The Built Environment Professions in Disaster Risk Reduction and Response

A guide for humanitarian agencies

RICS
the mark of property professionalism worldwide

ice
Institution of Civil Engineers

RIBA

RTPI
mediation of space · making of place

Contributors and acknowledgements

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A damaged bridge 17 years after earthquake in Uttarkashi, India (Photo: Ripin Kalra)
Hindu temple destroyed by the tsunami (Photo: Ram Sateesh)
Consultation during tsunami reconstruction in Tamil Nadu (Photo: Ram Sateesh)
Baddegama housing project, Sri Lanka (Photo: Leslie Dep, Hela Sarana 2005)

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Local team reinstalling energy infrastructure (Photo: Mew04 at www.ewb-uk.org)
Reconstruction monitoring in Tamil Nadu (Photo: Ram Sateesh)
Ongoing non-disaster construction 17 years after the earthquake in Uttarkashi, India (Photo: Ripin Kalra)

Malcolm Moor

Trawler Krisana Sakorn carried by tsunami through Baan Nam Khem fishing village in December 2004

Preface

Aims and origins of the guide

This guide is intended to demonstrate the value of using built environment professionals more widely in disaster risk reduction and response and giving early attention to engaging the right expertise to address the problems of building, infrastructure and land. It shows how relevant professional skills and expertise can be applied at all stages of disaster management. It highlights that their contribution is especially important to achieving the longer-term goal of sustainable recovery and development.

The guide is targeted, in particular, at non-technical decision makers in humanitarian agencies. However, it is also relevant to all international development agencies; to governments, at national, sub national and local levels and the affected people who, together, contribute the vast majority of funds and resources; and to non-governmental organisations involved in one or other aspect of disaster management.

The need for this document was identified through the ongoing work of the Royal Institution of Chartered Surveyors (RICS) President's Major Disaster Management Commission (MDMC), which was formed shortly after the Indian Ocean tsunami disaster of December 2004. Around the same time in London, the *Tsunami Recovery Network* was formed as an international grouping of organisations and individuals adhering to a set of basic principles addressing the sustainable development issues associated with major disasters, in particular how they affect vulnerable low-income communities in developing countries. Following subsequent disasters, including Hurricane Katrina and the earthquake in Pakistan, the Tsunami Recovery Network was reconstituted in August 2006 as the *Development from Disasters Network* (DFDN).

RICS President's MDMC, together with the Institution of Civil Engineers (ICE), the Royal Town Planning Institute (RTPI) International Development Network and the Royal Institute of British Architects (RIBA), as Network members representing the built environment professions on its Steering Group, met separately on a regular basis to explore ways in which they could support and promote the work of the Network and long-term recovery from disasters.

Discussions between the MDMC and the humanitarian aid community suggested a lack of in-depth understanding as to what the different disciplines' role may be in disaster risk management and response. The concept of producing this guide was met with an enthusiastic response and it was agreed that the institutes should together lend their support to its publication.

As the guide has been initiated by United Kingdom-based built environment professional institutes, it has a particular perspective on what the built environment professions are and do. Recognising, however, that it is normally best practice to employ local professionals with local knowledge in disaster management situations, reference has been made to the international

understanding and standard definition of the built environment professions. It is also essential to ensure that professionals, whether local or not, establish a strong relationship with the local communities who have been living with the threat or its aftermath and know what the community can achieve and sustain.

The scope and activities of these professions as a whole is broadly the same everywhere in terms of who does what, what they call themselves and how they are professionally constituted. However, particular roles, expertise and titles vary and it is vital to establish what they are in any local context so that responsibilities and lines of communication are clear from the beginning.

For this document to have maximum impact, international, regional and national professional associations in different parts of the world should adapt it to their own geographical, cultural and institutional context, not least translating it into languages other than English. The importance of local language cannot be overstated as effective disaster management normally requires building the technical capability of craftsmen and communities who may not communicate in the same language or use the same technical jargon that the professionals use.

Good practice in disaster management for the built environment

The guide is informed by an emerging set of good practice principles for built environment professionals engaged in disaster-related activities. These can be viewed within the context of UN-Habitat's work on 'Sustainable Relief and Reconstruction (SRR)'[1] and the to-be-updated Sphere Humanitarian Charter and Minimum Standards in Humanitarian Response that people affected by disasters should expect from humanitarian assistance.[2]

A number of these principles are summarised in various documents on the Resources CD inside the cover (which also contains a digital version of this guide). These aim to assist compliance by practitioners with their professional codes and standards through displaying increasing commitment both to 'building back better', and 'doing no harm' before, during, and after a disaster, and increasing the resilience of hazard prone communities and societies. Those commissioning the work of built environment practitioners in disaster risk management and response may refer to these documents in preparing the terms of reference for their work. Practitioners may draw on its principles in guiding their work in this field. The CD contains other useful resources including additional case studies of professional practice in disaster management, the 'Mind the Gap' report published by RICS in 2006, Article 25's 'Humanitarian and Development Career Information Pack' and documentation on UN-Habitat's Disaster Management Programme and SRR policies.

1 UN-Habitat (2005)
2 Sphere project website

Foreword

The importance of built environment professional expertise in disaster management seems obvious on the face of it. It is sometimes said, for example, that earthquakes don't kill people – buildings do. So how those buildings are designed and built, and where they are located, is critical to their ability to withstand different types of natural hazard.

But it is only after reading this guide that the full scope of professional skills in the sector – and who does what – becomes clear. From risk reduction and preparation, through to the immediate aftermath and the subsequent recovery and reconstruction phases of the disaster management cycle, the skills of architects, engineers, planners and surveyors can be harnessed. They can ensure that best use is made of finance, opportunities to build back better are seized, local people learn new skills and, crucially, that a legacy archive of lessons learned is developed.

This guide will be invaluable for humanitarian and development agencies, and all others who are involved in disaster risk reduction and post-disaster reconstruction, and will help them tap into a wide pool of enthusiastic professionals in these fields. It has come in response to a recognised need, and meets that need admirably.

Brendan Gormley
Chief Executive, Disasters Emergency Committee
April 2009

The Built Environment Professions in Disaster Risk Reduction and Response

Introduction

This guide outlines the responsibilities and capabilities of engineers, planners, architects and surveyors and their professional institutions in reducing disaster risks and responding to disaster impacts.

It looks at the role that built environment professionals can and should offer in supporting and empowering communities and the groups most vulnerable to disasters, especially in developing countries. It sets out how the different built environment professions can be engaged, individually or in combination, at different stages in the various phases of disaster risk management and response.

The guide recognises that professionals are already often employed by humanitarian agencies. However, this is normally in a specifically technical role, which may limit their ability to advise on wider operational matters where other built environment expertise might also be usefully employed. The importance is also acknowledged of professionals having the right combination of skills, experience and training for the context in which they are being employed. Professional qualifications and experience in a high income context may not by themselves be appropriate or sufficient.

The guide notes the need for international humanitarian and other public sector and development bodies to address a number of challenges in deciding why, how and when to deploy the expertise of built environment professionals.

These challenges may include:

- The variety of different built environment professions and the complexity this presents;
- A lack of precise understanding of what each profession does and how they relate to one another;
- Overlapping roles and expertise – while some skills are specific to particular professions, others are shared, for example, project management;
- Interdependency of expertise and the need to bring together teams of practitioners from the different disciplines;
- A lack of information on how to employ built environment practitioners on an individual or teamwork basis; whether a particular individual is likely to have the relevant expertise and experience;
- Uncertainty as to how long they may need to be engaged for and the associated costs;
- The fact that these different professions can vary considerably from place to place both in name and the specific areas of expertise that they offer;
- Misunderstandings arising through professional jargon;

Box 1. The Hyogo Framework for Action and built environment practice

The World Conference on Disaster Reduction held in January 2005 in Kobe, Hyogo, Japan adopted the current UN Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters.[3] The conference adopted the five priorities for action by national governments and international humanitarian agencies shown below. The built environment professions have a central role to play, both sector-wide and at the local and community level, in addressing each of these priorities for disaster risk reduction and response:

1. **Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation**
   At the institutional level, land use planning and building codes are key tools for reducing risk from hazards. Ensuring that appropriate zoning and building regulations are in place and being properly implemented is key to improving building safety and the protection of critical facilities such as hospitals and power stations and draws directly from the expertise of the practitioners.
2. **Identify, assess and monitor disaster risks and enhance early warning**
   Risk assessments increasingly rely on systematic hazard mapping and risk information collection. Surveyors in Turkey, for example, catalogue and make available detailed information on building construction throughout the country.[4] Such knowledge of building conditions provides a baseline for disaster preparedness campaigns and targeting in schools, homes and workplaces.
3. **Use knowledge, innovation and education to build a culture of safety and resilience at all levels**
   Sector training for engineers, architects and surveyors (as well masons and other trades people) is an essential part of the task of ensuring a culture of safety and resilience in the construction industry in vulnerable regions.
4. **Reduce the underlying risk factors**
   Environmental management to reduce risks relating to natural hazards, including those resulting from climate change, is an increasing part of the professional's task. Working with communities and traditional land use planning and human settlement development are essential elements of implementation.
5. **Strengthen disaster preparedness for effective response at all levels**
   Practitioners have a key role in disaster preparedness and response. A substantial part of the human and financial cost of any catastrophe is a consequence of damage to the built environment and resulting repair and reconstruction demands on diminished local skills and resources.

