviewees also noted that settlement is more complicated than a single individual can normally deal with, and that an integrated team approach is required.

Survey respondents also questioned how able NGOs were to manage large scale shelter projects, again calling into mind questions about their ability to manage significant engineering programmes in the WASH sector.

## Building back better

Clearly after any disaster, it would seem sensible that whatever new facilities are constructed are less vulnerable than the structures that they replace. Unfortunately this is not always the case. The evaluation of the Christian Aid shelter programme after Tropical Cyclone Ketsana found that the programme was not designed to increase the resilience of the shelter (Ievers and Pacaigue, 2010, p. iv). Similarly reconstruction of bridges that failed after the 1992 Flores earthquake did not always include the aseismic features needed to ensure their survival in the next earthquake (ADB, 2000, p. 7).

Risk reduction is still poorly integrated into both ongoing development programmes and humanitarian responses. This is a broader issue with both development and humanitarian response.

## Surviving the disaster

Aid Agencies are best able to play a role in the post-disaster setting if their staff and facilities continue to operate after the disaster. One MSF evaluation noted that field teams ability to recuperate after an earthquake may be limited because of the fear and disruption caused by aftershocks (Prescott, 2001, p. 3). The loss of staff, damage to offices, or the loss of records, can delay rapid intervention by the Agencies. In Haiti, "many human many humanitarian actors present in-country prior to the earthquake themselves suffered losses – both in terms of staff killed and injured, and offices and homes damaged and destroyed – significantly reducing their response capacities." (IASC, 2010, p. 8). For example, Oxfam lost half their office as well as two staff who were killed (Cocking and Bastable, 2010, p. 20).

Clearly, most Agencies in Haiti had not been alert to the earthquake hazard prior to the 2010 earthquake and lost staff and facilities as a result. The UN peace-keeping mission, MINUSTAH lost over 100 staff in the earthquake (IASC, 2010, p. 10).

Measure to ensure continued operations could include: only hiring office space and accommodation that is resistant to the local hazards; securing office equipment against earthquake damages; maintaining backups of records; standby agreement with partners for the use of their facilities if the Agencies own facilities are compromised by disaster etc.

Humanitarian engineers are normally not sufficiently aware of hazards and structural engineering to ensure the survivability of offices post disaster.

## Response and Risk Reduction

Earthquake experts often make the point that earthquakes don't kill people, but that buildings do. While this overstates the case, some 75% of earthquake fatalities occur directly due to structural collapse (Coburn et al., 1992, p. 5989). The other causes are fire, landslides, falling objects, tsunamis etc.

Clearly, after an earthquake happens, there is relatively little scope for life saving by Aid Agencies. The majority of those pulled from the rubble are rescued by friends and neighbours (Humanitarian Initiatives UK et al., 2001a, p. 4; IASC, 2010, p. 7; Manafpour, 2003, p. 19; Noji, 2005, p. 4). The numbers rescued by international rescue teams is relatively small.

However, many buildings can be built to be significantly more resistant to collapse at relatively low cost. Thus disaster risk reduction represents a potentially more cost effective intervention for earthquakes than does response.

This again raises the issue of the links between development and disaster response in the urban context. The need to take a community-based approach, pay attention to sustainability, attend to risk reduction, and look to urban development for operational models, all raises questions about traditional humanitarian response models in an urban setting.

## Damage assessment

It is normal after major earthquakes that earthquake engineers make an assessment of the earthquake and of the damage (Eberhard et al., 2010; EERI, 2006; Fierro and Perry, 2010; Manafpour, 2003; Nadim et al., 2004). These assessments are sometimes followed by detailed studies of particular building types (Baldridge and Marshall, 2011; Bothara and Hiçyılmaz, 2008; Brzev et al., 2007; Hicyilmaz, 2011; Hicyilmaz et al., 2012). Such damage assessments are a specialised area and there is no particular role for Aid Agency involvement.

Normally, humanitarian engineers do not possess the knowledge necessary to make broad based damage assessments.

