SHELTER PROJECTS

2010

UNHCR
The UN Refugee Agency

International Federation
of Red Cross and Red Crescent Societies

UN HABITAT
FOR A BETTER URBAN FUTURE

Shelter Projects 2010

Published 2012

Available online from www.ShelterCaseStudies.org

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Foreword

In this third annual Shelter Projects publication, containing summaries of a range of programming experiences in post crisis situations, we learn several essential lessons that should become principles for wider discussion and adoption.

One of the issues that triggers some reflection is that in every single shelter response, there is a need and obligation to involve and strengthen local capacities to enable sustainable solutions and proper housing reconstruction for the affected population. Once again, we need to emphasise the importance of putting survivors of these crises at the centre of the sheltering process, supporting their role in re-building their own dwellings and the training and awareness raising of local builders in safe building design and construction.

Another key lesson, clearly reflected in the Haiti 2010 earthquake response, is that since settlements provide the context for any shelter intervention, the focus on the provision of shelter "products" alone is too limited. Instead, a larger settlement response is required - without immediate strategic planning covering many areas (land use, tenure, livelihoods, essential services, housing reconstruction, etc) shelter response plans will always be limited in impact and at risk of failure due to the lack of integration with these other critical issues.

Identifying and addressing shelter and settlement related vulnerabilities through the reconstruction process will also enhance the resilience of the disaster affected population at risk to future such events. Disaster risk reduction must pass from messaging to explicit actions.

The rapid meeting of post disaster shelter and settlement needs, whilst enabling the rapid transition to more durable solutions by the affected populations themselves, requires informed support and engagement. Given the typical disparity between the scale of need and the availability of resources, involving and strengthening local capacities and supporting integral shelter and settlements responses that consider future risks is key.

This publication is an appeal to all those involved in responding to post disaster sheltering needs – affected governments, local, national and international response actors, and the affected populations themselves - to learn from and apply the practical lessons from the relevant, recent experiences. Initial response activities have a significant impact on the approaches to longer term reconstruction. Is therefore imperative that donors and implementing agencies work with Governments and affected communities to plan from first response to full recovery, maximise available resources and expertise, and utilise emerging better practices from the field.

On behalf of our institutions, and in appreciation of the many and varied contributions from shelter sector agencies, we are pleased to present this Shelter Projects 2010 publication. We encourage all to learn from this review of current practices in post disaster shelter and settlement.

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Acknowledgements

Project coordinated by: Esteban Leon (UN–HABITAT), Mark Hopley (UNHCR), Manoucher Lolachi (UNHCR), Sandra D'Urzo (IFRC) and Joseph Ashmore.

Compiled and edited by: Joseph Ashmore, with additional editorial support from Carlo Gherardi, Jim Kennedy and Wan Sophonpanich.

Case studies have been provided from the programmes of the following organisations:

- American Red Cross
- Australian Red Cross
- British Red Cross Society
- CARE International UK
- CARE Haiti
- CARE Indonesia
- CHF International
- Croix Rouge Française
- Development Workshop France
- Federation of Handicap International, DAU
- Grenada Red Cross
- Habitat for Humanity Tajikistan
- Habitat for Humanity Romania
- Haiti Red Cross Society
- IFRC - International Federation of the Red Cross and Red Crescent Societies
- International Organisation for Migration (IOM)
- Malawi Red Cross Society
- Norwegian Refugee Council (NRC)
- Oxfam GB
- Pan American Development Foundation (PADF)
- P3SD
- Save the Children UK
- Spanish Red Cross (Cruz Roja Española)
- Sri Lanka Red Cross Society (SLRCS)
- Tonga Red Cross
- UNHCR - United Nations High Commissioner for Refugees
- UN-Habitat - United Nations Human Settlements Programme

The editors would like to express their gratitude to the following individuals who wrote and reviewed the case studies in this book:

Alberto de Castro, Amanda Ball, Ann Lee, Arshad Rashid, Ascension Martinez, Behruz Dadoboev, Bill Flinn, Brian Kelly, Britt Christiaens, Carmen Ferrer, Carolina Cordero-Scales, Charles Setchell, Charlie Mason, Chiara Jasna Vaccaro, Clementine Ludford, Corinne Treherne, Dan O'Neil, David Sacca, Eddie Argenal, Edgar Scrase, Ela Serdaroglu, Elizabeth Babister, Emma Feeny, Emeline Decoray, Ganga Kariyawasam, Gregg Mcdonald, Guillaume Chantry, Helen Seeger, Hugh Earp, Ingvild Solvang, Iñigo Vila, Irantzu Serra, Jake Zarins, Jabborov Mardon, James Bellamy, Jamie Richardson, Jan-Willem Wegdam, Jonathan Brass, Javier Cidón, John Norton, Julia Macro, Julien Mulliez, Kate Crawford, Katerina Bezgachina, Kathleen Miner, Le The Thin, Lee Malany, Maggie Stephenson, Mahesh Gunasekara, Manuel Moniz Pereira, Meredith Sisa, Michele Detomaso, Mihai Grigorean, Milton Funes, Muhammad Abbas Khan, Nadia Tithi, Natalia Prokopchuk, Neil Brighton, Pascal Bourcher, Peter Clark, Pilar Bravo, Pornphun Sutthiprapha, Richard Hamilton, Rick Bauer, Robin Black, Samba Sibide, Sarah Davies, Shaun Scales, Stephen Robert Hutcheson, Terry Charles, Thomas Carey, Vanessa Larsen, Waqas Hanif, Xavier Genot.

We would also like to thank those who contributed to Shelter Projects 2008, and Shelter Projects 2009 whose work is reflected in this document.

We would like to thank the San Francisco Public Library for allowing access to the documents and images used for the San Francisco 1908 case study.

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Introduction

Section A - Case studies

Section B - Historical

Annexes

Introduction

This book contains summaries of shelter projects that have been implemented in response to conflicts, complex emergencies, and to natural disasters (Section A). It also contains a section on historical shelter projects (Section B) including the sphere handbook which was updated in 2011.

A full list of case studies, organised by country, in Shelter Projects 2008, Shelter Projects 2009 and this book, (Shelter Projects 2010) can be found in Annex 1.

The case studies in this book were implemented by many different organisations, a full list of which can be found in the acknowledgements section (page iv). In order to allow weaknesses of programmes to be openly shared, the case studies are not directly attributed to individual organisations. Host government projects are not included.

As a result of the projects being implemented in diverse and often challenging conditions, they illustrate both good and bad practices. From every case study there are lessons that can be learned, and aspects that may be repeated or avoided.

Warning

Each project must take into consideration the local contexts and needs of the affected population, which will differ in every case. Projects should not be directly copied or there will inevitably be programmatic weaknesses and failures.

Selection of case studies

The case studies were selected using the following criteria:

- The shelter project was wholly or largely complete, or solid learnings from the project could be gained.
- Given the scale of emergency shelter need every year, case studies must have had large scale impacts to be included. Discontinued trials or design concepts are not included.
- The majority of the project must be implemented within the first year following a natural disaster. For conflict-affected populations, chronic emergencies and returns processes, longer time scales were considered.
- Accurate project information was available from staff involved in the project implementation.
- The case studies illustrate a diversity of approaches to meet shelter need. Providing shelter is more than simply designing architecturally impressive structures.

Natural disasters in 2010

In 2010 over 304,000 people were killed by natural disasters[2,3], nearly three quarters of them in Haiti. This was the highest number of fatalities in one year over the decade. A further 304 million people were affected by natural disasters, the vast majority by floods, droughts and ensuing food insecurity[2,3]. Over half of the world's disaster affected people were in the People's Democratic Republic of China[2,3]. However, to be disaster affected does not necessarily mean homeless or in need of shelter support.

The two single largest international emergency shelter responses in 2010 were to the Haiti Earthquake and the Pakistan Floods.

Conflicts in 2010

By the end of 2010, there were 43.7[4] million forcibly displaced people worldwide, a rise of 400,000 people since 2009. This figure includes refugees (15.4 million), asylum seekers (837,500) and internally displaced people - IDPs (27.5 million[5]). Many of these displaced people have been displaced for many years - for example 7.2 million refugees are in situations of protracted displacement.

It is not known which proportion of these conflict affected people required or received support with shelter.

It is estimated that 3.1 million people who were displaced due to conflict were able to return during 2010[4]. To illustrate some of the

In just two responses, Pakistan and Haiti, over 2 million tarpaulins were distributed in 2010.
Photo: IOM Sukkur

[1] UN-Habitat, UNHCR, IFRC Shelter Projects 2008, UN-Habitat, IFRC Shelter Projects 2009. from www.ShelterCaseStudies.org

[2] CRED's EM-DAT disaster database: www.emdat.be

[3] See also IFRC, World Disasters Report, 2011

[4] UNHCR, Global Trends 2010

[5] IDMC/ NRC Internal Displacement Global Overview of Trends and Developments in 2010

The earthquake in Haiti had a high media profile and brought challenges of working in complex urban environments. Photo: Joseph Ashmore

issues relating to returns, we include an update on Sozma Qala camp for returnees in Afghanistan (A.1), a project for conflict returnees in Kyrgyzstan (A.16), a transitional shelter programme for returning IDPs in Pakistan (A.21), and a case study on housing in Sri Lanka (A.28). Additional case studies on shelter for returnees can be found in Shelter Projects 2008 and Shelter Projects 2009.

Shelter responses in 2010

International shelter responses in 2010 were dominated by an earthquake in Haiti and floods in Pakistan. Haiti (Case studies A.4 - A.11) brought exceptional challenges of working in highly complex urban environment, whilst the Pakistan floods (Case studies A.22 - A.25) brought challenges of how to respond on an exceptionally large scale with limited funding to meet the needs.

This book also includes three case studies from the response to the earthquake in, Pedang (Indonesia 2009, A.12 - A.15). and two recovery projects from Myanmar (A.19-A.20).

There were many shelter projects that were implemented in 2010 that are not included in this book. These include those from disasters and conflicts in many other countries including ongoing or "forgotten emergencies".

Affected people are the first responders

The first and main response after all disasters is by the affected people themselves. Of the case studies in this book, the more effective projects were set up with a clear understanding of the needs of beneficiaries and with clear two way communication between the implementing organisations and the affectees.

To encourage projects to address the needs, Sphere standards[1] and indicators (Section B.1) provide common standards on participation, initial assessment, monitoring and evaluation.

Scale

After the emergency response phase, the largest projects outlined in this book were a structural damage assessment (Haiti, 2010, A.6) which assessed 400,000 earthquake affected houses, and the construction of 38,500 one room houses by providing groups of households with cash (Pakistan 2010, A.24). Even projects on this scale are not able to meet the majority of the recovery needs for "mega disasters" such as the Pakistan floods in 2010 (overview A.21) which officially damaged 1.8 million homes.

Urban environments

The diversity of responses in Haiti (A.4-A.10) shows how multiple approaches are required when working in complex urban environments, where traditional concepts of "community" developed in rural contexts may be harder to apply.

Following the Haiti earthquake, Urban Shelter Guidelines were launched in late 2010[2].

Cash, vouchers, markets

During 2010 there was a significant research focus on market based assistance, led by projects such as 'The Cash Learning Partnership' (CALP) (www.cashlearning.org).

Shelter cash interventions range from small amounts of cash to support families whilst they build shelters (North Pakistan, 2009, A.21) to voucher schemes using plastic credit type cards (Chile 2010, A.2) to phased cash disbursements of several thousand US dollars (Sri Lanka 2009, A.28).

There are however very few examples of cash based shelter projects that were operational within the first weeks of a response.

Cash assistance is not a new form of response. The historical case study (USA 1906, B.2) illustrates the use of cash and loans, in addition to other forms of assistance such as loans, following the 1906 San Francisco earthquake and fires.

The case study from Tajikistan (2010, A.29) provides an example of the use of loans.

The table on page ix opposite shows 16 projects or responses that use cash/vouchers or some sort of market assistance to meet shelter-ing needs.

Many case studies feature the use of cash and vouchers in shelter projects. Photo: Carlo Gherardi

[1] Sphere Project, Sphere - Humanitarian charter and minimum standards in humanitarian response, 2011

[2] NRC, Shelter Centre, Urban Shelter Guidelines launched in 2010

Table illustrating which types of response took place in each case study

	Distribution		Shelter type					Support methods						
Case Study	General items	Construction materials	Emergency shelter	Transitional shelter / T-shelter	Host families / Rental	Core housing	Permanent housing / repair	Cash / vouchers	Loans	Advocacy / legal	Site planning	Training	Structural assessment	Guidelines and training materials
A.1 Afghanistan 2009 update	■	■	■	■							■			
A.2 Chile 2010	■						■	■						■
A.3 Grenada 2004		■					■					■		
A.4 Haiti 2010 (overview)	■	■					■	■			■	■	■	■
A.5 Haiti 2010	■	■					■					■		■
A.6 Haiti 2010							■					■	■	■
A.7 Haiti 2010		■			■			■				■		
A.8 Haiti 2010		■	■				■							
A.9 Haiti 2010			■	■							■			
A.10 Haiti 2010		■					■	■						
A.11 Haiti 2010				■	■		■	■				■		■
A.12 Indonesia 2009 (overview)													■	
A.13 Indonesia 2009													■	
A.14 Indonesia 2009	■		■	■				■				■		
A.15 Indonesia 2009				■				■				■		
A.16 Kyrgyzstan 2010		■				■	■	■						
A.17 Malawi 2009		■					■	■				■		■
A.18 Mozambique 2007							■			■		■		■
A.19 Myanmar 2008				■				■				■		■
A.20 Myanmar 2008		■		■								■		■
A.21 Pakistan (North) 2009		■		■				■				■	■	■
A.22 Pakistan 2010 (overview)	■	■	■	■		■	■	■						
A.23 Pakistan 2010		■				■	■							
A.24 Pakistan 2010						■		■				■		■
A.25 Pakistan 2010	■					■								
A.26 Philippines 2010							■							
A.26 Romania 2010		■					■							
A,28 Sri Lanka 2009							■	■						
A.29 Tajikistan 2010							■		■			■		
A.30 Tonga 2010				■										
A.31 Vietnam 2009							■	■				■		■
B.1 Sphere										■		■		■
B.2 USA 1906	■		■	■	■		■	■	■		■	■		■

Explanation of columns:
Distribution:
- General items - tents / blankets and other non-food items were distrubuted
- Construction materials - were provided to build the shelters / houses.