3 UN (2005)
4 UN (2007) p38

- Addressing the particular social circumstances in post-disaster situations and the demands for urgency in response from local communities, governments and donors;
- The complexity of facilitating professional activities in an unusual status quo.

The document aims to provide a simple guide to the wider use of professional expertise in disaster risk management and post-disaster reconstruction. Meeting this aim should ensure that the expertise of built environment practitioners can be drawn upon with confidence and to improve the overall quality of processes and outcomes.

Definition of a 'disaster' used in the guide

While this document arises out of a particular concern of the United Kingdom built environment professional institutions for long term recovery following natural disasters, the term *disaster* is used here in the sense employed in humanitarian practice. This refers to the impact of different physical, social, economic, political and complex hazards on vulnerable communities. It includes, therefore, not only disasters associated with extreme natural events such as earthquakes, hurricanes or volcanic eruptions, but also disasters due to war and civil conflict, displacement due to political violence and development projects such as large dams, and disasters due to the collapse of existing social welfare systems as a result of wider economic and political changes. As such, the term disaster is used here in a much wider sense than the conventional definition of "natural disaster".[5]

International classification of the professions

In this guide, four categories of built environment professionals are referred to – architects, planners, engineers and surveyors. Despite some variation in the way these professions are defined in individual countries, certain core expertise within these disciplines is internationally understood and recognised.

Built environment professionals, especially those engaged in disaster mitigation and development, commonly and necessarily work together in project teams and usually have a good understanding of the particular skills and expertise that their colleagues from other professions bring to the table in any particular context. However, it is particularly important that those professionals who are employed in particular disaster-related situations have the appropriate knowledge and experience. Those dealing with post-earthquake reconstruction, for example, must have appropriate technical knowledge of earthquake-resistance in designing for and managing effective reconstruction.[6] Those planning and executing temporary shelter measures need to be aware that temporary housing often becomes permanent, creating a situation of inadequate living conditions for residents if not anticipated.

5 UNISDR website
6 Da Silva (2009)

According to the current draft version of the International Labour Organisation's International Standard Classification of Occupations, ISCO-08, the built environment professions are included in two main categories of professionals: 'Engineering professionals' and 'Architects, planners, surveyors and designers'.[7]

The main category under engineering is civil engineering. Other engineering categories that are relevant in the ISCO classification are environmental engineering and mechanical engineering, where this relates to building and infrastructure services. The second relevant ISCO category includes architects, landscape architects, town and traffic planners and cartographers and surveyors.

Scope of built environment practice

The built environment refers, in general terms, to human settlements, buildings and infrastructure (transport, energy, water and waste and related services). The sector includes the commercial property and construction industries and the built environment and related professions.

The term 'built environment professional' includes those we refer to as 'practitioners', primarily concerned with providing technical support services – consultation and briefing, design, planning, project management and implementation, technical investigations including monitoring and evaluation studies. They may be employed directly by a client or indirectly through a contractor.

Built environment professionals may also be concerned with designing and implementing policy, standards and regulation of the built environment – factors that are critical in reducing the risks from hazards – or are exclusively or partly involved with training, professional education and research.

The professions include land surveyors, planners, administrators and land tenure specialists who are concerned with sectors such as housing and land issues that are particularly highlighted in any post disaster situation.

7 International Labour Organisation (2007)

Box 2: The roles of the principal professions

Architects

The architect's job is to understand the complex needs of clients and users of building projects and, in collaboration with multidisciplinary teams, to develop and realise designs based on these. Architects' services cover new buildings, conversions and refurbishment through a series of 'work stages' including: inspecting and surveying sites and existing buildings; consulting with clients and users on their requirements; co-ordinating the work of other professionals; testing design ideas to establish feasibility; developing selected options and preparing reports and design information ranging from site layouts to the technical details of construction and specification for estimating costs, meeting regulatory requirements, ensuring good performance, guiding construction and aiding future maintenance. Architects can also manage the procurement process for building-related projects.

Engineers

Civil engineering is about creating, improving and protecting our environment in a sustainable manner for this generation of society and the next. It provides the facilities for day-to-day life to go about its work. Along with structural engineering, it involves the safe design, construction and maintenance of infrastructure – roads, harbours, buildings, airports, tunnels, dams, bridges, power generation, safe water supply, drainage, wastewater treatment, railways and telecommunications – with a good understanding of the specific physical and environmental risks. Engineers play a leading role in delivering transport, energy, and waste solutions for complex projects. In addition to managing the project procurement process, engineers also oversee the implementation of health and safety measures.

Planners

Planners advise donors, politicians and other decision-makers dealing with urban and regional development processes. The role of the planner is to help manage the development of cities and regions, towns, villages and the countryside by producing and implementing plans and policies based on evidence. Planners analyse social, economic, demographic and environmental issues to inform the physical and economic development of an area. They are involved in establishing housing, transport, infrastructure, social, economic and other needs and play an important role in regenerating socially and economically deprived areas and in livelihood creation. To be effective, they must engage with the communities whose lives and livelihoods are being affected.

Surveyors

Chartered surveyors around the world understand the whole lifecycle of property, from land management and measurement, land tenure and boundary issues; through planning, environmental impact assessment, and investment appraisal; to managing the whole construction process to ensure best use of resources and build quality, and the planned maintenance of buildings. They are used to managing and working collaboratively with teams of other professionals, funders and contractors, and local community partners - helping to build capacity and partnerships for the future.

(Source: RIBA, ICE, RTPI and RICS)

The urban and rural context

Ripin Kalra

Increasing vulnerability of the urban poor

Built environment practitioners in most parts of the world are heavily concentrated in towns and cities where they practice independently or through public institutions or private organisations that are often also professionally-led.

The greatest immediate threat to life and property from hazard strike becoming a disaster is in such urban centres, particularly in the burgeoning cities of the developing world where increasing numbers of poor people live in precarious situations.[8] However, scattered rural populations are usually the hardest to reach and this greatly increases their vulnerability.

The built environment extends to wherever people live and work and is an integral part of a complex relationship with the resources they draw on for their livelihoods. In rural areas, infrastructure and buildings for storing implements, machinery, livestock, tools, supplies and produce are critical. In subsistence economies, restoring the landscape and cultivated areas often takes precedence over the provision of assets such as houses.

In urban areas, the majority of buildings consist of houses and shelter and is a major priority after a disaster, alongside critical facilities such as government offices, hospitals, clinics and schools. Restoring basic urban infrastructure and essential productive activities is essential. However, infrastructure in remote rural locations can also be critical for maintaining essential supplies such as water, power and food to the whole population in times of crisis.

Wherever hazards strike and become a disaster, rehabilitation and reconstruction in the built environment places a huge demand on the funds available for recovery. 'Housing and infrastructure development often account for up to 50% of recovery disbursements'.[9] As well as the economic cost, collapsing buildings and infrastructure pose one of the main threats to human life in all forms of disaster. Moreover, mitigating the dangers can involve retrofitting measures that may be prohibitively expensive relative to the degree of risk and/or can only be executed gradually over a long period of time.

8 UN-Habitat (2007)
9 ProVention/ALNAP (2005) p5

Case study 1: Local government engineer assists refugee camps to provide safe water and sanitation

RedR member and trustee, Peter Goulding is a drainage engineer with 36 years experience in local government. He has designed and constructed drainage schemes large and small and has completed over 12 assignments overseas, working for organisations such as Oxfam. He has worked as a water and sanitation engineer in Turkey, Somalia, Angola, Kosovo and Darfur to design and construct water supply systems for refugee camps.