## Housing, Land and Property (HLP)

Housing, land, and property issues can create significant problems after a disaster. This applies to all sectors (who owns the land where the school tent is sitting?). It is a particular problem for shelter. However, this is an area of general weakness in the humanitarian community, in part because housing land and property law and practice are very specific to particular contexts.

## Building assessment

After a disaster, particularly earthquakes, there is a need to determine whether buildings are safe to use or not, at the very least for the Agency's own operations. In Haiti, Oxfam experimented with the US-sourced Applied Technology Council (ATC) approach (ATC, 1987, 1997, 2002). A damage assessment form based on the ATC-20 form was developed by the Department of Public Works in Haiti with support from UNOPS. However this approach suffered from four problems:

1. The form relates only to the building's present condition and not to its ability to survive further

earthquakes or aftershocks. Tagging a building as green could therefore mislead people about its safety.

2. There was no centralised system for recording assessment data, nor any system for validating assessments.
3. The ATC-20 form was developed for a context where there is a large pool of specialists who can advise building owners on how to proceed based on the assessment. This was not the case in Haiti.

The ATC-20 form is simple, but only because it assumes both prior damage assessment experience and good structural engineering knowledge and earthquake engineering knowledge. These types of skills are often lacking in developing countries (Hicyilmaz and Kathy Gibbs, 2010, p. ii).

Oxfam tried to address this gap in Haiti with a team from Arup working with two local engineers. However, the team pointed out that there was a need to train locally recruited staff not only on the job, but also with classroom-based instruction on seismic principles and structural engineering (Hicyilmaz and Kathy Gibbs, 2010, pp. ii-iii).

## Building remediation

Building remediation (the making safe of damaged buildings, or the retrofitting of existing buildings to make them more seismically resilient) are both very complex areas. These are particularly complex with designed structures.

However, non-engineered structures (the vast majority of housing in most developing countries) are somewhat less complex. In the wake of the Gujarat earthquake a team of engineers from Arup produced a guide for the repair and strengthening of non-engineered buildings (Patel et al., 2001). Again, this is an area where most humanitarian engineers have little experience.

## Time needed

As well as the planning process discussed earlier, the lack of guidelines or building codes may also slow reconstruction. This was the case with schools reconstruction in Haiti (Kliest et al., 2011, p. 122). Guidelines for reconstruction may take some considerable time to develop. After the October 2005 Pakistan earthquake, the final catalogue of approved construction types was only published in March 2008 (ERRA, 2008a, 2008b). In all, guidelines for five different construction types were published in the two-and-a-half years following the earthquake (Figure 5) (Abidi et al., 2011). The slow pace of the issuing of guidelines delayed reconstruction (UNDP, 2006, p. viii).

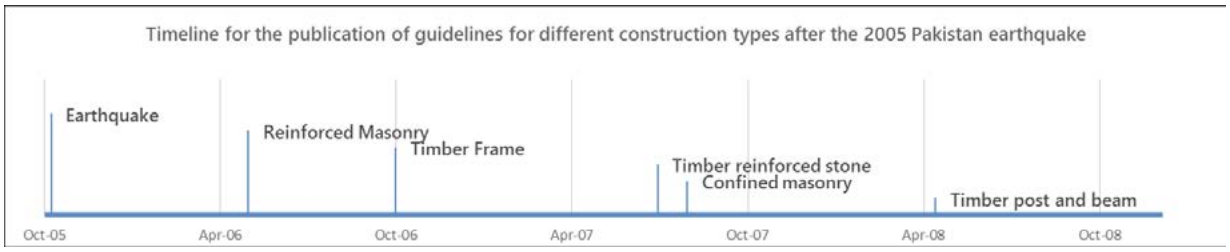


***Figure 5: Timeline for the publication of guidelines for different rural housing reconstruction types after the 2005 Pakistan earthquake.***

It normally takes some months before guidelines are published for the reconstruction of earthquake resisting shelter. This process may continue for years after an earthquake. For, example, the Gujarat State Disaster Management Agency published a guide on confined masonry house construction in 2012 (Iyer et al., 2012).