Shelter type:
The project aimed to provide one or more of the following types of shelter.
- Emergency shelter - shelter (often non-food items and covering materials) to meet emergency shelter needs.
- Transitonal shelter, T-shelter, Temporary shelter, semi-permanent shelter. Terminology is used according to the wording used in the response.
- Host families / rental support
- Core housing (basic component of a house designed to be upgraded at a later date)
- Permanent housing / repair. (durable housing or the repair / upgrade of exsiting pre-disaster housing)

Note definitions may change between disasters.

In addition to the use of cash, the case study from Pedang (Indonesia 2009, A.13), illustrates an Emergency Market Mapping Analysis assessment (EMMA). This aimed to better understand markets before procurement for reconstruction began.

Needs and approaches

Most of the projects in this book respond to a need, providing assistance through construction, materials, cash or training. In addition to responding to shelter needs, some projects show innovative approaches. Examples of this are handling cash with credit cards (Chile 2010, A.2) or developing construction technologies for risk reduction (Mozambique 2007, A.18). For some of these projects the major impact is not in terms of number of shelters built but the impacts on policies and behavioural change of the at risk population.

Remittances

According to the World Bank[1], remittances to developing countries account for three times the amount of official development assistance. Additional cash flows also occur within countries. In many, if not most disasters, remittances (money sent home from overseas) and other fund transfers outside the international relief system, are the major part of responses.

It has been difficult to find examples of humanitarian shelter projects which directly engage on the issues of remittances and cash flows within a country.

Some of the projects which give cash assistance provide slightly less than is required to build a shelter, implicitly expecting families to provide additional funding from their own resources or from remittances. A case study from Pakistan (A.24) provides a good example of this - providing 300 USD in cash per shelter. If all of the organisation's recommendations were followed, each house would cost 500 - 1000 USD - depending on the type of construction used. The risk of such an approach is that some of the more vulnerable families can benefit less.

Carpenter training in Myanmar. Training and communications projects are a key component of many shelter projects. Photo: Veronica Wijaya

Terminology

There has been a lot of academic and practical debate surrounding terminology used in shelter. Additional confusions have been added by language translation issues.

Issues of the definition of words have been particularly great surrounding the language used for different phases of assistance. As an example the terms "transitional shelter"[2], "T-shelter", "temporary shelter", "semi-permanent shelter" and "incremental shelter" have all been used in responses to define both types of shelters and the processes used.

In this book we use the terminology that was used in country for each response. Practically in each response, national understandings are developed surrounding the use of these terms. In some cases, flexibility in terminology has helped projects to take place sooner.

Interpret and contribute

In reading this book, or browsing relevant case studies, it is hoped that readers will be able to draw their own lessons and identify useful techniques and approaches.

Readers are encouraged to send in their own projects for future editions. In this way, the humanitarian community can compile good and bad practices and hopefully implement increasingly effective shelter projects in the future.

Contribute at:

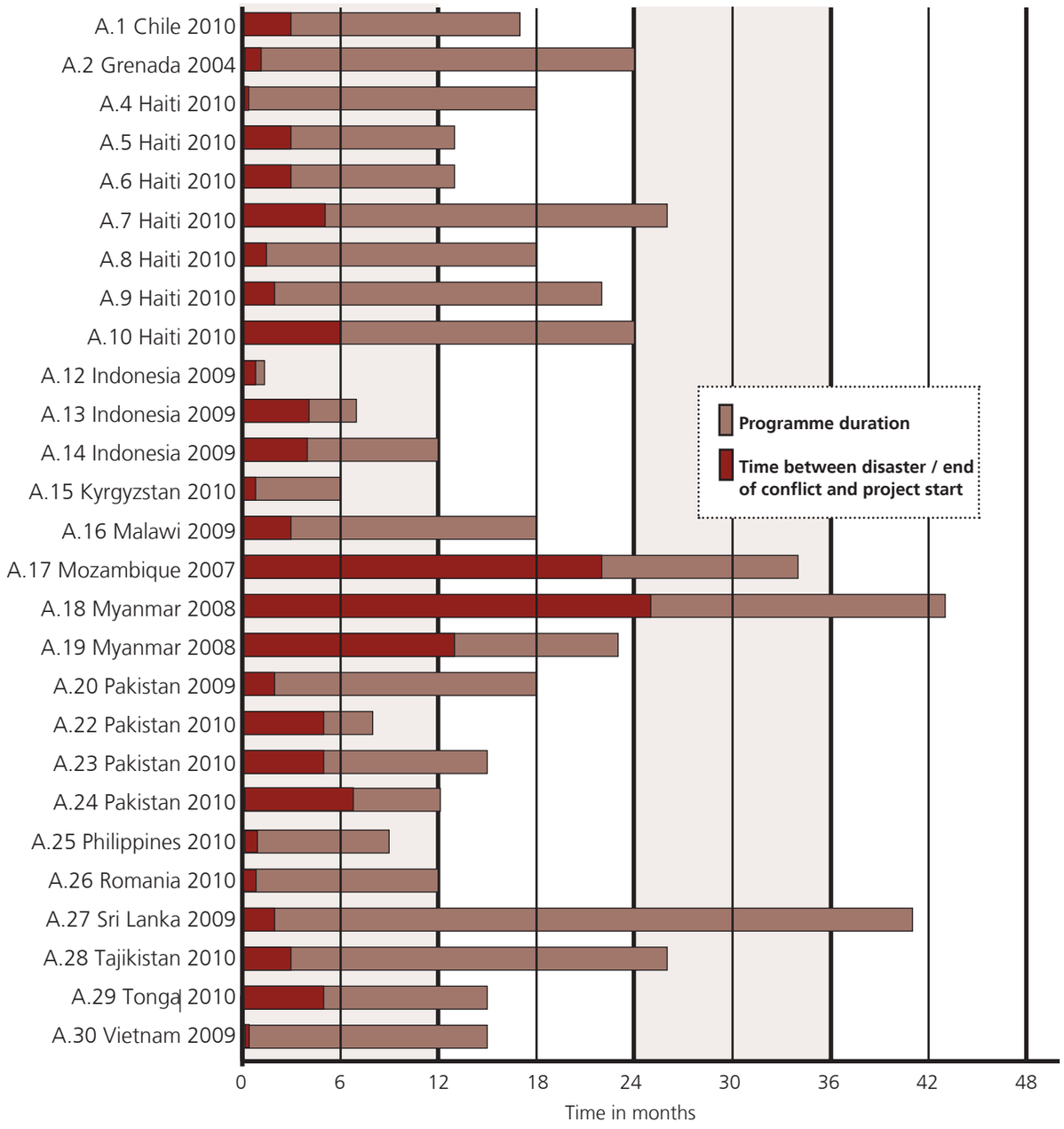
www.ShelterCaseStudies.org

This book contains only a small sample of projects implemented around the world. There were many disasters and conflicts, some ongoing for many years that have not been documented here. This photo is following the 2010 floods in Benin. Photo: Joseph Ashmore

[1] World Bank website: http://www.worldbank.org/prospects/migrationandremittances. Jan 2012

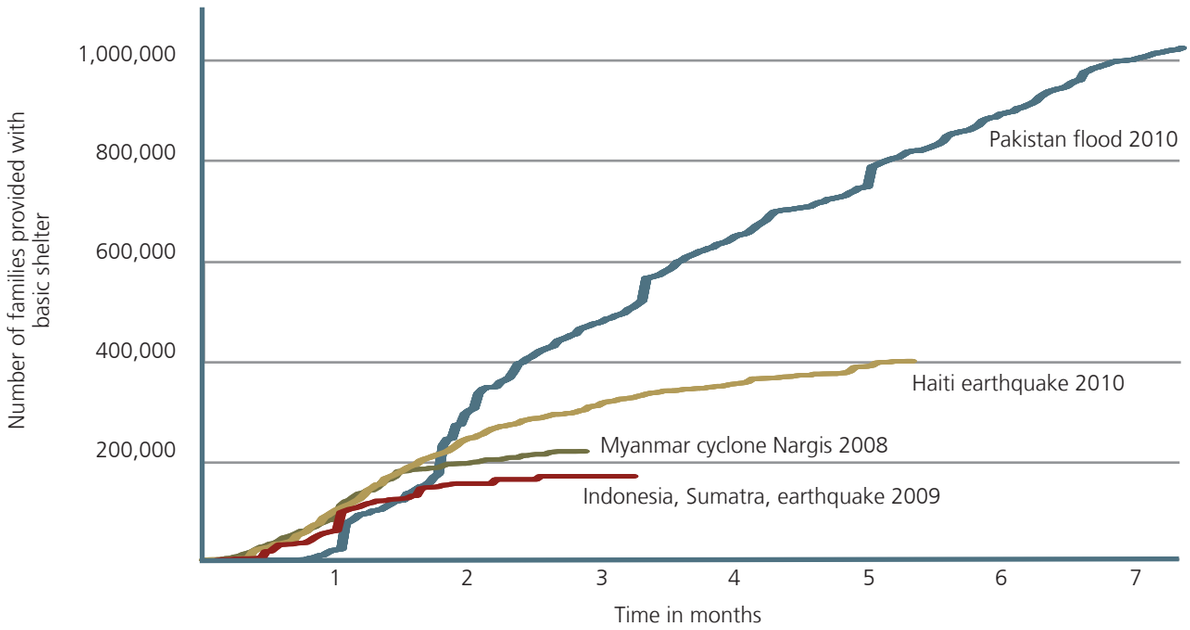
[2] IFRC Transitional Shelter: Eight Designs, 2011

Graph of the duration of the different case studies



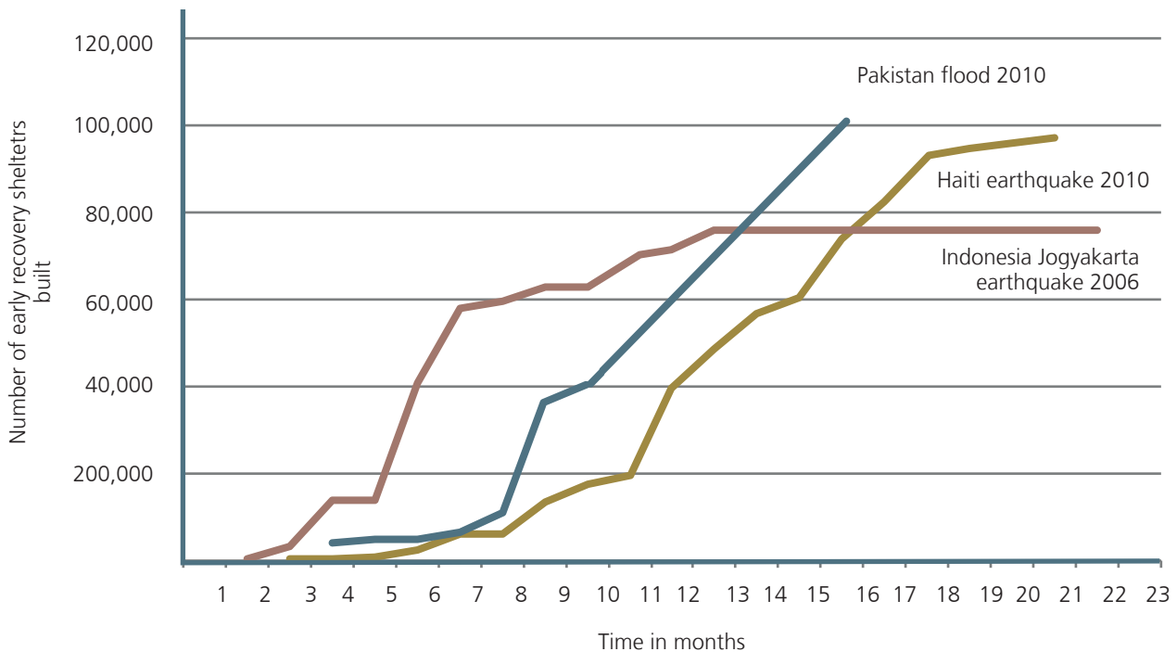
Some of the projects in support of long term displacements have not been included due to their long timelines. The majority of projects were implemented under funding cycles of less than one year.