On assignment he spent time organising working groups as well as the logistical movements of materials. On many of his assignments, he used a water kit from Oxfam, which is rapid to install once in location. It is important to adapt the system for the location and work out the politics as to who uses it and owns it. Peter comments that; 'Having an understanding of the infrastructure of a functioning system in the developed world assists the development of a simple system in third world environments.'

(Source: RedR)

Case study 2: Urban and social planner from Australia in tsunami planning reconstruction support project in Sri Lanka

Stephanie Knox, an urban and social planner from Australia was Director of the Post Tsunami Planning Reconstruction Support Project in Sri Lanka. She writes: 'This project, an initiative of the Planning Institute of Australia and the Institute of Town Planners Sri Lanka after the Asian Tsunami, with funding from the AusAID and the Australian Red Cross, involved assistance with national, regional and local planning in tsunami affected areas. Structure plans as well as detailed local plans were developed by teams of local planners and Australian planners for several towns on the south and south west coast of Sri Lanka. Training programs and capacity building were also included in the project. Experienced Australian planners volunteer go to Sri Lanka for periods of at least 3 months to work with their Sri Lanka colleagues on developing the local plans and national policy. Sri Lankan planners are also supported to come to Australia for work placements.'

(*Source: Stephanie Knox, RTPI)*

Drawing on local expertise

Local professionals have an understanding of how things work on the ground, which many international experts flown in to a post disaster situation may not have. However, the availability of appropriately skilled professionals especially in many low-income developing countries is often seriously constrained, particularly in remote locations and in the poorest regions.

It is not uncommon for a few engineers working in local authorities to be responsible for regulation and technical advice for vast, rural regions, and to have thousands of buildings under their jurisdiction. In such situations, training of building users and communities in basic maintenance and disaster preparedness may be the most practical way to develop and

maintain safety standards in construction and building maintenance. Under such circumstances, humanitarian and development agencies are likely to have to draw on non-local professional expertise and local non-professional experience. The strategic use of limited professional expertise in such situations has been shown to add value when focused on co-ordinating the local skills and non-professional human resources that are available, and leveraging and enhancing this through the design and delivery of appropriate training programmes.

Ripin Kalra

Effective reconstruction depends on harnessing local skills and resources

Local construction skills and techniques

Local construction expertise includes builders and skilled trades people who are familiar with established modes of construction, locally sourced building materials and techniques. Drawing on local skills, techniques and resources help to avoid the risk of introducing unfamiliar forms of construction as a 'quick fix' (particularly those dependent on imported material and components).

Such imported methods may be culturally inappropriate or difficult to assimilate. As a result, they may be subject to neglect and lack of maintenance and prove unsustainable in the long term. Where technological innovation is required, for example to increase the resilience of reconstructed buildings and infrastructure to the natural hazards, it is better to adapt existing methods and extend existing skills through training programmes where this is possible.

S.Jones at www.ewb-uk.org

Earthquake protection using bamboo

What expertise to use and when

This guide employs a framework that identifies different phases of a disaster risk management 'cycle'[10] (or, as explained below, better represented as a spiral) within which appropriate types of expertise provided by the different built environment professionals can be employed (see Table 1).

The key phases of the disaster risk management and response cycle identified here are:

- Risk and vulnerability assessment
- Risk reduction and mitigation
- Disaster preparedness and pre-disaster planning
- Emergency relief
- Early recovery/transition
- Reconstruction
- Post reconstruction development, review and ongoing risk reduction

There are seldom any clear boundaries between the phases, which in practice may vary greatly in duration and can frequently either overlap or be separated by unplanned gaps. There can be a lack of a joined up approach and complete stages in the process may be absent. Within any disaster-prone or affected region, different projects and programmes, engaging different actors may be occurring in different phases at the same time. Thus this framework needs to be used flexibly and with close attention to the real situation on the ground.

The cycle concept has two inferences. The first is that the outputs and experience of disaster recovery should feed back into improving the resilience of vulnerable communities and inform the disaster management process to reduce future risks. 'Building back better' and 'doing no harm' are critical aspects of this, with the main aim being to prevent any future hazard turning into a disaster.

A second inference is that many of the natural hazards that cause disasters re-occur periodically in the same location. This is particularly the case with hydro-meteorological (weather-related) events such as storms, floods and mudslides, but this can also apply to man-made hazards such as the reoccurrance of fires in informal settlements. These represent the majority of recorded disaster-related events and are increasing in frequency[11] which is, many would argue, as a consequence of climate change.[12]

Figure 1 shows the cycle unfolding over time and offering the opportunity of achieving sustainable development in the disaster management process.[13] Increasing sustainability is achieved through improving on pre-disaster conditions, reducing risk and vulnerability and increasing the resilience of local communities towards the goal of disaster prevention.

10 The cycle in figure 1 is based on a diagram in Max Lock Centre (2006) p35, itself developed from the original in the ACT//CSW Emergency Management Training Manual of Churches Together (2001)
11 Saunders (2009)
12 Christian Aid (2005) p5
13 See UN definition at http://www.un-documents.net/ocf-02.htm

Figure 1: The disaster risk management and response spiral

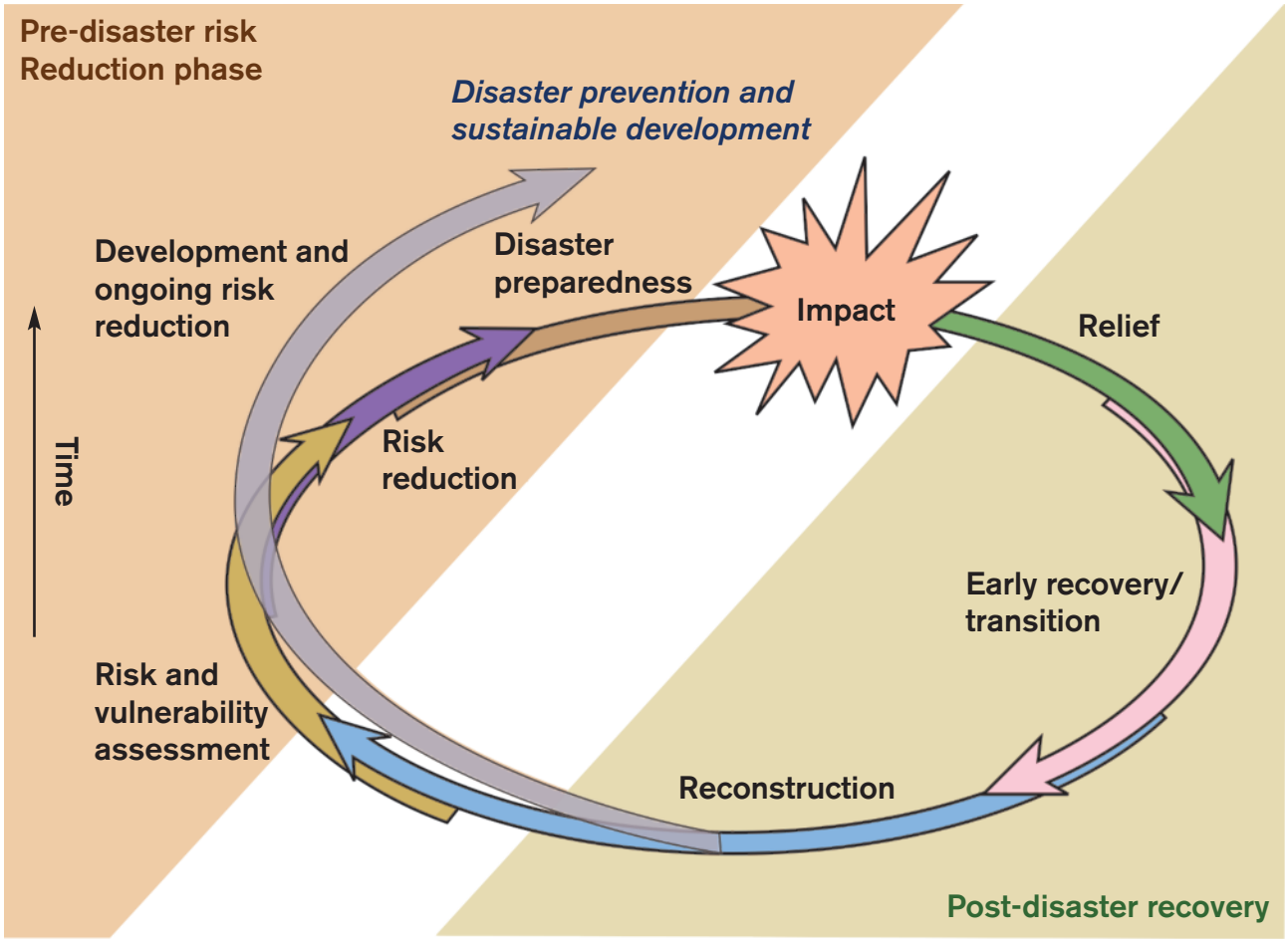

Figure 2: Key to table 1

Activities	Roles of professionals			
Phases[14]	Architects	Surveyors	Planners	Engineers
Risk and vulnerability assessment				
Disaster risk reduction and mitigation				
Disaster preparedness and pre-disaster planning				
Emergency relief				
Early recovery/transition				
Reconstruction				
Post reconstruction development and review				