# Addressing the Gaps

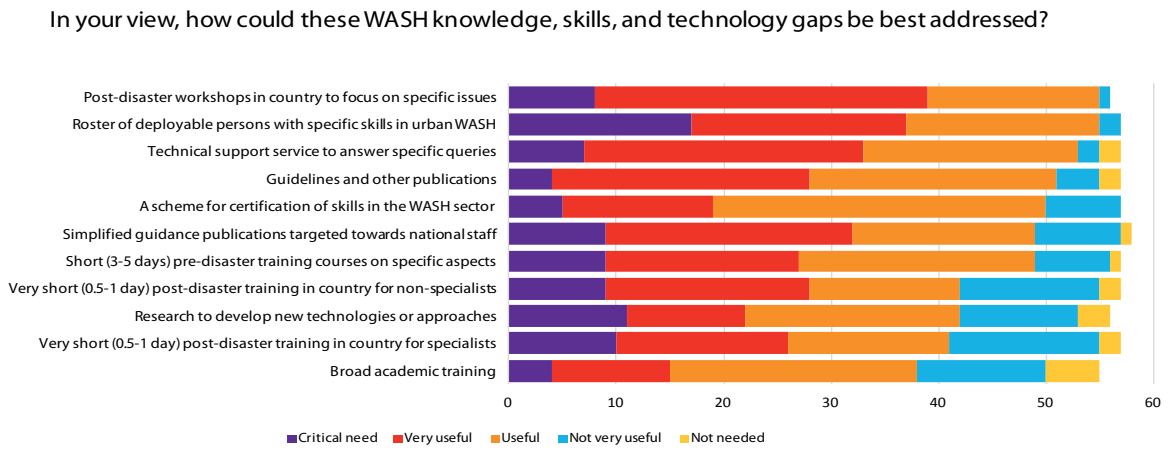


*Figure 6: How to fill gaps in WASH*

The survey asked respondents how the gaps in shelter and WASH could be addressed.

There were significant differences between the rating of different approaches for WASH and for shelter. Post-disaster workshops were most often rated as useful approach to addressing gaps in the WASH sector. However, they were only rates as the fourth most useful approach in the Shelter sector. Short pre-disaster training was rated as the third most useful approach in the shelter sector, but they were only rates as the 7th most useful in the WASH sector.

Obviously, some of the gaps identified by this research are broader systemic gaps that need far broader action than falls within RedR's mandate. Areas such as the need to take effective risk reduction measures, or the need for capacities to manage large-scale projects are examples of this.