Graph of the distribution against time for major international shelter responses



Note: "Families provided with basic shelter" means the number of families (or households) who have received tents or plastic tarpaulins. The number of tarpaulins received per household varies between response and occasionally changes as responses continue. For most responses two tarpaulins per household were provided.
In the case of the Pakistan 2010 floods, the start of the response was phased over 6 weeks as the flood waters moved through the country, and the full extent fo the floods became known. As a result the curve may appear to be shifted to the right. These graphs display the data that was reported to shelter coordination teams during the responses.

Graph of number of early recovery shelters* built against time for some major international shelter responses



*** Early recovery shelters include "T-shelters, one room shelters or any other shelters to designed support the recovery process.**

"The poor inhabitants were dispersed about St. George's Fields, and Moorfields, as far as Highgate, and several miles in circle, some under tents, some under miserable huts and hovels, many without a rag or any necessary utensils, bed or board, who from delicateness, riches, and easy accommodations in stately and well furnished houses, were now reduced to extremest misery and poverty."

September 5th, 1666.

"His Majesty and Council indeede took all imaginable care for their reliefe by proclamation for the country to come in and refresh them with provisions... they now began to repaire into the suburbs about the Citty, where such as had friends or opportunity got shelter for the present, to which his Majesty's Proclamation also invited them."

September 7th, 1666.

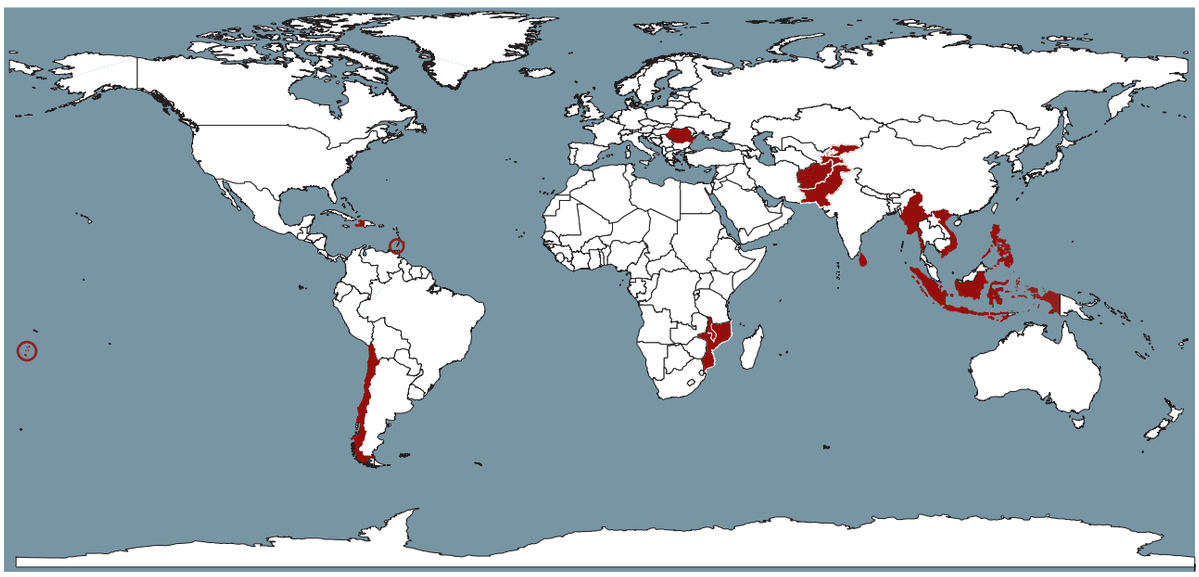
Excerpts from John Evelyn's diary following the great fire of london in 1666, illustrating how families moved in with host families whilst others settled in spontaneous camps. Following the fire the navy provided tents and canvas for some of the affected people.

"Following the 1827 Great Fire of Turku, the tsar opened warehouses of the Russian garrison to supply flour and grain, exempted the city from taxation and the obligation to accommodate soldiers and established a construction fund to give interest-free loans..."

Source Jacob F. Field (2011). Charitable giving and its distribution to Londoners after the Great Fire, 1666–1676. Urban History, 38 , pp 3-23

SECTION A
Case Studies

This section contains case studies of projects from both conflicts and natural disasters. It also contains one update from a project (A.1 Afghanistan) that was included in Shelter Projects 2009. See "Annex 1 - Index - by country" for case studies that are in previous editions.



A.1 Afghanistan - 2009 - Conflict returnees

Update:

Country:
Afghanistan

Disaster:
Afghanistan returns to Sozma Qala camp

Returns date:
August 2009

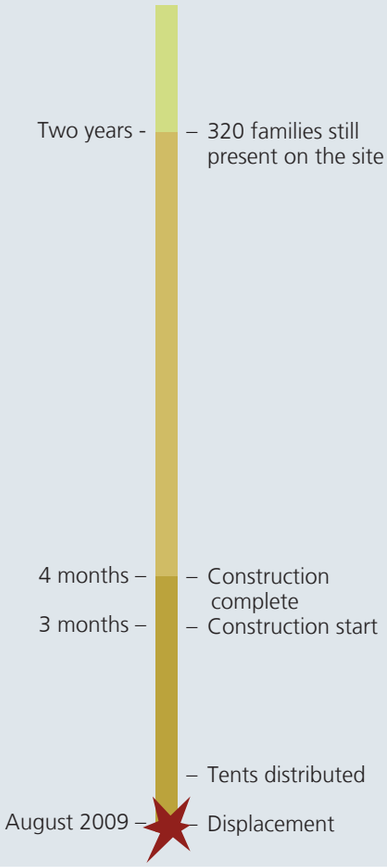
Number of people displaced:
2002 - 2010 - over 5 million people returned to Afghanistan

Project target population:
379 families 2009
320 families 2011

Occupancy rate on handover:
94%

Shelter size:
Covered area 38.7m²

Project timeline



Project description

An emergency team rapidly winterised a temporary transit camp. The site was for 379 families of refugees returning after 23 years. Two years later 320 families remained at the site with dwindling funding for external support. To improve the existing tents, weather mitigating tent structures (WMTS) were built from bamboo and plastic sheeting. They lasted for more than two years - longer than expected.

Strengths and weaknesses

✓ The shelter design and fabrication proved to be more durable than expected.

× During this extended period of displacement, increases in family size further complicated the inevitable land disputes upon their return. This was hard to factor into planning for support packages.

- Although the camp was established as a short term fix, it may well become a permanent settlement. Initial land allocations and site layout will therefore have a long term impact upon the families at the site.

A Weather Mitigating Tent Structure. Left: in 2009. Right: two years later.
Photos: Richard Hamilton and Shaun Scales

Sozma Qula transit camp after winterisation in 2009.
Photo: Shaun Scales

Background - 2009

(See Shelter Projects 2009 for the original case study.)

The Sozma Qala Transit Camp in the Sar i Pul district of Afghanistan was established in late 2009 to accommodate 379 families returning to their area of origin after the settlement in Iran that had been their home for the previous 23 years was closed by Iranian authorities.

Local authorities had initially approved the development of the temporary transit facility to house the families whilst long abandoned houses and infrastructure were rebuilt and issues over land ownership were resolved.

However during the 2 decades of displacement, family numbers had grown significantly, and their original land was no longer sufficient to accommodate all of the returnees.

Update: site issues - 2010

Of the 379 families who moved to the temporary site, 320 remained two years later.

Representatives of the returnee families then began a long process to try and be granted the area on which the site had been developed. This was opposed by local communities who had remained in the area during the previous decades of conflict. To increase the pressure on the local government many families with access to their original plots refused assistance to rebuild their original homes in a show of solidarity with their community members and extended families.

As time has passed and the land issue has remained unresolved many of those families with their own land have returned to these plots and reconstructed their homes whilst the remaining families have remained on the Sozma Qala site.

As of 2011, it was planned that 150 families would return to their place of origin, a village a few kilometres away, and would be supported to build their own houses.

Of the families who have left the site:

- 34 families have received a winterised mitigating tent structure (known as WMTS) at their place of origin. They have then rebuilt their own homes.
- 25 families have moved to a plot of land (owned by one of them) at the bottom of the camp and have built permanent houses.

Two years later, the site has a mosque on the opposite side of the main road, and a school is being built in the camp. It also had three wells. Six camp residents were paid and armed as Afghan Local Police.

It is highly likely that a number of families will remain at the site and it will become a small village in the future.

Technical solutions 2009

The original transit camp facilities were built to provide temporary support and were not intended for winter occupancy. Tents were provided as family shelters and a basic water delivery system had been developed.

As winter approached the tented site was winterised through the provision of bamboo framed plastic sheet structures over the tents. Drainage, gravel roads and insulated WASH facilities were also provided at the site.

Technical solutions 2011

The original weather mitigating tent structures have lasted well beyond their initially planned life span and will remain standing for a fair amount of time to come.

In some cases the shelters were upgraded with mud blocks and new sheeting by the remaining families. At this site, plastic sheeting lasted a maximum of 24 months. As a result, the plastic sheeting distributed was used to patch up the shelters.

The design of the weather mitigating tent structures has been adopted, and many were built two years later for conflict IDPs from Sayad district in and around Sar i Pul district centre. The design was also adapted for northern Pakistan in response to the 2009 IDP crisis.

The two remaining agencies who continue to work in the camp have provided limited support of heating fuel (350kg coal per family), blankets (3 per household) and other non-food items.

The latrines and washing areas fell apart early in 2011 as did the garbage collection process.

The design of the weather mitigating tent structures used in this project was informed by shelters built following the 2005 earthquake in Pakistan.










Views of Sozma Qula transit camp in 2011, two years after it was established
Although intended as a temporary transit site, the majority of the families remained on the site.
Photos: Richard Hamilton, Jake Zarins

A.2 Chile - 2010 - Earthquake

Case study:

Country:
Chile
Disaster:
Earthquake
Disaster date:
February 27th 2010
No. of houses damaged or destroyed:
More than 200,000 houses
Project target population:
10,000 households
Shelter size:
Variable
Materials Cost per household:
375 USD value per household on the card

Project timeline

- 17 months – Project completion
- 15 months – Final delivery of cards
- 13 months – Number of beneficiary households increased
- 6 months – First delivery of cards
- 5 months – Partnership agreement with supporting company signed
- 3 months – Start
- 2 months – Project coordinator hired
- 1 month – Shelter specialist arrives to support the country team
- February 27th 2010 – Earthquake

Project description
Following a non-food item distribution to 10,000 households, plastic cards with magnetic strips were given to earthquake affected households. These cards were valid for 30 days from manufacture and could be redeemed in 40 pre-designated hardware stores located in the affected regions.

Strengths and weaknesses

✓ In general the project was well received by beneficiaries giving them flexibility to spend resources as they saw fit.

✓ The project team invested time to explain the project to the beneficiaries. Suppliers were also able to explain the process well to beneficiaries.

✓ Community members were encouraged to group their purchases together to receive free or reduced price delivery of their materials from the merchants.

× The process of choosing beneficiaries was not as clear as it should have been. Many affected people felt that many of those who received assistance didn't suffer major damage to their homes. Others noted that the project excluded some families who they thought should have been eligible to receive the assistance. This led to some jealousy and resentment from community members who did not receive cards.

× More time should be given for the use of the card or it should have been distributed earlier than it was.

× The project did not provide technical support on safer and more earthquake resistant construction. It did not build on the experiences of recent programmes in neighbouring Peru.

- The prices of a basket of selected materials at various hardware stores should have been monitored over the course of the project. At the start, a baseline price survey could have been conducted to check that the project had not lead to price escalaiton. However in a mid-term evaluation, 80% of the targeted families found the prices in the stores acceptable, and there was little evidence of price escalation due to the project.

The earthquake caused a tsunami.
Photo: Sebastián Klarén

After the earthquake

On 27 February 2010 an earthquake of magnitude 8.8 struck Chile. The epicentre was located 60km southeast of the nearest city in the Maule region (400km south of Santiago).

The earthquake generated a tsunami, affecting 500km of coastline. The earthquake and successive tsunami caused hundreds of deaths and serious damage to homes and other infrastructure, primarily in the Maule and Bío Bío regions.

The survivors of the earthquake had to survive the remaining months of the winter without appropriate shelter.

According to the Chilean Ministry of Planning, in the worst affected region (Maule) nearly one in five people had a damaged or destroyed house. The earthquake affected 5 cities with over 100,000 inhabitants, 45 other cities with over 5,000 inhabitants each, and more than 900 villages. It affected both rural and coastal communities.

Emergency response

During the emergency phase of operations, the organisation distributed the following non-food items:

- Tents (1,587families)
- Tarpaulins (20,650 families)
- Blankets (44,740 families)
- Hygiene kits (11,290 families)
- Kitchen sets (11,175 families)
- Buckets (22,370 families)

However this first phase of the response was slow and did not meet all of the needs. As a result other approaches were developed.

Implementation

It was decided to implement a voucher scheme using a plastic card with a magnetic strip.

The voucher scheme complemented the delivery of the emergency items, as it allowed for the improvement of housing solutions through the purchase of different household items, as well as material for the reconstruction of damaged homes. The monetary value of the card (equivalent to 375 USD) was decided in line with the legal minimum wage at the time.

The project provided cards which could be redeemed for construction materials.
Photo: Mirna Suárez

The organisation trained both staff from the participating suppliers and beneficiaries on the use of the cards. In a project evaluation, recipients of the cards generally found the staff at participating hardware stores knowledgeable about the project.