14 These may overlap or be disjointed in practice

Table 1: Activities and the roles of professionals in disaster risk management and response

Activities

Risk and vulnerability assessment

Risk and vulnerability asesssment

Risk and vulnerability assessment involves identifing the nature and magnitude of current and future risks from hazards to people, infrastructure and buildings, particularly vital facilities such as hospitals and schools. Risk can be assessed using computer modelling of natural disasters using satellite image based mapping. This can be combined with consultation with communities concerning their vulnerability and ability to cope with a hazard, particularly when climate change may threaten precarious land rights.

Risk reduction and mitigation

Disaster risk reduction and mitigation

Preparing a strategy to reduce vulnerability against known risks is a complex and continuous exercise involving strengthening vulnerable structures, preventing building activity in high-risk areas, managing and maintaining assets, and ensuring the enforcement of building regulations. Community based disaster preparedness (CBDP) is already in place in many parts of the world and is a reliable vehicle for disaster prevention at the grassroots level, particularly for vulnerable groups, such as the young, the elderly and the infirm.

Disaster preparedness and pre-disaster planning

Disaster preparedness and pre-disaster planning

While all practical measures should be taken to avoid hazards becoming disasters, it is often impractical to eliminate all risks. The experienced skills of built environment professionals are needed to plan for effective disaster preparedness.

Emergency relief

Emergency water supply and sanitation

The aftermath of a natural disaster can severely disrupt and contaminate water supplies, further increasing the risk of death and illness. Along with medical aid, existing provision of clean drinking water and basic sanitation are therefore vital in the period immediately after a major disaster.

Roles of professionals			
Architects	**Surveyors**	**Planners**	**Engineers**
Provide an assessment of the way people build in the area, their use of dwellings, community facilities and other buildings; architects can help pinpoint historic and culturally important buildings at risk.	Assess the general stock of buildings and provide costs of mitigating potential disaster impacts by strengthening structures and planning alternative procedures and improving regulations.	Estimate vulnerability relating to the way land is used and settlements, buildings and infrastructure are located, taking into account climate change impacts; assess potential access issues during a disaster; analyse the effectiveness of regulations and policies.	Assess the stability and vulnerability of existing structures particularly vital facilities. Identify failure modes and consequences.
Facilitate community surveys and advise on the planning of community shelters and dwellings.	Advise on the cost and delivery of 'risk mitigation' particularly roles and responsibilities of owners and tenants of buildings and assets. Marine surveyors can inform on environmental resources to reduce risk in coastal areas.	Identify the risks associated with areas; advise on risk reduction; plan for quality development in the right locations. Develop regulations that are practical and cost-effective to implement. Facilitate development of stakeholder partnerships and community consultation.	Specify structural requirements and retrofitting measures to mitigate disaster impacts; identify post-disaster response mechanisms; design and implement risk reduction training for communities in collaboration with social development professionals.
Provide advice on building use in the event of hazard.	Advice on the cost and delivery of disaster preparedness measures.	Locate settlements and define those most at risk; advise of relocation measures before, during and after a disaster. Transport planning for access in disaster situations.	Specify measures for providing temporary strengthening of existing structures in the face of hazards. Identify vulnerable structures and measures to be taken in the event of damage to the building. Develop emergency response plans to provide vital services (water, waste water, transport, logistics, communications, power).
	Identify usability of existing infrastructure in collaboration with planners and engineers. Estimate costs of installation and procurement and maintenance.	Estimate the demand for clean water and the locations it will be required. Liaise with community leaders and local authorities to plan the supply.	Plan and provide locally suitable technology to re-establish drinking water supply and sanitation.

Table 1: Activities and the roles of professionals in disaster risk management and response

Activities

Emergency relief

Logistical planning

Establishing access to disaster struck areas and planning for provision of emergency supplies and access for relief workers is a key challenge facing agencies in the immediate and often chaotic aftermath of disaster. Ensuring land and securing harvests, seeds livestock and food production often takes priority over shelter in rural communities in developing countries.

Relief shelters and sheltering material

Relief shelters may be needed to protect people from the elements after a disaster. They have to be strong, micro-climatically appropriate and easy to install. They should also be sensitively designed for habitation by people who are likely to have been traumatised. They may be in active use for several years after reconstruction has been underway, so a degree of durability is also helpful. Designs should be lightweight and removable to permit re-use elsewhere.

Project planning and management

Once basic and essential services are re-established, there is an immediate need for professionals to establish good lines of communication with each other, the local community and the relevant authorities. A co-ordinated response is required to assess the immediate and medium term priorities for affected communities and local authorities, come up with a strategic action plan and plan, manage and implement recovery projects.

Early recvovery/transition

Physical condition surveys/audits

The first step towards recovery requires a damage assessment with a view to assessing the scale of recovery required and recovering whatever materials and resources that can be re-used. Specialist expertise, such as that provided by surveyors, seismologists, geologists and hydrologists is required at this stage. The surveys should be co-ordinated with local community groups, NGOs and the authorities overseeing recovery efforts as well as between the professions to avoid duplication and ensure compatibility.

Roles of professionals			
Architects	**Surveyors**	**Planners**	**Engineers**
	Advise on costs and procurement of goods and services. Establish land rights and rehabilitation for economic and subsistence reasons.	Evaluate local access issues and plan for transportation and storage/shelter for supplies, services and rescuers to the disaster area. Establish the priority needs and requirements of affected communities.	Provide technical solutions for delivery of material and people to affected areas and secure storage of essential supplies.
Design relief shelters for dwellings as well as larger structures for essential services such as medical facilities and vulnerable groups that need special accommodation such as the sick and injured.	Advise on procurement of shelters; work with local authorities and communities to make the best use of local skills and labour.	Estimate the demand for relief shelter, including number, types and locations; consider medium/long-term issues associated with shelter locations and design (e.g. implications on income if shelters are some distance from employment locations).	Technical design of relief structures for bulk production/use; ensure designs are safe in the aftermath of disasters (e.g. safe from aftershocks in earthquake affected areas); ensure that shelters are safely located.
Develop survey methods to facilitate the repair and reconstruction of dwellings, vital facilities, community buildings and heritage buildings.	Develop property survey methods; analyse procurement and funding requirements addressing shortages in material and labour. Review the reuse of local material and local labour capability.	Initial assessment of infrastructure recovery requirements, particularly access, energy, water and food storage. Liaise with stakeholders and the community and establishing feasible strategic plans for the area in the medium term.	Provide an assessment and delivery plan for of emergency civil works such as restoring access roads, providing temporary bridges, power generators and water tankers.
Provide an assessment of traditional patterns of use of space, building materials and technology; work as part of social survey teams.	Carry out building condition surveys, including assessment of key buildings and overall damage assessment; capture detailed information related to land ownership, tenure and registration.	Assess potential locations for interim settlements, transitional dwellings and vital facilities in consultation with key stakeholders.	Structural surveys of buildings and infrastructure; identify safe sites for setting up facilities. Establish safe and cost-effective procedures for removal of rubble and clearing sites. Assess further environmental risk in the near term.

Table 1: Activities and the roles of professionals in disaster risk management and response

Activities

Early recovery/transition

Compensation packages

Material and personal loss will affect different groups in different ways. For some, compensation may best be in the form of cash; for others, livestock or building materials. In preparing a compensation package, it is therefore necessary to assess the nature and extent of the damage and loss suffered. This needs to be adjusted according to the resources available for compensation. The distribution of benefits, should be seen to be fair, especially to the most vulnerable. The compensation package will rely heavily on the survey information collected on the ground about damage or loss to property and land, livestock and life.

Rapid mapping

Rapid mapping will enable the planning team to capture the spread and scale of destruction and comparison with mapping before the disaster event. Satellite imagery is becoming more and more advanced, affordable and accessible for such work, although it always needs to be field verified. At a later stage, such comparisons can be very useful to establish land use and ownership claims.