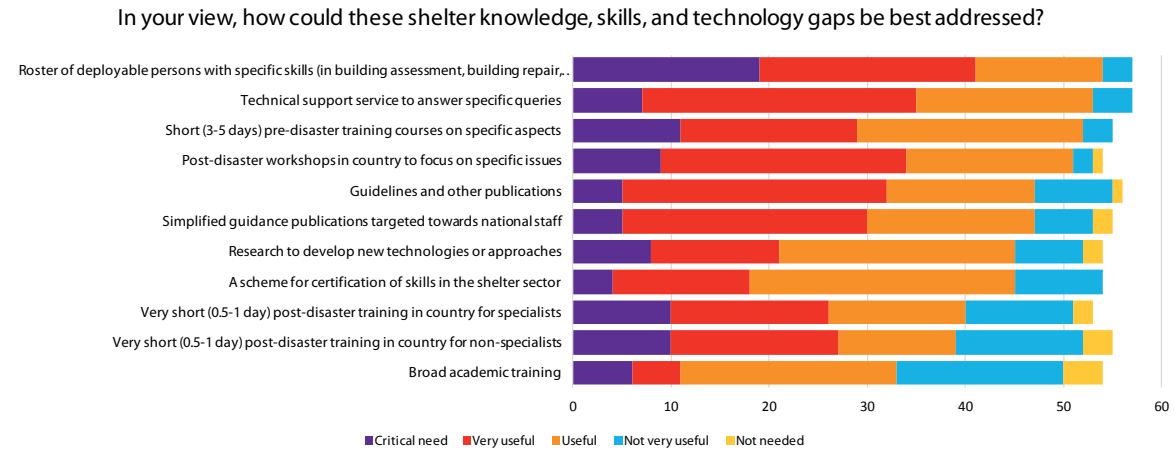


*Figure 7: How to fill gaps in Shelter*

## Roster

Several interviewees commented that a roster featuring strong skills in municipal water and sanitation (rather than humanitarian experience) would be a return to the RedR's original mandate. Several key informants made the point that it is easier to provide a skilled water engineer with humanitarian training, than to equip a humanitarian specialist with sufficient skills to manage repairs to a municipal water plant.

Similarly, it is more cost effective to deploy specialists with a specific focus, such as Housing, Land, and Property, than it is to try and train generalists in these areas.

A roster with specialists was rated as a critical need nearly twice as often as any other measures, both for WASH and for Shelter.

However, while a roster would be possible the following issues were raised:

1. The difficulty of getting roster members working for commercial companies deployed. In the current environment, consultancy companies carefully manage their staff to ensure that they are fully employed, and deployment could cause delays and damage to other commitments. One Agency had trained eight staff from a large consultancy in humanitarian response, but found that these staff were never available when deployment was requested.
2. Whether those deployed would be deployed at full commercial rates (i.e. at no cost to their employer) or via some other arrangement. There was a general consensus that even if not at full commercial rates, there should be some element of cost sharing.
3. The current commercial context makes it difficult to post staff from more than 7 to 10 days due to the costs and due to their need to attend to their regular duties.
4. Whether there was any possibility of having an "on call" system whereby roster members would be on-call for two months a year and paid a small fee to guarantee their availability during the on-call period.
5. What is needed in the urban context is not individuals but teams, as there are so many different issues to be considered. It might be more appropriate for rosters to offer teams of people (urban planner, shelter specialist, programme specialist) rather than one-off staff.
6. As well as the traditional role of personnel working directly with agencies, there is greater scope in urban areas for secondment to local service providers (such as water supply agencies) to support their response.

One suggestion was that there could be a pilot project whereby a large donor could guarantee the reimbursement at commercial rates for people deployed from a specialist skills roster.

One intriguing option raised was having a team package available, where one relatively junior engineer is made available to travel to the humanitarian response operation for 7-10 days, but is supported by a team back at the head office. Modern communication would allow information to be passed in the form of photographs or videos. This structure would mean that the advice of senior engineers would be available without imposing large costs and that the rostered team was already familiar with each other.

Clearly, there would be a need for roster members to be familiar with the humanitarian system. This could be provided by RedR as short training for roster members.

## Framework agreement

Although the survey did not ask about framework agreement with commercial companies in the WASH sector, several key informants referred to these. Several Agencies have framework agreements with Veolia and several more with Arup International. Experience of these framework agreement was said to be positive.

The question arose as to whether such framework agreements should be at the Agency or Cluster level. This option would require external funding to be viable.

## Resource staff at the cluster level

Again, this issue was not raised in the survey, but emerged during the key informant interviews. The suggestion was that there could be staff with a particular focus on urban response as part of the standby staff within the WASH cluster in this instance11.

## Technical support service

This was rated 3rd in Wash and 2nd in Shelter. RedR already runs a technical support service, and this is relatively active. Most of the queries revolve around construction and WASH, but there is no reason why RedR could not also add urban settlement to the area of expertise (as urban WASH is probably

11 WASH is a much more significant part of Aid Agency operations than is shelter.

already well covered).

However, any technical support service should be aware of the presence of universities and other research institutions in-country that may have information on particular issues of interest (such as local building materials, etc).

Many developing countries have poor record keeping systems, so that there are often few records of water and sewage systems available. Records are particularly difficult in conflict environments12. One suggestion to address this was that RedR should poll members, when a new crisis starts, to identify individuals with knowledge of specific plants and systems.