Staff from the hardware stores travelled to communities with product catalogues. This assisted affectees who had limited access to transportation.

A partnership was established with the Corporate Social Responsibility programme of a Chilean company. The company verified beneficiary data, printed relevant documentation and opened a permanent call centre to answer any questions about using the card.

A call centre was also established to allow beneficiaries to verify the amount of funds remaining on their card along with the location of participating stores.

The validity of the card was set on the magnetic strip by the manufacturer, but an expiration date was also printed on each card. Due to the time needed to distribute the card, some beneficiaries had less time to purchase material.

Selection of beneficiaries

The criteria for selecting beneficiaries was very broad, and took into account which families had received relief kits. No detailed damage and needs assessment was conducted. In practice, the project relied on beneficiary lists that were provided by local authorities and community leaders along with lists provided by project staff. These lists were developed during the distribution of relief supplies in March and April 2010, some months before the distribution of cards.

In some cases the data in the lists wasn't accurate, leading to the misprinting and subsequent voiding of the cards at the distribution sites. During distributions there were families at the distribution sites who claimed that they should be included in the project. In these cases, they were added to a waiting list and told that there would be a second distribution in the community at a later date.

There was also the risk that segments of the affected population were not included because they did not have good relations with the community leaders or they lived in sites between targeted communities.

Technical solutions

Once the users received their cards, they had one month to use it. Partial purchases were allowed, meaning that they could buy several times during the month in smaller volumes. One other way to use the funds on the card was to make a bulk purchase for the total value of the card.

At a later stage, initial home repair guidelines were delivered at the same time as the cards. These were in line with an agreement signed for future collaborations between the organisation and the relevant government Ministry. During an interim project review, approximately 80% of respondents stated that they had the knowledge to make their own repairs with the materials purchased with the card, 17% paid for someone else to do them, while 4% stated that they did not have the knowledge and would have liked to have been trained in how to make the repairs themselves.

Project conclusion

Initially the project targeted 8,400 households, but this was later increased to 10,000 families. The project was implemented in one year – from May 2010 to May 2011. It took a little longer to close the project as some transactions could only take place once all invoices had been received.

The project required significant amount of paperwork. Photo: Jorge Romo

Team members, a phone line and posters explained how the project worked.

A.3 Grenada - 2004 - Hurricanes Ivan and Emily

Case study:

Country:
Grenada
Disaster:
Hurricane Ivan (Cat. 4)
& Hurricane Emily (Cat. 1)
Disaster date:
September 7th 2004
and July 13th 2005
No. of houses damaged or destroyed:
14,000
No. of people affected:
About 61,000 people;
50% of the population was left homeless
Project target population:
- 750 families received a new roof or a house
- 2,000 families received hurricane straps
- 128 carpenters trained
Occupancy rate on handover:
100% (estimated)
Shelter size:
11m² -70m²
Materials Cost per shelter:
Average cost per shelter repaired 2,500 USD

Project timeline

- 2 years - Over 750 roofs rebuilt and houses built
- 2,000 families installed hurricane straps
- 128 carpenters trained
- 1 year - Start of the second project
- 9 months – Hurricane Emily
- 9 months - Over 250 roofs rebuilt
- 3 months - Construction training of the first teams of carpenters and first roofs rebuilt
- 1 month - Project start
- September 7th 2004 – Hurricane Ivan

Project description
Over 2 years, the roofs of over 650 houses were repaired and 100 homes were built from scratch. 128 people were trained and certified as carpenters, over 2,000 houses were strengthened with hurricane straps and 32 communities were better prepared to face the next disaster.

Strengths and weaknesses

✓ Capacities in hurricane-resistant construction techniques were increased through training of men and women.
✓ Those trained during the project received a certification in carpentry. At the end of the project most of them were able to find a related job.
✓ The project was integrated with an island-wide project of disaster preparedness.
✓ Over 2,000 houses were strengthened with hurricane straps as a risk reduction and risk mitigation project.
✓ Fact sheets were distributed through newspapers and with materials. They promoted safer construction techniques.
✓ Community members in 32 communities received training on safer roof techniques.
× The project did not meet the needs of many of the most vulnerable. The weakest houses could not get a roof because they needed too much retrofitting.
× More houses should have been built to replace the destroyed homes.
× The trainees who received materials did not get the community help anticipated. Carpenter teams had to be deployed to help.
× The project focused on the needs of homeowners and did not support tenents.
× Larger houses received a higher financial value of support as their houses were built from more materials.

The project focussed on building safer roofs. Photo: Emeline Decoray

Before the hurricane

Before the disaster, Grenada had not been hit by a hurricane since 1955. People had forgotten about the hurricane-resistant techniques which had previously been applied by carpenters.

The houses in Grenada are constructed in two types; either from wood or from concrete. Wooden houses have timber frames and are clad in timber and have corrugated iron roofs. Concrete houses are commonly made from concrete blocks and have a corrugated iron roof.

Many wooden houses were resting on concrete or wooden pillars, their structures had no braces, not enough studs and the roofs were flat with long eaves.

After the hurricane

The hurricane damaged 90% of the housing on the island. Concrete structures partially or entirely lost their roofs. Wooden houses were severely affected or totally destroyed. The agricultural sector was also severely affected.

Implementation

Initially, the project focused on re-roofing 100 homes. Six team leaders were trained in hurricane-resistant techniques which had been used by carpenters 50 years earlier. Trainees were selected and assigned to each team leader.

In total 128 men and women were trained. They received a one-day theoretical course followed by hands-on training. At the end of the course, the most capable became assistant carpenters. After gaining more experience some of them became team leaders.

The trainers who qualified, received a certificate in Carpentry and Masonry from the Technical College (T.A. Marryshow). They were evaluated after rebuilding 5 to 6 roofs with a team composed of a team leader, an assistant carpenter and 2 trainees.

After this the trainees could receive material to rebuild their own destroyed roofs.

The project ultimately had more than twenty teams of 4 people working island- wide.

A disaster preparedness project was also implemented in 32 communities. On weekends, some public awareness activities were held to train some community members on different topics including rebuilding better roofs. As a mitigation project, 2000 vulnerable homes received hurricane straps which were installed by trained community members.

Selection of beneficiaries

The beneficiaries were selected by the organisation according to criteria defined by the government and the agencies involved in the relief emergency operations. Two types of criteria were used: social (vulnerable people affected by the hurricane) and technical (house damaged or destroyed by the hurricane).

All of the houses were technically assessed before the beneficiaries were selected. This allowed the organisation to decide on the type of assistance the beneficiary would

The project used "old time" techniques, learning from the past and which buildings had survived the hurricane and why. Photo: Emeline Decoray

obtain. Able-bodied beneficiaries were invited to become trainees and receive the material to rebuild their roofs. If the beneficiary was elderly, or was unable to undertake construction himself or herself, a carpentry team was sent to reinforce and re-roof the house.

Technical solutions

The techniques applied to rebuild the roof and to strengthen the house before building the roof were "old time" techniques, which had resisted Hurricane Ivan. The "old time" wooden houses resisted the wind forces better than the newly built houses, even concrete houses.

The houses received some reinforcement, such as doubling studs in the corners, around doors and windows, bracing the corners in both directions, attaching the flooring beams to the pillars, and attaching them to the foundations with metal straps. The smallest houses received a gable roof with a 30° slope and 25cm eaves, while the largest one received a hip roof.

Logistics and supply

All materials were purchased locally, through local suppliers, even if it was imported material.

After an assessment of each damaged house, a bill of quantity of the material needed to rebuild the roof was drawn up. This was calculated by putting the size of the house into a standardised spreadsheet.

The material was delivered on site before the start of the work. At the beginning, all the logistics was done from the project warehouse: storage of the material, loading of the truck and delivery on site. Because the project grew rapidly, the supplier was asked to manage a part of the logistics from his warehouse. The bills of quantity were sent to the supplier 3 days prior to the delivery date. This way, most of the logistics issues were transferred to the supplier. As a consequence of this, the organisation had to coordinate closely with the supplier.

	A	B	C	D	E	F	G
1	QUANTITY OF MATERIALS						
2							
3						builder:	
4		width		length		surveyor:	
5	house	12.0		18.0	feet	owner :	
6	eaves	8	inches			place:	
7	slope	30	degree	7	inches/feet	date:	
8							
35		thickness	width	length	unit	Quantity	CHECK
36	top plate G	2	6	12	ft	2	
37	ridge pole G	2	6	16	ft		
36	top plate G	2	6	12	ft	2	

A spreadsheet was developed that calculated the materials required given the dimensions of each house.

The project retrofitted 2000 houses with hurricane straps. Photo: Emeline Decoray

A.4 Haiti - 2010 - Earthquake - Overview

Sheltering in Haiti: Looking forward while looking back

In August 2010, seven months after the devastating Magnitude 7.0 earthquake near Port-au-Prince, a think tank made the following key shelter-related recommendation[1]:

"*The Haitian government, together with the donor community, should accelerate removal of rubble. This is the single most important step toward reconstruction of housing and infrastructure that the Haitian government and donors can take.*"

The study went further:

"*For housing to be reconstructed, sites have to be cleared… Unless rubble is cleared expeditiously, hundreds of thousands of Haitians will still be in tent camps during the 2011 hurricane season.*"

That hundreds of thousands of Haitians still face the very real prospect of remaining in camps during the upcoming 2012 hurricane season, and perhaps beyond, speaks volumes about the challenges of delivering humanitarian shelter assistance and housing reconstruction in Haiti - and elsewhere.

The difficult, dangerous, and generally thankless task of clearing rubble is viewed largely as a means to the end of enabling the recovery of lives, communities, and societies in the wake of disasters. Clearing rubble, then, is a critical precursor to recovery; it can't be overlooked or sidestepped. Perhaps more so than any previous natural disaster since the adoption of the UN cluster system in 2005, the Haiti earthquake challenged that system significantly with the profound issue of ownership: which cluster would take the lead in addressing clearance of the enormous rubble pile generated by the earthquake? Which donors would fund the planning and clearance of rubble? Which organisations would actually do the clearance work? While the case studies that follow reflect extraordinary and laudable effort, they also at least suggest that the questions remain only partially answered, to the detriment of those living in - and out of - camps.

As central as the rubble issue has been to recovery, the more important issue, and underlying rubble both literally and figuratively, is the land that was the locale of the homes, shops, schools, neighbourhoods, and other features of a primarily densely populated urban area affected by the earthquake. The rubble and broken buildings littering settlements after the earthquake effectively decreased the size of those settlements, and thus the supply of land available for sheltering people and recovering economic, educational, governance, and other activities. The land and housing markets in those settlements, constrained by myriad tenure, infrastructure, service, and hazard risk issues prior to the earthquake, were exacerbated significantly by its impacts, making it extremely challenging to respond to widespread shelter needs, while also affecting the longer-term process of recovery.

Shelter and land issues in urban areas pose particular challenges to humanitarian organisations, many of which have their genesis, institutional memories, protocols, and expertise in rural areas. Confronting rubble, land, and related issues in dense urban areas anywhere would thus be a challenge to even the most experienced humanitarian organisations. All the more so in Haiti, where extreme poverty, environmental degradation, and a host of hazards, coupled with the limited capacities of a complex network of regulatory, political, community, and market actors, combined to create the highly vulnerable settlements that sustained such overwhelming destruction, and making it all the more difficult to respond to needs generated by the earthquake.

[1] RAND Corporation. Building a More Resilient Haitian State, 2010. Available from http://www.rand.org

Dealing with the rubble has been a central issue to recovery.
Photo: Joseph Ashmore

Many of the case studies that follow contended directly with land and related settlements issues, bringing both reaffirmation of and new meaning to the phrase "shelter and settlements" (S&S) sector that has been used increasingly by humanitarian actors in recent years to reflect a recognition that sector activities entail not just the four walls and roof of a shelter, but also its contextual setting. A focus on the settlements side of the sector will likely remain a feature of continuing efforts in Haiti, as well as future sector responses elsewhere, particularly those in urban areas. To do otherwise would only further increase the vulnerability of populations in hazard-prone settlements.

Perhaps the zenith of shelter and settlements sector programming in Haiti has been the "neighbourhood approach" adopted by several actors to plan and integrate multi-sector, area-based programming, often in collaboration with other humanitarian agencies, civil society organisations, the private sector, and local and national government offices. This settlements-based approach to shelter provision was identified early on after the earthquake as a means of both working in rubble-strewn areas to provide humanitarian assistance and establishing a platform for subsequent reconstruction. Although initial results of the neighbourhood approach are promising, there are still more earthquake-affected neighbourhoods than actors to work in them. Further, a macro-level, city-wide complement to the neighbourhood approach, which could link currently disparate and distant efforts, is still very much a work in progress in Haiti, despite the intensive and concerted efforts of UN-HABITAT and others. Finally, it must not be overlooked that the neighbourhood approach, if adopted and implemented early in the response effort, is an effective means of promoting inter-cluster coordination, lending critically important on-the-ground support to the cluster approach, which is, after all, the primary means of guiding humanitarian action.