Community surveys/resource mapping

Ground-level surveys are essential for the recovery and full development process. The benefits include field verification of satellite mapping, gaining knowledge about the community that has been affected and identifying community skills and resources that can be incorporated into the reconstruction process. This can be a key factor in helping to 'build back better' both socially and materially.

Housing needs assessment

Dwellings nearly always make up the largest proportion of buildings in hazard-affected settlements causing the greatest degree of hardship when becomimg a disaster. They are often the largest component in a recovery programme. Survey data collected by specialists can feed into the development of a housing plan to estimate the number and types of units required in both the short and longer term, together with the form of land tenure, infrastructure provision, and settlement locations and layouts within the wider economic and social contexts.

Land survey and acquisition

Whilst damaged or destroyed structures are being rebuilt, an area of land may need to be identified and developed for transitional shelter needs. This requires a survey of suitable areas and should be undertaken in consultation with the community as well as landowners and the local authorities. Surveys need to locate valuable agricultural areas, or land of high ecological importance that should be avoided for construction.

Roles of professionals			
Architects	**Surveyors**	**Planners**	**Engineers**
Advise on the selection of building materials and technology that are part of the compensation package.	Prepare financial compensation package; advise on the breakdown of cash costs per family or unit and in kind supports such as materials, labour and tools.	Research and advise on strategic objectives for compensation packages (e.g. qualitative costs and benefits associated with individual versus settlement investment).	Specify safe construction methods to be included as part of the compensation package.
	Procure and analyse satellite imagery to establish boundaries for planning and property recovery purposes.	Work with surveyors to review mapping and establish boundaries and provide estimates (if not already available) of land-use, transport and access lines, water-bodies and the impact on them after the disaster.	Relate mapping results to sources of key vital services.
Work with social development agencies to carry out surveys with community groups and households for which shelter needs to be provided.	Carry out surveys of land and property ownership at the ground level; review construction skills in the local community.	Access and provide information on population, households, social and economic activity and carry out additional participatory surveys, as necessary. Consultation with communities about their aims and objectives.	Provide information on access/ provision of key vital services.
	Interpret housing needs assessment in particular with regard to issues related to land, title, tenure and cost.	Evaluate overall housing needs, establishing the scale and type of infrastructure, and housing and land required for transitional and permanent housing. Consider layout design at the settlement level.	
	Carry out land surveys in consultation with planners and other specialists such as hydrologists and geo-technical scientists. Identify in consultation with local communities and local authorities the exchange, purchase and transfer of land.	Advise on optimum locations for transitional housing based on economic, social and environmental considerations (e.g. flood risk and access to income generating activities). Identify in consultation with localcommunities and local authorities the exchange, purchase and transfer of land.	Provide engineering assessment on suitability of areas of temporary/ permanent new development.

Table 1: Activities and the roles of professionals in disaster risk management and response

	Activities
Early recovery/transition	**Physical planning** When planning the reconstruction of damaged or destroyed areas, it is important to the success of the recovery process to rebuild areas of particular social importance. Obvious considerations include the location and form of local landmarks, such as religious or social centres, but also more personal aspects such as the relationship between public and private areas. It is vital to include the local community in the process of re-planning. At the same time, professional expertise can enable improvements to be made in an area, such as better access roads and services provision resulting from modest revisions to settlement layouts and land use patterns.
	Infrastructure demolition/repair/renewal Some natural disasters, such as earthquakes, may seriously damage public infrastructure, including roads, telecommunications, power supplies, water and sewer networks. Clearing waste and recyclable materials from affected sites needs to be undertaken under professional supervision. It will be important to include municipal engineers responsible for restoring infrastructure networks in any team responsible for physical re-planning of affected areas.
	Transitional Shelter The provision of 'permanent' dwellings may need to wait until a later stage while housing needs are fully established and confirmed. However, transitional shelter will need to be provided that is suitable for the local micro-climate and restores an element of normality, such as access to schools, health facilities, water, energy, waste disposal and transport. Ideally, transitional shelters should be of a form that is durable and re-usable.
	Property rights and claims Land and property ownership is a critical issue in reconstruction, particularly where land and materials are lost or indistinguishable and supporting records and markers are not available. It is therefore vital to establish claims in open consultation with the affected community so that any disputes can be identified and resolved quickly, before they prejudice the entire recovery process. This will require the involvement of community leaders who can command local respect, together with independent professional advisers, especially surveyors and lawyers.
	Land boundary/cadastral survey Field verification of satellite image based surveys will ne needed along with cadastral surveys of the area to be redeveloped or repaired. Particular attention is needed in areas where land and property ownership are complex. Again, surveyors and lawyers will be helpful.
	Financial claims resolution Resolve claims people may have about loss, damage and entitlement. Most people may not be able to provide receipts for lost items, so a degree of discretion and flexibility will be required in assessing appropriate amounts. At the same time, care should be taken to avoid abuse or multiple claims. The more local the level of enquiry, the more accurate and transparent will be the data collected.

Roles of professionals			
Architects	**Surveyors**	**Planners**	**Engineers**
Establish footprints of dwellings and other typical and key buildings; draw up local area layouts and site planning in consultation with communities and local authorities. Ensure overall appropriateness to local culture.	Provide detailed contour surveys for planning purposes; planning surveyors may be engaged to carry out site planning.	Strategic level physical planning and local area planning: location of buildings, key facilities, transport routes and access (existing and new).	Advise on civil works required to implement the physical plan.
	Estimate quantities and cost of rubble removal.	Identification of key infrastructure issues and priorities for action.	Supervise the removal and clearing of sites, reclaim building material (householders may want to claim material from their individual homes).
Design and layout of transitional shelter. Ensure such shelter is appropriate to social and religious custom.	Advise on cost planning and allocation of shelter.	Draw up and amend local planning policies and guidelines to take account of transitional housing requirements. Site and location planning to ensure access to necessary facilities.	Provide stable structures for roads, paths, infrastructure, dwellings.
	Fine-tune property boundaries and ownership. Provide inputs into resolving conflicting land ownership claims and the protection of community land rights from commercial land grabs.	Establish, with legal assistance, a registry where one does not exist. Resolve ownership issues in consultation with authorities and communities.	
	Implement boundary/cadastral survey.	Advise on physical planning and 'intense' areas of particular importance to communities and local authorities.	
	Carry out case by case resolution depending on the nature of the dispute.		

Table 1: Activities and the roles of professionals in disaster risk management and response

	Activities
Early recovery/transition	**Training and mobilisation of volunteers** There are numerous tasks from arranging community meetings to professional inputs that volunteers will be required for. There are never enough resources to employ paid personnel for all these tasks. Reconstruction relies heavily on the generosity of volunteers. Co-ordinating such voluntary efforts requires leadership, so identifying local leaders or professionals able to make best use of human, material and financial resources, is vital.
	Project planning and management Managing the reconstruction process requires professional skills in working with people and co-ordinating different types of expertise. It is essential to ensure that available resources are used in a cost-effective manner. Whilst project management is now often practised as a separate discipline, some built environment professionals may provide such skills and experience. 
	Financial planning and management This involves monitoring spending, preparing strategies for appropriate compensation for victims and expenses for volunteers, including labour by the community itself. It may also involve raising resources for ongoing and future work. Recovery is often funded by humanitarian agencies, while longer-term development and reconstruction will be funded through local authorities, national and regional development plans and international donors and banks. All monies spent need to be accounted for.
Reconstruction	**Land development/landscape design** Land, landscape and planting play an important part in long-term reconstruction and recovery particularly in societies that live off subsistence agriculture. Most effects of flooding and cyclones can be mitigated by careful siting, controlling drainage run-off and providing adequate shelter from the elements. Decision on settlement location and relocation should address the cultural and livelihood needs of local communities.
	Housing allocation The allocation of dwellings for households will need to take into account the sites of damaged or destroyed structures. If possible, households should be resettled on their earlier plots or in repaired or rebuilt dwellings as this will facilitate social and economic recovery. Where this is not practical, the process of allocation needs has to be transparent and equitable to ensure that householders preferences are taken into account.
	Advice on regulations and codes In many countries, planning and building regulations, standards and related administrative procedures are not relevant to the needs of all sections of the population, especially the poor. Post disaster recovery situations provide an opportunity to reassess. Whilst issues of health and safety deserve primary attention, it may be desirable to relax any other official norms in order that all sections of the affected community can obtain affordable and legal shelter. Regulatory audits should be done in consultation with community groups to ensure that compliance is not burdensome on time and cost and people will be able to access technical help where required.