## Pre-disaster assessment

One potential role for RedR would be facilitating pre-disaster assessments of the likely survivability of Agency offices in the face of different hazards. The assessment of risks from earthquakes is one area that demands more technical input. Such assessments could increase the likelihood of Agencies begin able to respond in-country immediately after a disaster through preserving their own operational capacity.

## Pre-disaster training

Pre-disaster training is a staple of RedR's activities. Typically these courses are from 2-5 days. Such courses were rated as 7th in the WASH sector and 3rd in the shelter sector. This ranking may reflect the more generous provision of training in the WASH sector.

Key informants stated that there is a case for broader training on responding in urban environments. However, they also made the case that such a training should focus on the need for:

1. Awareness of the differences in the urban setting
2. Building relationships with and working with local authorities
3. Navigating the informal sector in the urban environment
4. Developing partnerships in the urban environment
5. Considering urban planning issues in the response
6. Integrating the overall response
7. Recognising issues of sustainability
8. Drawing lessons from development practice in the urban environment

It was considered that there is a need both to include short segments on the urban context in existing training as well as doing a broader course for humanitarian response in urban settings.

One further suggestion was that RedR conduct familiarisation training visits to large municipal water works to brief humanitarian engineers on the scale of the plant and some of the issues to be aware of.

## Post disaster training

In-country workshops on specific issues were the most highly rated in-country training provision, coming far ahead of short training for specialists or generalists. While such workshops are possible, funding them might well require some sort of framework agreement with a donor. They would also need to be supported by assessment missions to identify the specific issues to be tackled.

Very short courses (up to one day) post-disaster were not highly rated overall, but they were rated as critical needs by about one in six/seven of survey respondents. Such courses might be appropriate for briefing utility managers on emergency response, or for briefing non-specialists on very basic rapid building assessments. Key informants identified short post-disaster training for the staff of national bodies as being particularly useful.

12 For example, in Iraq in 2003, the only available technical description of the process in many water treatment and pumping plants was the schematic depicted on the control panels.

This could possibly be a pilot project, to be rolled out when the next major disaster occurs.

## Guidelines and other publications

These were highly rated, but there are so many of these in the sector that RedR would not seem to have any particular advantage, unless a revision to Engineering in Emergencies specifically addressed the urban context.

## Certification

The certification of staff as having a particular skill staff was rated 5th in the WASH sector and 8th in the Shelter sector. This relates to the broader issue of professionalisation in the sector, and even more generally to the lack of any career structure in the humanitarian structure.

This raises questions as to whether RedR should seek to have its course accredited so that they could be counted as part of continuing professional development.

## Research

Research was rated 9th in WASH and 7th in Shelter, but it was the second most commonly rated critical need in WASH. This presumably is related to the need to develop solutions for urban excreta disposal highlighted in recent reviews (Bastable and Russell, 2013).

# Annexe: One example of how a roster team might work

## The following illustrates one example of how a rostered team might function

### *The consultancy would provide*

- A number of engineers for the roster (ideally chartered, though could include non-chartered partnered with more experienced to increase numbers and therefore availability).
- An engineer to be available with a minimum 2 weeks' notice for a period of up to 2-3 weeks.
- Technical support from the UK office of the consultancy to the engineer in the field during initial period.
- On-going support to remaining humanitarian team for subsequent period of up to 6 months. This would be to answer queries from the external team who remain in country following engineer's departure. This would be on a basis arranged between the engineer and the NGO team during visit.
- Engineer's normal salary to be paid by the consultancy whilst away.
- Some on-going training to NGOs.

### *The NGO would provide*

- A counterpart from the NGO to be in place as a project co-ordinator to work alongside engineer in the field and remain in the field after the deployed engineer returns to the UK
- A team of people who have a basic engineering (not necessarily structural) knowledge
- UK-based training for the deployable roster members to equip for post-disaster environment (via RedR)
- A fee (as agreed by the parties) to the consultancy as payment for engineering input (probably on cost basis).
- Payment for flights, personal insurance and living expenses (accommodation, meals) of engineer whilst abroad.
- Logistics support to engineer in the field (internal travels, communication).

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