One very large "lesson learned" of the Haiti earthquake is that both the neighbourhood approach and its macro-level complement, an emergency master plan, are fundamental to any effort to address shelter needs. No less important than these foundational elements of sector strategy is the communication of strategy, for even the best of strategies are less than effective if not understood widely, adopted by key actors, and implemented expeditiously. The strategic communications outputs of humanitarian actors in urban areas must be disseminated early and repeated often in order to inform and guide response activities. Messaging also needs to be creative, visible, and pervasive to compete with the multiple and voluminous messages received daily by those living in urban areas. Although this was and remains a challenge in Haiti, as it is anywhere, the rapid emergence of numerous forms of social media enabled not only delivery of strategic messages, and much needed feedback, but also actual implementation of shelter programmes, with "mobile money" initiatives to pay for rent and other necessities a good example.

Finally, the following case studies reflect considerable innovation and flexibility by humanitarian actors in response to numerous constraints, an awareness that risk reduction is paramount to "Building Back Better" and a recognition that "one-size-fits-all" approaches, if they ever were effective in rural settings, are most definitely inappropriate in urban settings. Moving ahead, a focus on the neighbourhood approach will likely remain a feature of continuing efforts in Haiti, as well as future Shelter and Settlement sector responses elsewhere, particularly in urban areas. In Haiti, the range of interventions will have to expand, as impoverished families in camps, limited land supplies, complex land tenure issues, and limited resources will likely conspire to produce not just more transitional shelters and more repairs of damaged housing, but also greater resort to hosting support, rental housing production, and rental subsidies. It is hoped that the effort going forward will feature the continuing quest for clarity on the seminal issues that confound and define the sector, perhaps the largest alluded to in the study quoted above: what is shelter, what is housing, and what is meant by "toward reconstruction"?

A humanitarian response to urban context: Two-story transitional shelters, part of a project to apply a "neighbourhood approach" in central Port-au-Prince. Photo: USAID/OFDA.

Charles A. Setchell

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A.4 Haiti - 2010 - Earthquake - Overview continued

Overview:

Summary

The earthquake of 12 January 2010 resulted in over 222,000 deaths and over 300,000 people injured. Over 180,000 homes could no longer be occupied, the majority in densely populated informal settlements, generating a large scale challenge in terms of debris and increased pressure on space. Spontaneous and planned camps were established throughout the affected area, accommodating at peak 1.5 million people.

The international response was large scale and well funded. It used a wide range of actors, with varying degrees of experience of humanitarian response, urban crises and coordination.

The shelter sector recovery strategies evolved from meeting emergency needs to addressing a range of shelter solutions including T-shelter and housing repairs. The Shelter, Camp Coordination Camp Management, and Early Recovery Clusters were mobilised to address these needs.

Background

Prior to the earthquake, Haiti was the least developed country in the region, ranking 145th of 169 countries in the United Nations Human Development Index. More than 70% of the population lived on less than 2 USD per day.

In the cities people lived in crowded neighbourhoods with poor infrastructure and without access to basic services. Living space in Port-au-Prince's permanent housing was reported at just 1.98m^2 per person before the earthquake.

The urban context, with high proportions of tenants, needs for urban planning and challenges of engagement with the government contributed to the complex operating environment.

After the earthquake, thousands of non-government organisations with varying levels of experience appeared in Haiti. At times this undermined an already weak government sector that had lost infrastructure and personnel. Recovery was further challenged by political uncertainty, annual risks due to rain and hurricanes and an outbreak of cholera at the end of 2010.

Emergency Response

During the first three months, many affected families moved from damaged neighbourhoods onto available spaces, establishing spontaneous camps. Some of these were subsequently formalised and serviced by various supporting agencies. In less damaged areas, many stayed with host families. For the first months, many people slept outside damaged houses afraid to go back in.

An estimated 500,000 people left the earthquake affected area in the first month but the majority returned by mid 2010.

The initial response provided emergency shelter support through provision of basic materials, tarpaulins, fixings and other non-food items to a maximum number of people. This was to supplement and weather proof the large number of self-made shelters built from salvaged materials.

In the first four months, 560,000 tarpaulins, 62,000 tents and 130,000 kits containing tools and fixings were distributed by 80 organisations.

As per the initial plans, distribution data showed that 100% of households received emergency shelter items by 1st May 2010.

T-Shelter and early recovery

Many donors and agencies developed projects to provide transitional shelters (also referred to as T-Shelters) to agreed standards. Given the need for large scale material imports, pressure for land and other challenges, it took two years to build over 100,000 planned shelters, missing the initial planning target of 18 months - the start of the hurricane season of 2011.

Repairs to damaged houses were slow to start but accelerated from the end of 2010 to almost 14,000 houses repaired by agencies by the end of 2011. This figure does not include the houses repaired by people themselves without support.

Many earthquake affectees found themselves living in temporary settlements through the rains. Photo: Joseph Ashmore

Over 630,000 plastic tarpaulins were distributed, allowing people to protect themselves from the sun and rain. However there was a risk that many of the spontaneous settlements would become the slums of the future.
Photo: Joseph Ashmore

Initial strategies also made provision for host family support, but in general projects were not able to scale up to quickly meet these needs on any scale. Two years later over 6,000 households had received rental subsidies.

Housing and neighbourhoods

A strategy was developed during 2010 to promote support in the areas of origin to accelerate return from camps and reconstruction in rehabilitation. This was not adopted until the beginning of 2011 and formed the basis of the majority of neighbourhood based recovery programmes.

At the end of 2011 there were still over 500,000 people in camps. This included both people directly affected by the earthquake but also reflected a pre-existing housing deficit and urban poverty.

Official permanent reconstruction assistance shows limited progress with approximately 5,200 houses built within two years, and limited support for host families. However, the rate of self recovery and formation of spontaneous new settlements by Haitian families themselves is significantly higher. Support programmes including information and training have been limited, and much of the rubble has yet to be cleared.

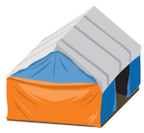
There were major shortages of land - in this settlement, families built in the central reservation of a major road.
Photo: Joseph Ashmore

Many families built their own temporary shelters using reclaimed materials.
Photo: Joseph Ashmore

SHELTER IN HAITI

188,383 DESTROYED OR SERIOUSLY DAMAGED HOUSES IN HAITI

1.5 MILLION PEOPLE NEED SHELTER ASSISTANCE



EMERGENCY SHELTER consists primarily of tarpaulins and fixings such as ropes, nails, a hammer etc. Tents can also be used for emergency shelter but, because they are less versatile than tarps, their use is limited. Emergency shelter can be distributed quickly but offers only limited protection against heavy rains.

TRANSITIONAL SHELTERS are simple timber or steel frame structures that provide better protection, more privacy and more space. Transitional shelters will often have a concrete foundation and can last years. Once people have found permanent homes, transitional shelters can be be put to other uses. They take longer to build but can be dismantled and moved if necessary.

THE ACHIEVEMENTS

AS OF 6/25/10

MEMBERS OF THE SHELTER AND NON-FOOD-ITEMS CLUSTER have delivered vital aid to the estimated 1.5 million people who were directly affected by the earthquake. Despite a destroyed port, a severely damaged airport and a lack of infrastructure, cluster members reached an average of 100,000 people per week in the first four months of the response operation. Each family received two tarpaulins or one tent.

TRANSITIONAL SHELTERS

Today, shelter cluster agencies are increasingly focusing on transitional shelters. These are simple structures that provide better protection than tents or tarps but take longer to build.

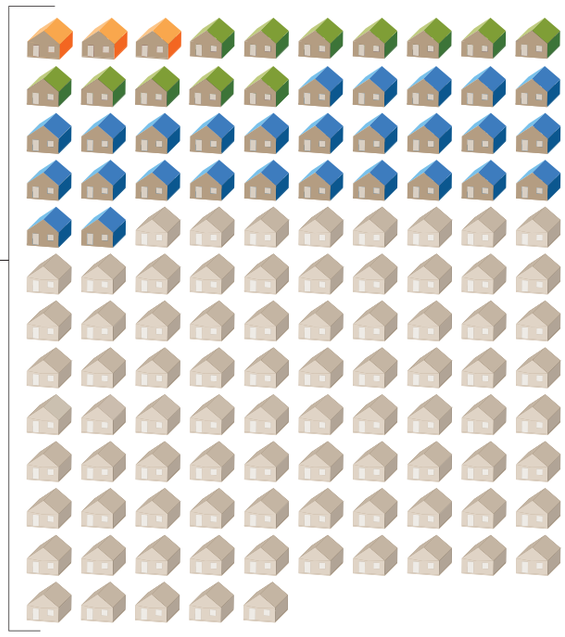
= 1,000 TRANSITIONAL SHELTERS

OF TOTAL **125,000** PLANNED

3,264 COMPLETED

12,175 IN COUNTRY

27,214 IN PIPELINE



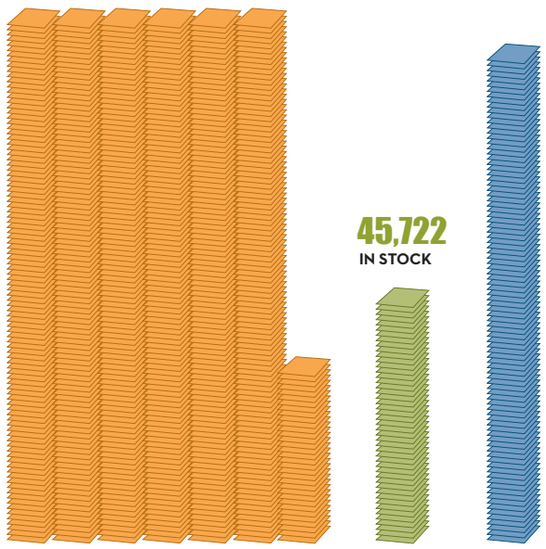
HEAVY DUTY TARPAULINS

633,052 DISTRIBUTED

= 1,000 TAUPAULINS

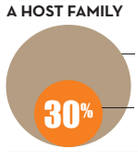
93,287 ON THE WAY

45,722 IN STOCK



HOST FAMILIES

500,000-600,000 PEOPLE LIVING WITH A HOST FAMILY



TOTAL DISPLACED PEOPLE

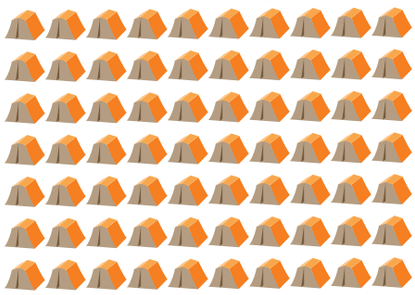
PERCENT OF DISPLACED PEOPLE LIVING WITH A HOST FAMILY

TENTS

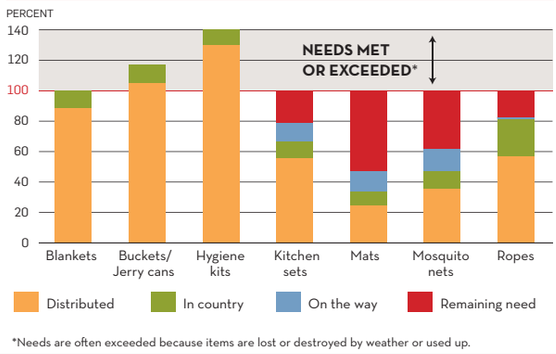
70,279 DISTRIBUTED

= 1,000 TENTS

Tents are less versatile, need more space and do not last as long as tarpaulins. For that reason fewer tents than tarps were distributed.



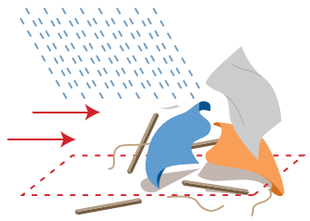
HOUSEHOLD NFI'S COVERAGE AND GAP



*Needs are often exceeded because items are lost or destroyed by weather or used up.

THE CHALLENGES

Because most people were renters or squatters and don't own land, all aspects of shelter are very complicated. All steps have to be agreed with the tenant and the land owner.



1 OWNERSHIP OF LAND IS OFTEN UNCLEAR BUT OWNERS HAVE TO GIVE PERMISSION BEFORE ANY WORK CAN BE DONE.

2 SITES ARE BLOCKED BY DEBRIS. EVEN WITH HEAVY EQUIPMENT IT WILL TAKE YEARS TO REMOVE IT.

3 MANY ROADS ARE TOO NARROW FOR HEAVY EQUIPMENT. MULTI-FAMILY BUILDINGS CANNOT BE EASILY REPLACED.

4 HURRICANE SEASON: EMERGENCY SHELTERS CAN BE DESTROYED BY HEAVY WIND AND RAIN.

THE WAY FORWARD

The provision of transitional shelters is gaining momentum, particularly in rural areas where more land is available. It is essential that the identification of additional, safe relocation sites, debris removal and the required planning processes are urgently addressed by the authorities to enable the large scale construction of transitional shelters and ultimately the provision of permanent housing solutions.

SOURCE: IASC HAITI SHELTER CLUSTER, 2010

GRAPHIC BY STANFORD KAY STUDIO.COM

A.5 Haiti - 2010 - Earthquake

Case study:

See A.4 "Haiti - 2010 - Earthquake - Overview", p12 for background.