Roles of professionals			
Architects	**Surveyors**	**Planners**	**Engineers**
Volunteer architects to train other volunteers and manage design and planning process. Volunteers also required to be trained for building and construction.	Volunteer surveyors to deal with large scale work. Buildings surveyors to train volunteers for building and construction.	Volunteer planners to deal with large scale work. Training other volunteers in complementary tasks.	Volunteer engineers to deal with large scale and local work. Training other volunteers in complementary tasks, and building local capacity where possible.
Project management focusing on design and provision of transitional shelter.	Project management focusing on resources and cost of transitional shelter and implementation of physical plan.	Strategic planning of disaster affected areas to ensure integrated delivery of services and housing. Co-ordinate inputs from professionals and stakeholders. Ensure long term benefits including risk reduction and guidance on codes of standards and regulations.	Project management focusing on resource management, safety and civil works guidance.
Monitor and plan spending on building and construction.	Monitor and plan spending on the implementation of the physical plan.	Provide background strategic information on the physical plan.	Monitor and plan spending on the implementation of safe building practices including training for artisans and local communities.
Design and planning of landscape elements.	Base line survey information for planners and architects.	Overall siting of settlements and access routes and infrastructure. Regulatory guidance and enforcement.	Design and planning of drainage, further civil works related to the physical plan.
Work with households and communities to ensure that housing is allocated according to needs and preferences appropriately.	Allocation in consultation with community groups with reference to the structure of the compensation plan and procedure.	Allocate dwellings in the overall plan for each settlement according to needs assessments.	
Advise on building related regulations.	Implementing codes and regulations within the conditions of leases and ownerships.	Propose ways to monitor and enforce regulations. Advise on longer term policy and plan development to support future risk reduction and efficient reaction to risks.	Advise on building and infrastructure regulations.

Table 1: Activities and the roles of professionals in disaster risk management and response

	Activities
Reconstruction	**Housing/building design** The design of dwellings is often done on a mass scale, although a process of incremental development is to be preferred. Detailed consideration should be given to future growth of households, their use of open/ semi-open and covered spaces as well as spaces for livelihood provisions such as home-based economic enterprises. Equally, the role of planting should be considered as a place-making tool and a resource to subsistence economies. Dwelling design should incorporate features for thermal comfort, including passive design, water efficiency, and energy efficiency. Infrastructure provision should be planned in consultation with local people and professionals with external built environment professionals in an advisory and monitoring role.
	Housing/building construction advice/supervision The process of rebuilding, particularly dwellings and key facilities, provides a learning process for the numerous professionals, communities and volunteers involved. Such work should be carried out as far as possible under the guidance and control of local people and professionals with external built environment professionals in an advisory and monitoring role. 
	 **Infrastructure planning and implementation** 'Building back better' means using the opportunity to provide basic infrastructure services to a high level of quality and amenity. Reconstruction is an important opportunity to design and deliver renewable energy, water, transport and waste infrastructure in an integrated way. Integration can produce several benefits such as waste to energy generation projects.
	Training Reconstruction will involve a range of volunteers and paid staff from communities to built environment experts. Although some works are too specialised to involve the general public, there are areas where training can be given in design, safe construction and maintenance, particularly at the level of access roads and dwellings. Further training for the provision of water, sanitation and power networks, may be needed to ensure enough skills are present locally to look after the dwellings and infrastructure.
	Project planning and management Reconstruction planning and management is extremely complex as funds, human resources, construction materials and training efforts need to be co-ordinated at an intensive rate without compromising quality and safety. In most instances there is a dedicated agency that co-ordinates funds and ensures quality standards are met by all stakeholders. Involvement by community organisations within each neighbourhood can ensure that lessons to ensure future protection are learned. Such groups can play an important role in project management.
	Financial planning and management It is vital to ensure that the available funds are used appropriately and that future cash flow can be planned. Budgeting should take into account the resources needed for the full life cycle costing of repairing or replacing dwellings, other structures and public services and facilities.

Roles of professionals			
Architects	**Surveyors**	**Planners**	**Engineers**
Design and building technology for dwellings including covered, open and semi-open spaces and vegetation. Avoid design faults that will require costly and frequent maintenance and repair.	Costing of dwellings for capital costs as well as life-time costs.	Manage overall impact on use of services and transport etc. Draw up and amend local planning policies and guidelines to take account of new housing and site planning requirements.	Design of typical safety features in traditional buildings, new buildings and buildings to be retrofitted.
Supervision and advice as the buildings are constructed.	Supervision of the buildings as they are constructed such that costs and quality are maintained.	Provide background information on byelaws, construction practices and compliance.	Training of any volunteers and professionals to ensure safety standards are maintained.
Develop interface between infrastructure and buildings/boundaries.	Publish design guidance on ownership and infrastructure; and quality control.	Publish information on land-take for near site and on site facilities. Confirm infrastructure meets demand as well as regulation requirements. Develop integrated spatial strategies/action plans.	Design to meet demand and other performance criteria set out by the reconstruction authority; supervision and training of professionals to ensure safety standards are maintained.
Provide training in construction, retrofitting and maintenance of dwellings, non-dwellings.	Provide training in condition surveys, land surveys, costing and planning of projects.	Provide training in research and risk assessment when designing transitional and permanent settlements; monitoring and compliance of regulations/policies.	Provide training in safe installation, maintenance and upgrade of basic infrastructure, energy, water, electrical, waste and transport infrastructure.
Oversee the delivery of dwellings/ community facilities with the assistance of community groups and the delivery of facilities such as hospitals with specific clients.	Quality and cost control of the delivery of dwellings/ community facilities with the assistance of community groups and for facilities such as hospitals with specific clients.	Provide strategic input into establishing aims and objectives of projects, priorities for action, community consultation and planning at the settlement level.	Provide technical input into project planning and identify items that may delay or risk the project.
Identify the contribution communities are making to dwellings and non-dwellings and feed that into cost model.	Identify complete capital cost as well as life-cycle analysis of costs. Identify other sources of finance.	Provide background estimates of demand for funding required. Highlight changes in programme and projects. Advise on locally generated revenue	Costs for retrofitting, safety features in new buildings and civil works associated with reconstruction.

Table 1: Activities and the roles of professionals in disaster risk management and response

Activities

Post reconstruction development, review and ongoing risk reduction

Monitoring and evaluation

Reconstruction sites should be monitored and visited over regular intervals to understand the medium and long-term impact on local socio-economic conditions. This involves not just looking at the state of the physical infrastructure, dwellings and the skill levels of the local population, but also any changes that may affect future public safety from recurring hazard strikes not becoming disasters.

Project planning and management

The review, monitoring and evaluating of post-disaster reconstruction needs to take place within a life cycle project planning and management perspective and within the context of a review of and lesson learning from the whole disaster management cycle. It is vital to plan for the full life-span of all repaired or rebuilt structures and identify when it is time to renew, repair or replace them on a cost-effective basis. New developments should be planned to fit within the framework of sustainable development ideally established during the early recovery, transition and reconstruction phases.

Cost-effectiveness and financial advice on debt servicing

Reconstruction often leaves debt at many levels, including local authorities who ultimately finance the process. Reconstruction should never impose an unaffordable financial burden on local authorities or communities responsible for their management and maintenance. With high levels of debt, lower income groups may fall into a vulnerability trap as they deem 'safety measures' too expensive, or carry them out without correct technical inputs.

House/building maintenance advice

In every building there is continued need for basic repair and maintenance to avoid serious damage to its fabric and structure. Such advice should be available on demand, at least until people are fully equipped with the knowledge of safe construction practice and 'know how' to extend and build structures appropriate to meet local hazards.

Infrastructure maintenance advice

Infrastructure should be checked and maintained regularly to ensure its performance and safety. The supply of energy, water, sanitation, emergency access, treatment of hazardous waste are of particular importance. These will require professional expertise.

Retraining

There is a constant supply of skills required to develop, operate and maintain safe buildings and infrastructure. Cost-effective practice and resource-efficient technology are constantly evolving and they need to be embedded within professional training courses as well as within communities who are the day to day users and sometimes front-line carers for these structures.

Roles of professionals			
Architects	**Surveyors**	**Planners**	**Engineers**
Review and revisit dwellings and non-dwellings, observing the way people are changing their life-style and habits in relation to the use of buildings. Ensure safe and sustainable adaptations.	Review and revisit reconstruction sites periodically and carry out condition surveys of key buildings, dwellings, understanding operational costs and labour use.	Periodically review the demand for infrastructure and its capacity. Review disaster preparedness plans in consultation with local communities. Monitor regulations and their compliance and revise if necessary.	Periodically review the strength and stability of key buildings as well as dwellings and infrastructure services. Carry out further training if required to build a skills base.
Undertake life cycle studies of reconstruction projects and plan for their eventual replacement; work with existing communities to design new developments that reduce their vulnerability to hazards.	Explore the cost planning implications in life cycle studies of reconstruction projects, and of new developments that reduce vulnerability of existing communities to hazards.	Work with resident communities in reviewing and renewing plans for the long-term sustainable development of disaster-effected or hazard prone settlements. Develop renewal and regeneration strategy for the settlement as a whole.	Undertake life cycle studies of infrastructure projects and plan for their eventual replacement; work with existing communities to design new infrastructure developments that reduces their vulnerability to hazards. Carry out regular checks on safety of infrastructure, development and maintenance of management plans.
Advice on reducing operational and management costs.	Advice on reducing and servicing debt by utilising the value of land and buildings to the fullest.	Advise on making safety regulations cost less to implement.	Advise on cost-effective retrofitting, extensions and safe new construction.
Identify regular housekeeping and maintenance procedures to avoid major repair.	Ensure repair and maintenance are obligatory and cost-effective.		Monitor any issues that are leading towards major repair of buildings or require addressing to stop unsafe construction.
	Estimating operational costs and ownership of repair and maintenance.	Raise awareness and education among general public and enforcing compliance where necessary.	Carry out regular checks, monitoring and training of specialist workers. Provide guidance on infrastructure maintenance provision.
Provide training in building design, construction and extensions for professionals as well as communities.	Provide training in cost-effectiveness and responsibility for maintenance and management..	Provide training in planning for professionals in local authorities, covering future risk assessment and reduction when planning developments/settlements.	Provide training in safety and stability of the structures as well as understanding environmental risks and risks from construction practices.

The following sections explain the role and nature of professional institutions, in particular, in the United Kingdom context, and outlines their connections with humanitarian practice. Users of this guide should take note of the particular issues raised regarding professional standards and codes of conduct, titles and accreditation. They are encouraged to contact the relevant professional associations in the countries and regions where they are operating and/or to make use of the international channels described in Box 4 on page 38.

Professional institutions and their role

The main built environment professions include architecture, and landscape architecture; civil, structural, transport, municipal, environmental and building services engineering; quantity, building and land surveying; and transport and town planning. In the UK and most other countries each is represented by, or within, a professional institution.

These institutional structures ensure standards of professional competence, integrity and compliance with regulations. Most institutions also validate academic and vocational courses to ensure an acceptable standard of competence and professional conduct by those entering the professions. The institutions publish professional codes of conduct that explicitly or by implication, seek to balance public good with client interests. (See **Box 3**)

Box 3: An example of a professional code of conduct

The ICE (Institution of Civil Engineers) Code of Professional Conduct states:

Members of the ICE should always be aware of their overriding responsibility to the public good. A member's obligations to the client can never override this, and members of the ICE should not enter undertakings which compromise this responsibility. The 'public good' encompasses care and respect for the environment, and for humanity's cultural, historical and archaeological heritage, in addition to the duties specified in the Rules of Professional Conduct to protect the health and well being of present and future generations and to show due regard for the environment and for the sustainable management of natural resources.

(Source: ICE, 2008, p2)

There are other associated construction industry professionals such as building engineers and facilities managers, concerned mainly with the maintenance and management of buildings, and building construction and project managers, as well as specialist professional sub-disciplines such as conservation architects and urban designers. There are also professionally trained and certified building trades operatives, as well as members of building and engineering professional and trade associations.

While professional institutions generally play a key role in establishing and maintaining professional standards, they do not necessarily have a monopoly in the use of a professional title. In the UK, for example, an 'architect' is not required to be a member of the Royal Institute of British Architects, the RIBA, but to be registered with the Architects' Registration Board. In other countries, the main body responsible for professional accreditation is sometimes the national government rather than a professional institute.

The RIBA, however, is responsible for the professional accreditation of courses and ensuring professional standards for architects through its Code of Conduct. The preamble to the current (2005) version of the RIBA code states that its focus is the consumer, and society at large. The RIBA represents 40,000 chartered members in the UK and overseas. Landscape architects and designers have a separate chartered body in the UK, the Landscape Institute, with 5,000 members.

The UK engineering profession is not regulated and anyone can call themselves an 'engineer'. However, certain professional titles are protected. The Engineering Council of the United Kingdom, EC(UK) licenses 36 engineering institutions to put appropriately qualified members on its Register of Engineers, as 'Chartered Engineer', 'Incorporated Engineer' or 'Engineering Technician' (titles protected by the EC(UK)'s Royal Charter).

The Institution of Civil Engineers is one of the largest licensed and chartered institutions dealing specifically with built environment with 80,000 members worldwide. However, a number of other institutions in the UK are concerned wholly or in part with built environment and infrastructure concerns, including: the Chartered Institution of Building Services Engineers; the Institute of Healthcare Engineering & Estate Management; the Institute of Highway Incorporated Engineers; the Institution of Highways & Transportation; the Institution of Lighting Engineers; the Institution of Mechanical Engineers; the Chartered Institute of Plumbing and Heating Engineering; the Institution of Structural Engineers and the Chartered Institution of Water and Environmental Management.

In the UK, the term 'surveyor' encompasses a wide range of professional skills recognised and accredited by the Royal Institution of Chartered Surveyors (RICS) with some 100,000 members across the world (see Case Studies 4a-c). As with 'engineer', the term 'surveyor' is not regulated, but the title 'Chartered Surveyor' is protected by a Royal Charter. In many countries the term 'surveyor' is limited to the profession of land surveying. There are many parts of the world where the term 'quantity surveyor' is not employed. The skills in building economics and financial management associated with this discipline are, of course, essential to the design and construction management process.

In the UK, the chartered body for planners is the Royal Town Planning Institute (RTPI) with 20,000 members. In many countries of the world, planning or 'urbanism' is taught as a

Case study 3: Architect, urban designer and project manager for the reconstruction of Bam, Iran after the 2003 earthquake

Fatemeh (Farnaz) Arefian is a chartered professional, with master's degrees in architecture and urban design and experience in planning and urban management consultancy. The company she founded, a member of FIDIC[15], alongside other companies was approached to work on housing reconstruction in Bam following the earthquake where they delivered free architecture, planning and engineering consultancy services to local residents and NGOs. Later the company became involved in reconstruction of shops and then urban design for streetscape redevelopment. It was important for the programme to address cultural as well as basic housing needs. As a World Heritage urban area it has unique architecture and garden city characteristics. As Project Manager, Fatemeh analysed the main objectives and optimised available professional skills to meet the targets, using her multidisciplinary experience to find planning shortcuts, meet quantitative targets, maintain the quality of service and safeguard the values in accordance with the criteria indicated by Bam Architectural Council.

(Source: RTPI International Development Network, Photo: Reconstruction Management Deputy, Housing Foundation Islamic Revolution, 2008)

specialism in architectural training and is seen as an aspect of the professional practice of architecture. In the UK and other countries, whilst it used to be the case that planners normally had an architectural, surveying or civil engineering background, planning has long since emerged as a separate social science discipline with its own professional accreditation process and institutions.

15 The International Federation of Consulting Engineers: see page 38

Case studies 4a, 4b and 4c: The varying disciplines of the Chartered Surveyor

a) Surveying in the Gaza Strip

An RICS staff member and chartered land surveyor worked in the Gaza strip, training and supervising a team of local Palestinian surveyors in the use of modern survey hardware and software, including Global Positioning Systems (GPS). He completed the large scale mapping of several highly populated refugee camps and worked closely with the UNRWA legal offices in cadastre and land ownership disputes. In the highly charged and politically volatile environment of Gaza, he was required to display both technical excellence and socio/economic/political sensitivity. Based on these experiences as a surveyor in Gaza, he published *Mapping the Camps of the Gaza Strip: The surveyor in a political context.*

b) Disaster reconstruction in Sri Lanka

A Sri-Lankan chartered quantity surveyor working for an international construction consultancy in London is the founder member of a Sri-Lankan charity, Hela Sarana, involved in building low cost housing, school buildings, irrigation reservoirs, and hospital buildings. Since the devastating tsunami of December 2004, he has been actively engaged in reconstruction projects and has so far completed 75 houses for tsunami victims. He is also involved in the management of a micro finance scheme.

c) Costing and planning schools in Indonesia

In July 2007, an Indonesian chartered surveyor was able to help an international NGO with some costing work for a school, at short notice. Bills of Quantities were prepared, based on drawings and specifications for housing in Aceh. The surveyor was able to advise on materials that were both suitable for the region, and disaster-appropriate. The surveyor was already experienced in disaster work, and involved in housing, school, and clinic construction projects by the British Red Cross, AusAid and others in Aceh.