Country:
Haiti
Disaster:
Earthquake
Disaster date:
January 12th 2010
No. of houses damaged or destroyed:
180,000
Project target population:
10,000 emergency shelter kits distributed
20,000 reinforcement kits distributed.
2,550 T-shelters installed
Materials Cost per shelter:
T-shelter: USD 1,700 per unit
Project cost per shelter:
T-shelter: USD 2,800 per unit (materials and project costs)

Project timeline

Project description
This project provided different forms of support for people with differing needs. In the emergency phase the organisation distributed 10,000 emergency shelter kits. It went on to provide 2,550 transitional shelter kits, 20,000 reinforcement kits for those did not have land to build upon, 500 rural repair kits and over 1,000 tool kits. These kits were accompanied by trainings and posters on staying safe during hurricanes. The organisation also actively supported inter-agency coordination and had a strong advocacy role.

Strengths and weaknesses

✓ Multiple approaches were taken to shelter provision, allowing projects to match the evolving context.

✓ The organisation was able to deploy several experienced shelter team members, who were able to influence national strategy and programmes beyond the organisation.

✓ The organisation carried out extensive advocacy on land rights and access to land.

× Procurement and logistics caused significant delays to the transitional shelter projects. Recognising that logistics capacity within the organisation was weak, attempts were made to establish partnerships for supply with other organisations. These were not all successful, and three months were lost trying to establish a working partnership.

× The quality of non-food items and tents procured and imported by the organisation was variable.

- Immediately after the earthquake, there was an apparent "equality of vulnerability" as everyone has lost their home. However, it quickly became apparent that who, prior to the disaster, had the power, identity, connections and resources – in particular housing, land and property assets – were able to reassert these networks and recover more quickly;

- A given neighbourhood was likely to need an array of services and it was not always clear whether it is more efficient for a single, non-specialist agency to deliver all services or for specialist agencies to provide a single, specialist service across several neighbourhoods or indeed the whole city.

Hillside showing transitional shelters built on small plots of land.
Photo: Mildred Beliard, CARE

Before the earthquake

(See A.4 "Haiti - 2010 - Earthquake - Overview", p12.)

Before the earthquake the organisation in Haiti had concentrated in poor rural areas and on smaller scale projects. The organisation was not focused on shelter or construction.

Many of the organisation's experienced staff were directly affected by the earthquake. The country office had very few staff, no partners and little experience in areas directly affected by the earthquake. Scaling up the capacity of the country office was also difficult because many non-government organisations arrived – all trying to recruit locally.

Emergency shelter kits

The organisation initially responded by distributing emergency shelter kits. These contained plastic sheeting, mattresses, hygiene sets and kitchen sets. These materials were delivered to affected people within the first three months after the earthquake and before the major rains arrived.

It was difficult for any agency to identify the neediest geographic areas in terms of the highest number of the most vulnerable people, highest levels of damage, and zones most likely to be neglected by responding agencies in the first 3-6 months. The organisation decided to deliver emergency shelter kits to:

- Spontaneous camps in highly damaged zones close to the epicentre of the earthquake (Leogane).
- Dense spontaneous settlements along roads to Leogane, that were likely to be neglected by other agencies (Carrefour).
- Spontaneous settlements close to the office and warehouse (Port-au-Prince).

Neighbourhoods

Following the emergency distributions, the organisation shifted target to neighbourhoods rather than camps. The main reason for this was to push to more durable shelter solutions than could be found in camps.

Although massive shelter needs remained, the organisation decided not to continue providing shelter assistance in spontaneous settlements in Port-au-Prince. This was due to the large number of other actors working there, and also to allow them to focus activities.

All families with destroyed housing in the most vulnerable neighbourhoods were targeted.

Transitional Shelter Kits

Kits were developed to protect people from the imminent rains and hurricanes. 2,550 transitional shelter kits (6 million USD of materials), 20,000 reinforcement kits (3 million USD of materials) and 500 repair kits for timber-frame houses were distributed. Half of these transitional shelters were built in partnership with another organisation.

Transitional shelter kits required that people had access to a space to build a shelter. These were not necessarily the most vulnerable families.

Reinforcement kits targeted families who were unlikely to receive a transitional shelter kit and who would remain in self-built shelter during the hurricane season. Training sessions were held on how to use the kits and printed fliers were distributed. Trained carpenters also supported families to reinforce their makeshift emergency shelters.

Toolkits were given to agencies that were training technicians, but who had limited resources.

Land tenure

The organisation's approach to tenure was to:

- Record reported tenure status during registration.
- Develop a Memorandum of Understanding (MoU) with beneficiaries in coordination with other agencies. This highlighted that beneficiaries will own the shelter but that tenants must take responsibility for seeking the consent of their landlord to erect a transitional shelter for 3 years.
- Engage the municipality in a similar agreement which outlines the approach and puts the onus on municipalities to resolve disputes.

Shelter Design

The following are the seven key stages in the transitional shelter programme:

- Assessment and beneficiary selection: visit dwelling and complete assessment form.
- 1st verification: visit destroyed house, and plot. Check with neighbours. Fill in verification form.
- 2nd verification: visit proposed plot to check that it is ready.
- Explanation and 1st MoU signature: explain and sign the MoU to clarify that the beneficiary has consent to use the plot and that the roles and responsibilities are understood.
- Delivery and 2nd MoU signature: sign MoU to confirm that the shelter has been received.
- Installation: teams install the shelter (2 carpenters, 5 helpers from the beneficiary's side, supervised by a technician).
- Final handover and 3rd MoU signature: sign the MoU to confirm that the shelter has been installed.

Kits and the accompanying information campaign were developed in partnership with other agencies using a commonly agreed transitional shelter brief. Shelter designs were checked by qualified structural engineers from partner organisations both in Haiti and Europe, who offered their services to check the designs.

Daily labour on construction sites was supervised by technicians who had been trained by engineers.

The organisation itself directly monitored implementation of the project and quality.

Logistics and supply

Haitian companies were not necessarily registered, paying tax, publishing accounts or accountable to identifiable shareholders. This made it difficult for the organisation to monitor problems with labour rights, health and safety, environmental regulation or check that materials – particularly imported timber – were from sustainable sources.

Emergency staff were unable to build sufficient capacity for efficient procurement. As a result the project used multiple approaches for procurement. These were:

- A partner organisation and local private contractors purchased the timber and all other components and delivered them to site.
- The organisation itself purchased and delivered plastic sheeting, hurricane strapping and cement. It also provided truck rental for later deliveries.
- The beneficiaries themselves provided gravel and sand.
- Local private sector manufacturers assembled roof trusses and frames. This allowed quality to be controlled before kits arrived on-site.

Different approaches were used to procurement - some items were prefabricated off site.
Photo: Mildred Beliard, CARE

Extension built by a family to upgrade a transitional shelter.
Photo: Mildred Beliard, CARE

20,000 Reinforcement kits

Item	Quantity
Plastic sheet (4m X 5m)	1
Timber 2" x 4" (50x100mm)	24m
Hurricane strap	6m
Roofing nails	1Kg
Nails - 1inch (25mm)	2Kg
Nails - 4 inch (100mm)	1Kg
Metal corner spikes 50cm	6
8 mm nylon rope	25m
Bag for ironmongery	1
Plastic box	1

500 Rural Repair kits

Item	Quantity
Timber 2" x 4" (50x100mm)	48m
Hurricane strap	10m
Nails - 1" and 4" (25, 100mm)	4Kg
Plastic sheet 4m x 5m	2
Corrugated iron	2m2
Roofing nails	1Kg
Cement 42.5kg	2 bags

1,126 Tool kits

Item	Quantity
Bucket - 20l with cover	1
Rope - polypropylene 10mm	15m
Iron wire gauge 12 or 14	15m
Hammer carpenters 0.5kg	1
Mallet - 1.3kg	1
Crowbar 45cm	1
Cold chisel 20cm	1
Wire cutters 20cm	1
Dust masks	2
Gloves	1
hacksaw 30cm	1
Hacksaw blades 30cm	4
Roofing nails 25mm	50
Wood saw 50cm	1
Chisel 3cm	1
Nails - 1 inch (25mm)	2Kg

A.6 Haiti - 2010 - Earthquake

Case study:

See "A.4 Haiti - 2010 - Earthquake - Overview", p.12 for background.

Country:
Haiti

Disaster:
Earthquake

Disaster date:
January 12th 2010

No. of houses damaged or destroyed:
180,000

Project target population:
Repair - 14,000 households
Structural assessment - 400,000 structures

Occupancy rate on handover:
Once a building had received a green-tag, occupancy jumped from 50% to 80%

Shelter size:
1-floor earthquake damaged structure (1 – 3 rooms): average of 15 - 35 m²

Materials Cost per house:
Repairs: average 2,000 USD per structure

Project timeline

13 months - Project completion

11 months - 1,500 houses were repaired

3 months - Project start

January 12th 2010 - Earthquake

Project description
The programme provided safe and improved housing which helped people to leave the camps and allowed them to restart the recovery process. The programme included: 1) damage assessment, 2) house repairs 3) public communication and training manuals 4) training.

Strengths and weaknesses

✓ The project used a community based approach and maintained open channels of communications with the relevant government ministries and the population at large.

✓ A repair and rehabilitation project was developed. This considered the types of housing, differing neighbourhoods, government guidelines and the local community.

✓ Local builders learned cost efficient but safe techniques for rebuilding.

✓ Public awareness campaigns assisted displaced community members to return to homes which were structurally safe.

× A shortage of local companies, combined with presidential elections and security issues lead to a delay in the start of the public information campaign.

× The public information campaign suffered from poor messages and overlapped with other organisations who were conducting repairs. This caused some confusion.

- Initially, owners were suspicious of the engineers. As the project became better known, owners began asking the engineers to assess their homes.

- The repaired houses are stronger than they were when the earthquake struck, but they look virtually identical to how they looked before the earthquake.

- The assessment showed that nearly every neighbourhood of Port au Prince contained a mixture of levels of damage.

- An analysis of the damage showed that residential buildings, schools, and churches were the hardest hit while commercial buildings fared best.

- Although all the houses repaired were more resistant to earthquakes than they had been before, it is not possible to guarantee that the repaired houses would be able to withstand another major earthquake.

Many buildings that were tagged yellow could be repaired at a lower cost than building a new transitional shelter.
Photos: Chiara Jasna Vaccaro

Before the earthquake

(See "A.4 Haiti - 2010 - Earthquake - Overview", p.12.)

Prior to the earthquake, there were no enforceable building codes and no inspections. As a result homeowners could build as cheaply and therefore insecurely, as they chose. The same was true for urban planning and zoning. Houses were regularly built into existing roads, on steep, unstable slopes, or in ravines prone to flash floods.

Most structures were built in stages as and when money was available. Additional floors and rooms were often added without checking the original foundations or structures. Entire neighbourhoods were built and developed without planning.

The main problem with construction in Haiti is that the structures are too brittle. Almost all the structures are built out of masonry blocks with reinforced concrete columns and beams.

After the earthquake

An international seismic engineering company was brought to Haiti a week after the earthquake to help the organisation with the early response. Initially the focus was on the main government buildings as well as the main hotels and factories.

Many people were sleeping under tarpaulins not because their house was unsafe, but because they were afraid that it was. Large numbers of people would leave camps and tents and return to their homes if they could be sure that their houses were safe.

Implementation

The programme was divided in four separate components.

1) Damage assessments

Damage assessments were implemented working closely with the Ministry of Public Works (known by its french acronym MTPTC). The survey was conducted by teams of engineers. Each team had between one and fifteen engineers. During the project there were up to 18 teams at any one time; a total of 270 Haitian engineers.

The assessment tagged buildings according to the damage using the following "traffic light" system:

- green - safe for use,
- yellow - damaged, but stable (needing minor repairs to be made useable),
- red - unstable, either major repairs or demolition and rebuilding required.

Haitian engineers were trained to conduct the evaluation. They were then sent in groups to assess the structures in a neighbourhood. The engineer would use a PDA to photograph each building and take its GPS coordinates.

They then inspected every room of the building, and completed a short questionnaire on the PDA. At the end of the inspection, each building was spray-painted with a highly visible red amber or green tag. Each engineer was able to inspect an average of 10 structures a day. At the end of each day, the data was downloaded directly into the central database and used to create a map.

To standardise assessments, the ATC20 form was modified for use in Haiti. The ATC20 is the standard form used in California to rapidly assess earthquake damage.

During the assessment, over 400,000 structures were tagged; this was nearly every building in the Port-au-Prince metropolitan area that was impacted by the earthquake.

Buildings were sprayed with green, yellow or red markings according to the level of damage sustained.
Photos: Joseph Ashmore

The assessment highlighted how widespread the damage was. Rather than having a core area of red tagged houses surrounded by rings of yellow tagged and then green tagged houses, nearly every neighbourhood is a mixture of green, yellow, and red tagged buildings.

2) House repairs

Once a house had been assessed, the next challenge was to repair it. The cost of rebuilding yellow tagged buildings was relatively inexpensive compared to the cost of new construction or comparable transitional shelters. However, it was also clear that the reason that most buildings had collapsed was that they were poorly built.

Based on the information gained during the damage assessment, twelve different types of repairs were identified.

The most common repair was of an X-shaped crack in masonry wall. The specific steps to repair each type of damage were detailed in a separate guideline accompanied by clear illustrations.

To ensure that builders continued to use the better techniques, the organisation, working with an international contractor, conducted inspections of the work on site.

3) Public communication & training manuals

Four areas were chosen, for a public communications project. In each area, a community based organisation was contacted.