(Source: RICS. Photo: Hela Sarana, RICS funded post tsunami reconstruction house, RICS)

The international context

As with the examples above, the skills sets recognised in the qualification and related training of the built environment professions differs in each country and may also alter over time with changing priorities in the profession and the property and construction industry as a whole.

The individual role of professionals within building projects can also vary from country to country and over time. They normally acquire skills and practical experience beyond their initial training enabling them to specialise in specific areas or work across different national contexts or in particular forms of collaboration with other professionals.

Professional institutions and associations operate in many countries, often forming part of larger international networks of professional institutions (see Box 4). Their role is to represent the common interests of their members and promote the public role of the profession. They generally help set educational and ethical standards for the profession as well as providing platforms for professional acceptance and understanding, information and professional development.

The associations are increasingly taking on an international role in sharing and exchanging experience and expertise on natural disasters and climate change challenges. They are often the first port of call for outside bodies trying to identify reliable local sources of professional expertise.

Built environment NGOs and disaster and development-related initiatives of the professional institutions

The built environment professions, both at the student and practitioner level, reflect a wider public concern with providing a charitable or voluntary response to providing assistance to those affected by the impacts of disasters. A number of NGOs have been established over recent decades that are dedicated to giving technical support and material assistance in the built environment and in humanitarian relief and/or in longer-term disaster reconstruction contexts.[16]

Some of these bodies are part of or maintain a close relationship with the professional institutions. In the UK, Article 25 (formerly Architects for Aid) is closely associated with the RIBA, although it has a wider remit to provide cross-disciplinary voluntary professional support to agencies and NGOs working in development and disaster relief.

In 2005, RICS set up a Disaster Management Commission to contribute RICS' and its members' expertise to governments, humanitarian agencies and affected communities to assist those affected by, or vulnerable to, major disasters. The Commission's BuildAction initiative seeks to place built environment professionals on a pro bono basis for disaster management projects in developing countries, to provide professional expertise where it would otherwise not be available.

16 Readers are referred to the Professional Humanitarian Career Information Pack published by Article 25 at their web site www.article-25.org and included on the CD that accompanies this guide, for a comprehensive list of resources for built environment professionals wishing to engage in the Disaster Relief and Development sector

Many of the support agencies have their own professional advisers and/or provide in-house training for the volunteers they use in the field. It is particularly important that well-intentioned volunteers with a professional background in a developed country are not sent (or send themselves) to a post disaster situation in a poor, developing country without undertaking some form of induction and preliminary training to orientate them towards the particular conditions they are likely to find in dealing with local communities, cultures and systems of governance.

In this respect, the short international training and orientation programmes offered by RedR are a key resource. RedR was set up as a charity in the UK in 1982 as the Register of Engineers for Disaster Relief. RedR is now increasingly offering its courses directly in areas of natural disaster or conflict although it still offers a programme of training and learning events across the UK. This covers 'basic introductions to working in the humanitarian sector through to professional courses for experienced aid workers, engineers, health workers and security experts'.[17]

The RTPI's International Development Network (IDN) works to develop and maintain members' interest and level of professional competence in international issues including: managing the challenge of rapid urbanisation; creating safer, more humane, environmentally-friendly places to live; reducing the formation of new slums; and reducing vulnerability to natural disasters and helping when disaster strikes. Through IDN, members can commission research, spread awareness of development issues, and play a part in the transfer of knowledge and resources between developing and developed countries on planning and development.[18]

Article 25

Earthquake resistant construction in Pakistan

17 RedR UK website
18 RTPI International Development Network website

Box 4: International built environment professional networks

The **International Union of Architects (IUA)** is an international network and NGO representing architects worldwide and encompasses associations of architects in 116 countries and territories. It holds a triennial conference held in one of the participating countries.

The **Commonwealth Association of Architects (CAA)** is a membership organisation for institutes representing architects in Commonwealth countries. It currently has 37 member institutes. It is particularly concerned with the validation of courses in architecture.

The **Commonwealth Association of Planners (CAP)** is a membership organisation for institutes of professional planners in Commonwealth countries. It 'seeks to focus and develop the skills of urban and regional planners across the Commonwealth to meet the challenges of urbanisation and the sustainable development of human settlements.'

The **Commonwealth Engineers' Council (CEC)** rrepresents 46 engineering institutions in 44 countries aiming "to advance the science, art and practice of engineering for the benefit of man kind." CEC promotes the development of young engineers throughout the Commonwealth, "in particular through their engagement in sustainable development and poverty alleviation." ICE provides the secretariat for CEC.

The **Commonwealth Association Surveying Land Economy (CASLE)** is 'a federation of independent professional societies representing surveying and land economy' with more than 40 societies in 32 countries with approved associate members and correspondents, including those in 19 other countries. It covers the disciplines of surveying and mapping, land economy, and quantity surveying and cost-control.

Built Environment Professions in the Commonwealth (BEPIC) is an informal grouping consisting of the four Commonwealth associations listed above. A platform for knowledge transfer between professionals, BEPIC also participates in the Commonwealth Peoples' Forums of the Commonwealth Heads of Government Meetings, providing an opportunity to influence the assembled Heads of State.

The **International Federation for Housing and Planning (IFHP)** is a world-wide network of professional institutions and individuals active in housing, urban development and planning. Focusing on *sustainable* development, the Federation organises activities and creates opportunities for international exchange of knowledge.

The **International Society of City and Regional Planners (ISOCARP)** is a global network of professional planners. It consists of individual and institutional members from more than 70 countries. It is an international NGO with formal consultative status with UNESCO holding an annual World Congress in a different country every year.

The **Global Planners Network (GPN)** is a network bringing together planning organisations committed to sharing knowledge, experience and best practice to promote sustainable development throughout the world and provide leadership in addressing issues of climate change and disaster recovery.

Fédération Internationale des Géomètres (FIG) is a UN-recognised NGO representing the surveying profession. It is an international federation of national member associations, affiliates, and corporate and academic organisations in more than 100 countries. RICS is a founding member of FIG.

The **International Federation of Consulting Engineers (FIDIC)** comprises 75 national associations representing around 1 million professionals. 'Companies and organizations may join FIDIC as Affiliate Members if they do not qualify or cannot join a Member Association, or as Associate Members if there is no national Member Association.'

The **World Federation of Engineering Organizations (WFEO)** is a non governmental international organization that brings together national engineering organizations over 90 nations and represents some 15 million engineers from around the world. WFEO is 'committed to the advancement of the world engineering profession for the benefit of mankind'.

Sources: *information drawn from the web sites of each of the named organisations. See References section.*

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About this guide

This guide is intended to demonstrate the value of using built environment professionals more widely in disaster risk reduction and response. It shows how their skills and expertise can be applied at all stages of disaster management. It highlights that their contribution is especially important to achieving the longer-term goal of sustainable recovery and development. The guide is targeted, in particular, at non-technical decision makers in humanitarian agencies. However, it is also relevant to all international development agencies, governments, at national, sub national and local levels, and non-governmental organisations involved in one or other aspect of disaster management.

'The built environment professions have much to offer in the field of disaster management, and this guide will help the humanitarian sector to ensure that the right skills are applied at the right time, for the benefit of people hit by major disasters.'
Peter Goodacre, RICS President

'This is an outstanding example of co-operation between the built environment professions, explaining our involvement in humanitarian practice to a wider public and our commitmtent to closer professional working for the benefit of all.'
Martin Willey, President of the RTPI

'The institutions are delighted to have collaborated on the production of this handbook, which we hope will assist the humanitarian aid community in better understanding the key contributions built environment professionals can make to disaster risk management and response.'
Professor Paul William Jowitt, Vice President for International Development and President Elect of the ICE

'Constructive response to disasters needs to compel more of our collective and multidisciplinary attention. The skills of built environment professional can have huge impact on the lives of people trying to rebuild after such event and the RIBA is very pleased to have collaborated on producing this guide with other institutes. We hope that it will help those already active in the field but also attract new energy and intelligence.'
Sunand Prasad, President of the RIBA

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