The involvement of the community facilitated the setting up of meetings with the inhabitants, and municipal authorities. It has also facilitated the design of a public awareness and information campaign.

Workshops with local populations and existing community projects helped to identify the key people to meet and to accompany and support the teams on the ground.

To build back safer, three key changes were made to the way that the masons built walls:

- High quality materials: rather than allowing the masons to make their own blocks using river sand, stronger blocks were made in factories. They were made with clean materials and were vibrated after casting. Masons were required to use clean sand for the mortar.
- A thinner layer of stronger mortar: the masons used a 3:1 sand : cement ratio rather than the traditional 6:1 ratio. The masons were instructed to use only a thin layer of this mortar. This helps to compensate for the higher cost of the mortar.
- Steel reinforcement bars in the wall: the masons were instructed to add two steel bars between every four courses of blocks and vertically every three blocks. The horizontal steel bars are tied into the vertical columns and the vertical bars are tied into the ring beam.

The repair process

1. The damage assessment database was used to identify the number of houses that can be repaired.
2. Project engineers visit the neighbourhood to verify that the houses are not in high risk areas, nor in rights of way.
3. Community animators meet with local leaders to identify the house owners. The owners sign a repair agreement.
4. Local engineers assess each house. The engineer fills in a form on the PDA and writes the details of the repair required on the house.
5. A contractor is assigned to repair a group of houses.
6. As each repair is completed, the supervision engineer certifies that the repairs are complete and the contractor is paid.

- Contractors work on groups of three to six houses at a time.
- Only masons and contractors who had successfully completed the training on the improved construction techniques were allowed to work on the repairs.

Team of engineers assessing buildings. Photo: Chiara Jasna Vaccaro

Different repair specifications were developed for walls with and without windows, cracked ring beams, walls that had separated from the roof, and for minor cracking in walls and columns.

The specific steps to repair each type of damage were detailed in a separate illustrated guideline.

4) Training

The following people were trained:

- engineers (who had been vetted by the government) - to conduct damage assessments, to use PDAs and to how complete the required forms,
- masons - on repair techniques,
- contractors - on repair techniques,
- international NGOs and their technicians.

The focus was on how to build more safely. Since the changes were minor, the masons and contractors could be trained in just three days.

Trained on conducting Damage evaluations
270 engineers for Damage evaluations:
105 during the 1st Phase
165 during the 2nd Phase
Trained on conducting Repair evaluations:
32 engineers
Trained on conducting repairs:
11 sub-contractors
Trained to support subcontractors on conducting repairs:
30 engineers
210 masons

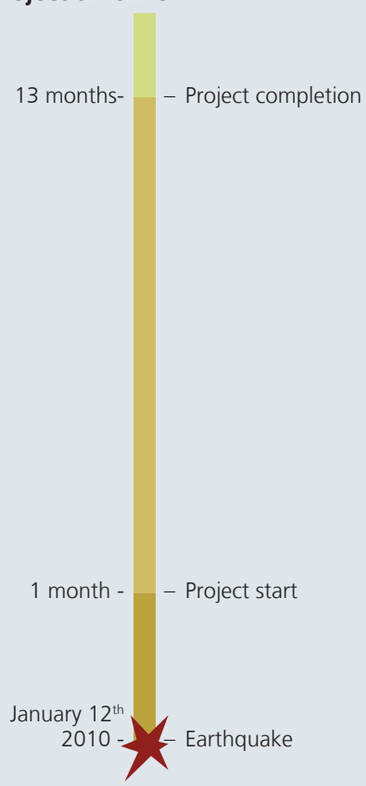
A.7 Haiti - 2010 - Earthquake

Case study:

See "A.4 Haiti - 2010 - Earthquake - Overview", p.12 for background.

Country:
Haiti
Disaster:
Earthquake
Disaster date:
January 12th 2010
No. of houses damaged or destroyed:
180,000
Project target population:
5,690 households or 34,140 individuals
Shelter size:
18 m^2
Materials Cost per shelter:
Wood framed shelter 878 USD
Steel framed shelter 1,800 USD
Host family grant 800 USD
Project Cost per shelter:
Wood framed shelter 1,060 USD
Steel framed shelter 2,500 USD

Project timeline



Project description
This organisation ran several projects focused on supporting economic, social, and political recovery. Shelter assistance was delivered through a variety of "shelter solutions", including traditional wooden framed transitional shelter construction, steel framed transitional shelter construction, supporting host families through a livelihoods-based incentive system, and the removal of rubble. The projects targeted those who decided to stay in or around their homes of origin.

Strengths and weaknesses

✓ The projects provided an economic benefit to both shelter recipients and through supporting activities such as paid labour for rubble removal. In total, the projects injected 750,000 USD into the local economy in paid wages.
✓ The projects trained and / or employed nearly 400 local masons and builders. Many of whom went on to secure formal employment for the first time.
✓ The projects successfully prevented over 5,000 households from going to settlements.
✓ Many households converted parts of their new homes into shops, salons or cafes, leading to a more rapid recovery.
× The projects were delayed. This was primarily due to unavoidable circumstances such as domestic shortages of key construction materials, severe weather conditions, disease outbreaks (cholera), and post-election tensions.
× Steel framed shelter components were delayed in shipment and customs.
× Effective sanitation for shelters was delayed.
× Relatively low capacity of local builders required extensive capacity building and oversight.
× Complications with land tenure and land verification processes slowed shelter provision and created an unexpected staffing and administrative burden.
× Procurement of some shelter components was delayed, leaving some incomplete shelters.
- Challenges with coordination often resulted in duplication and a wide variation in shelter assistance.
- Removal of debris was a key factor in the ability to construct transitional shelters.
- Limited local leadership from the local or national governments, which varied from location to location.
- Assembly lines and serial production were largely newly introduced concepts and required a lot of advocacy, training, and oversight.

Before the earthquake

(See "A.4 Haiti - 2010 - Earthquake - Overview", p.12.).

Target groups

The projects aimed to encourage affected families to stay in their communities of origin to depressurise formal or informal camps. To achieve this aim, mobilisation teams worked with settlement leaders to identify households who wished to settle near to their properties.

In most cases, the organisation worked with 'spontaneous settlements' that were no more than a cluster of households squatting on private land or in the streets or public spaces next to their property.

Selection of beneficiaries

Beneficiary criteria were developed with community leadership structures in neighbourhoods and informal settlements, and through local authorities.

The starting point for the beneficiary selection process was the Mayor's office in any given location. Identification of informal settlements in this way was highly dependent on the support and activity level provided by each Mayor.

To triangulate vulnerability assessments, project staff also consulted with other local organisations and community leadership. Shelter assistance was prioritised for single female-led households, the elderly, and households with more than four family members.

Previous homeowners rather than renters were targeted as a result of the added complexity of determining viable rental agreements and entitlements.

Plot identification

Individual shelter plots were identified through written statements by community members and local leadership.

Upon finalising the location of the plot, shelter construction teams coordinated with cash for work teams to assure that all rubble and dangerous material was removed from the construction site, and from access paths.

Engineers worked closely with shelter construction teams to assure that placement of the shelter would provide the safest possible space for the beneficiary household.

Wooden shelter

The transitional wooden shelter had an area of 18m^2 and was intended for a family of five. The structure was composed of almost 50 pieces of timber, ten corrugated galvanized iron sheets of 12 feet (4m) and a concrete floor.

The structure was strengthened with hurricane straps. The main bearing wooden columns were anchored to the soil using cast-in-place concrete piers. The walls were clad with plastic tarpaulin. The life expectancy of this structure was 24 to 36 months.

Once materials were delivered to site, a team of one skilled carpenter and two unskilled labourers built two shelters a day. On average, the project completed 15 wooden shelters per day.

The organisation hired approximately 120 carpenters in five communes of Port-au-Prince and installed wooden shelters in various areas of the capital.

Steel shelter

The organisation built 2000 light gauge steel shelters in areas outside of Port au Prince, Leogane and Petit-Goave. These were more resistant to hurricanes and heavy rain, being designed to resist winds up to 120-140 miles an hour. These 18m^2 shelters were anchored into concrete floor slabs.

The shelter components were shipped pre-cut from USA, from an American design firm in 40 containers of 50 shelters per container.

Different teams off-loaded the containers, assembled the parts, loaded and off-loaded prefabricated structures and installed the shelters on site.

Approximately 200 male and female workers were trained to use drills in the assembly of metal parts. Additionally, 8-10 other drivers and loader crews were used to deliver the assemblies to the construction sites.

Once the assembly mechanism was fully operational, each facility prefabricated about 45 steel shelters each day and installed or "completed" approximately 17 shelters per day on individual plots.

Only a short training time of 4-5 days for each assembly team was required to start producing roofs, sides and front walls.

Once the shelters were built, an additional 6-8 three man crews of masons installed the cement floors.

Owner contribution

The beneficiaries made a floor fill from broken rubble so that the concrete floor would use minimum

A steel framed shelter converted into a shop.
Photo: CHF International

Family in a timber framed shelter.
Photo: CHF International

Projects were implemented with the common goal of encouraging affected families to stay in their communities of origin to depressurise formal or informal camps.
Photo: CHF International

cement. The families were also expected to help clear rubble in preparation for the arrival of the shelter.

Since the project was only funded to provide a metal sheet roof and a tarpaulin as side covering, it was left to the families to build more durable walls. This lead to some issues between the organisation and the beneficiaries.

Host family

Rather than distinguish between the displaced and the host families, the project viewed the combined households as one household unit so that the economic assistance would be tailored to the needs of both families and agreed upon by both the displaced and hosting heads of household.

Each household unit was offered a choice of vouchers that could be spent on a variety of needs, including: tuition, household supplies and groceries, medicines, and small business re-stocking.

Project staff worked with each household to select the vouchers needed to support the joint family unit. Both families signed tri-partite agreements with the organisation and a local government representative to document their cooperation, agreement, and intent to mitigate any arguments with local officials.

Each household unit received 800 USD to support the host family arrangement for a minimum of four months. In most cases, the arrangement lasted long past the distribution and expenditure of household livelihoods grants.

Logistics

Existing relationships with brokers and familiarity with customs systems built over the previous years helped more rapid procurement of materials required for the wooden shelter. Local vendors sourced timber in bulk from the USA and the Dominican Republic, and delivered directly to warehouses.

Shelter managers submitted order forms for each project site for remaining materials such as nails, cement, and iron sheeting.

Shelter mobilisers and team leaders organised the delivery of specific material quantities to construction sites on a daily or weekly basis, to reduce the possibility of graft and wastage.

Customs delays resulted in some interruptions in the supply chain, and other materials such as sand and plastic sheeting were also delayed due to high demand among non-government organisations and slow-moving customs processing.

Wood framed shelters under construction.
Photo: CHF International

Local teams were responsible for managing and tracking shelter components from the assembly facilities. In many cases, steel frame shelter components were transported to individual building sites by groups of labourers.

Materials list

For 1500 Wooden Shelters	
Timbers 2"x4"x12' yellow pine (50 x 100mm x 3.7m)	9,000
Timbers 2"x4"x14' yellow pine (50 x 100mm x 4.3m)	11,500
Timbers 2"x2"x12 yellow pine (50 x 50mm x 3.7m)	10,500
Corrugated iron roof sheeting, 28 gauge. 12' lengths (3.7m).	5,000
Portland cement (42,5 Kg)	2,500 bags
Hinges 4" (100mm)	3,000 pairs
Sliding lock	1,500
Nails 3" (75mm)	900 kg
Nails 4"(100mm)	900 kg
Roofing nails (Umbrella Type)	900 kg
Doors and windows	1,500
Staples (boxes of 1000 staples)	1,000 boxes
Mosquito nets metalic type	50 Rolls

Host Family Livelihoods Grant Options	
Small business grants	Through a selection process with a committee with beneficiaries submitting business plans
Household supplies	Buckets, cleaning supplies, cooking supplies
Fees for tuition	Direct payment to schools through vouchers
School supplies	school books, pens, paper, etc.
Work tools	hammers, drills, nails, paint, brushes, etc.

A.8 Haiti - 2010 - Earthquake

Case study:

See "A.4 Haiti - 2010 - Earthquake - Overview", p.12 for background.

Country:
Haiti
Disaster:
Earthquake
Disaster date:
January 12th 2010
No. of houses damaged or destroyed:
180,000
Project target population:
3,960 households
Occupancy rate on handover:
One year after the beginning of the project, the occupancy rate was 89%
Some households did not occupy shelters still covered with tarpaulin for fear of theft
Shelter size:
1-5 people 18m²
6-10 people 36m²
11-15 people 54m²
Materials Cost per shelter:
2,400 USD (18m² module)
Project cost per shelter:
4,700 USD (18m² module)

Project timeline

Project description
This project built progressive shelter in two phases: a first emergency response (structure covered with tarpaulin) and a second durable solution (permanent housing with cement cladding). The project included safer construction awareness activities and safer construction trainings. The shelter project was the beginning of an integrated programme that also included water and sanitation, hygiene promotion, health, disaster preparedness and livelihoods projects.

Strengths and weaknesses

✓ Support was provided irrespective of land tenure.
✓ Modular design allowed for living space to be varied according to family size.
✓ All construction materials, except the steel frames and a part of the roofs, were purchased locally, promoting the local economy.
✓ The project included safer construction awareness activities for all families and safer construction trainings for construction workers.
✓ As a part of the integrated programme, the access to water and sanitation was improved.
× Beneficiary participation in the construction is low as rapid construction was prioritised.
× Power tools were needed to assemble the shelters and as a result generators were required. This had logistical and financial implications.
× Due to lack of understanding of the market, some construction materials were purchased locally. However the local market could not provide these materials easily. This resulted in construction delays.
× The project was still ongoing two years after the disaster, and water and sanitation solutions were not complete.
× Few resources are being allocated to follow up and monitoring of incidents (occupation, evictions, etc.).
- Some of the land where the beneficiaries were living was very close to a river. All the shelters have a raised floor to prevent flood damage. In areas with higher flood risk, a deeper foundation would be built as an additional measure.
- The traditional Haitian house has several exterior doors. Many beneficiaries added doors to their shelter.

Before the earthquake

See "A.4 Haiti - 2010 - Earthquake - Overview", p.12.

After the earthquake

The town of Leogane's population was estimated at more than 134,000 people. The earthquake is estimated to have destroyed 32,000 buildings (around 80% of Leogane's buildings). After the disaster there were around 300 camps in the area, with more than 60,000 people living in them.

The construction of shelter was the beginning of a programme that provided support to affected households. The support also included water and sanitation, hygiene promotion, health, disaster preparedness and livelihoods projects.

Land issues

The shelters were allocated on land where the beneficiaries lived before the earthquake, promoting the return of displaced people to their places of origin.

Land ownership was difficult to verify. Many beneficiaries did not have personal identification documents, and there were many difficulties in obtaining legal and official land property records. There were many owners or heirs that did not have documents to prove that the land belonged to them. Rental agreements with the land owners were made verbally in most cases.

To meet shelter needs of all the people living in the communities, solutions for all households who fulfilled the selection criteria were developed, whatever their tenure situation. Intensive community mobilisation was undertaken, and local authorities were involved.

In the case of owners or heirs without official identification or land ownership documentation, validation meetings were organised where the community certifies their identity and their land ownership. A document was signed by the beneficiary, a neighbour, community representatives and local authorities.

In the case of tenants who lived in houses that were destroyed during the earthquake, it was initially unclear whether the shelter would be the property of the beneficiaries who fulfilled the selection criteria, or whether the shelter would be the property of the house owners.

Shelters had a steel frame and were modular. They could be personalised to meed household needs. Photo: Beti Egea

It was decided that shelters would always be the property of the beneficiaries. A document was signed between the beneficiary and the owners, where the owners authorise the beneficiaries to build their shelters on their land. This document was valid for five years. If the owner did not respect this agreement the beneficiary could move the shelter.

If families were landless, the community networks were encouraged to help them to find some land. There were also negotiations with local authorities to find a solution for beneficiaries who had lived in squatter settlements. Finally authorities let these shelters be constructed.

Implementation

After the validation and signing of the documentation, construction materials were distributed.

The construction team had 4 shelter specialists, 4 local coordinators and 15 local engineers. Each engineer led a team of workers from the communities, and each team built 6 shelters per week.

Up to ninety shelters were built per week, but delays with material supply slowed production.

Beneficiary participation in construction was low. Rapid construction was prioritised, leaving little time to mobilise, train and incorporate beneficiaries into the work.

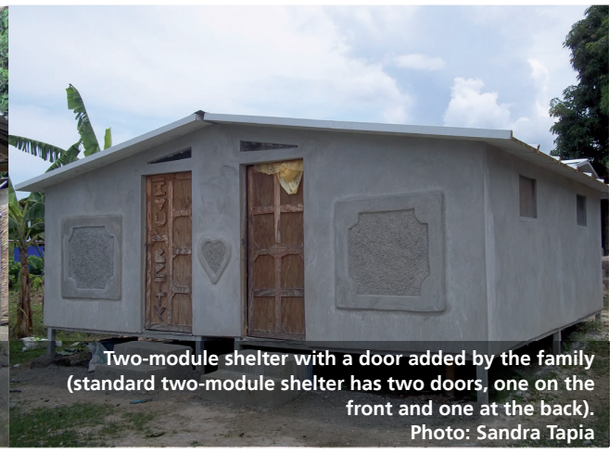
The shelters were adapted according to the number of people in the family. The basic module is 18m². Families with up to 5 members received one module, families over 5 members received two modules and families with over 10 members received three modules.

The construction of the progressive shelter is implemented in two phases: a first emergency response shelter (structure covered with tarpaulin) and a second durable solution (permanent housing with cement cladding). Different cladding materials were tested for the permanent housing.

A prototype was erected to compare the practicality of installation and the acceptance by the target population. The beneficiaries chose cement cladding as they found it more durable, safer and very similar to the construction technique they traditionally used.

The project included safer construction awareness activities for all the families and safer construction trainings for construction workers.

Shelter made from two modules and later upgraded by family.
Photo: Betisa Egea



Two-module shelter with a door added by the family (standard two-module shelter has two doors, one on the front and one at the back).
Photo: Sandra Tapia

Shelter construction was part of an integrated programme to support affected households and communities, access to water and sanitation was later improved. There were plans to drill bore holes, to provide 70 litres of water per person per day.

Selection of beneficiaries

Coordinated project assessments started one month after the disaster intervention in areas agreed through coordinating with other organisations. 3,960 families living in rural and semi-urban areas of Leogane were targeted.

All of the families of the intervention areas were surveyed. Since this was an integrated programme, shelter support was not only provided to families directly affected by the earthquake, but also to families whose houses did not achieve a certain minimum habitability criteria. The aim was to avoid creating inequalities within the communities.

Selection criteria

The following selection criteria were used:

- Families whose main residence became uninhabitable because of the earthquake.
- Families whose house does not achieve a certain minimal condition of habitability, even if it has not been affected directly by the earthquake. These included:
  - lack of space in relation to the number of people who live there,
  - no water and sanitation.
- Vulnerability criteria:
  - number of dependants, elderly, or handicapped people or children,
  - single-parent families,
  - no monthly income.

Technical solutions

The shelter had a galvanised steel frame with a mono-pitch roof and a raised floor. The shelter was 3 x 6m on plan and had 6 columns spaced on a 3m grid, fixed to rectangular reinforced concrete foundations using a base plate and four ordinary bolts per base. The shelter could be demounted and foundation bolts cut to reuse the frame.

The main structure was made from three primary frames spanning in the transverse direction with rectangular hollow section columns. The roof cladding was corrugated steel sheeting nailed to steel secondary roof members spanning between the three primary frames.

Timber studs are screwed to the steel members and the tarpaulin (emergency response) or the perforated metal sheet of the cement cladding (durable solution) attached to them. Additional timber subframing is used to form windows and doors.

The intention was that the structure could be used in a modular manner, putting two side by side to form a double pitched roof structure of 36m^2.

Logistics and supply

Steel frames were procured internationally and shipped to Haiti. Other materials were sourced locally and transported by trucks to site.

Due to lack of understanding of the local construction materials market it was decided to locally purchase some materials that the local market could not provide easily. This resulted in construction delays.

Materials list

Materials	Quantity
Cement (42.5kg bags)	3 bags
Sand	0.38 m^3
Gravel (20mm aggregate)	0.38 m^3
Iron bars 12 mm	36 m
Column base plate (300mm x300mm x6mm plate)	6 pieces
Steel 2mm (80mm x80mm)	27.65m
Floor beams 2mm (40mm x 40mm)	100.9m
Window and door framing (32.5mmx100mm)	9.9m
Plywood door (1.94m x 0.7m)	1 piece
Plywood flooring (21.8thk)	18 m^2
Steel sheeting (0.75m x 1.83m)	18 pieces
Plastic sheeting (6m x 4m)	4 pieces
Mosquito net	8 m^2
Bolts, nuts + washers (20, 10, 6.25 d.)	200 pieces
Brackets (35wide, 70+20legs, 2thk)	70 pieces
Hurricane straps – angles (75x75)	36 pieces
Self tapping screws	75 pieces
Nails (10, 8, 4 d.)	22.7 kg
Hinges	3 pieces
Door latch + padlock	1 piece
Cement cladding:	
Perforated metal sheet	27 pieces
Cement (42.5kg bags)	16 bags
Sand	1.25 m^3
Natural fibre	0.34 m^3

A.9 Haiti - 2010 - Earthquake

Case study:

See "A.4 Haiti - 2010 - Earthquake - Overview" p.12 for background.

Country:
Haiti
Disaster:
Earthquake
Disaster Date:
January 12th 2010
No. of houses damaged or destroyed:
180,000
No. of people displaced:
Approximately 1.5 million
Project target population:
1,356 families
Occupancy rate on handover:
105%
Site density:
30m² / person
Materials Cost per shelter:
Tent 300 USD (excluding transport)
Transitional Shelter 1,600 USD
Project cost per shelter:
Unknown

Project timeline

Project description
Families were relocated from a spontaneous settlement in the Haitian capital to a new planned camp in an area called Corail 20km away. The initial establishment of the camp was according to a carefully considered plan and relocation took place within a month. As with many sites in Haiti, two years after the earthquake, the future for the camp based population remained unclear.

Strengths and weaknesses

✓ Key actors worked together to prepare the site within an extremely limited timeframe.

✓ Strong coordination greatly assisted with the logistics of the relocation through information campaigns and consultation with the affected population.

× The urgency of the relocation initially left little opportunity for activities beyond the provision of shelter, water, sanitation, food, education and health services.

× Greater emphasis on ensuring access to existing or developing livelihood activities would have been beneficial had time allowed and the site was far from existing livelihoods.

× There was a significant delay in the follow up construction of transitional shelters, meaning people had to stay in tents in an area with little natural shade from the sun and wind.

× The site does not represent a durable solution for the relocating families and remains one of 802 occupied camps for displaced families in Haiti.

× Rapid site preparation required significant investment at a time when financial resources for the provision of basic services were limited.

- The impact of having a camp in any location has to be carefully considered since it might end up as a permanent settlement.

- The decision to relocate the people was based on an engineering assessment of the risk of flash floods (high volume, fast moving water) at several spontaneous IDP locations. The identified population faced life threatening risk in their current location. In addition, there was an urgent need to decongest the camp to allow the introduction of basic services.

Left: an aerial photo of a typical spontaneous settlement in Port au Prince.
Right: An aerial photo of Corail shortly after construction.
Photo: Shaun Scales / NRC

Background

See "A.4 Haiti - 2010 - Earthquake - Overview" p.12.

Identification of families

Given the large population in camps within Port au Prince, weeks after the disaster, assessment teams identified specific areas at risk from flash flooding. They also assessed which engineering works could mitigate identified threats to life.

The assessment was conducted in spontaneous settlements within Port-au-Prince. Amongst others, it identified the Delmas 48 site as being at risk from flash floods and landslides during the approaching seasonal rains. The site had over 25,000 people living in high densities on a steep hillside.

The engineering team developed a mitigation plan that included the diversion of surface water and land stabilisation works. To complete these works, an estimated 7,500 people would be required to move from their current high risk plots.

The area of the settlement that needed to be vacated was marked. The high density population left little room for internal relocation and re-organisation.

Selecting the site

State land is limited in Haiti and the power of the government to claim land for public emergency use is even more limited. Identifying alternative land close to neighbourhoods of origin was problematic as most potential sites were already occupied. The only immediately available land of sufficient size was 16km away. This did restrict opportunities for relocating families whilst maintaining access to livelihoods.

Planning the site

The new site was based on a firm plan. Site assessments identified four separate 'sectors' for development with 'Sector 4' selected as the first to be prepared and occupied by the relocating population from Delmas 48.

The outline of the site was determined by existing natural drainage. This was upgraded to protect plots from surface water from above the site and to allow the development of an internal drainage network.

The camp was planned for occupancy as a transitional site with defined individual family plots, internal road networks and space for education, health, recreation and distribution facilities. The plan was strictly followed so that future development with longer term infrastructure could be possible. Although the site was officially temporary, the site planners took account of the possibility that it might not close soon.

Pending the development of durable solutions for the significant displaced population within Haiti, the maintenance of essential services to all camps, including Corail, remains a prolonged and significant challenge.

Site construction

Land clearance and the development of a gravel road network were completed within two weeks. Construction progress was accelerated by foreign military forces, some who were due to depart imminently.

Land clearance allowed plots to be marked for shelter and infrastructure. Tents were then erected and temporary water and sanitation facilities provided. Fire breaks were built and a population density of 30m^2 per person was maintained.

Why tents?

Allowing relocating families to bring their existing shelter materials with them was not seen as a sensible approach as they were generally of too poor a quality to re-use and it was too logistically challenging.

It was recognised that the commonly adopted emergency shelter strategy focused on the provision of plastic sheeting, but given the circumstances tents were provided as they were the best emergency shelter solution.

Relocation

The Camp management agency with support from the Camp Coordination and Camp Management lead organisation initiated a settlement wide information campaign to identify families willing to relocate to a new planned camp.

The relocation of 1,356 families was completed in stages over a ten day period with transport provided by the United Nations mission. A plot identification system allowed each arriving family to be allocated an individual plot which was recorded as part of the registration process and assisted with the future delivery of services.

Transitional shelters and other structures

The delivery of transitional shelter was significantly delayed. However by mid 2011, each family plot had an 18m^2 transitional shelter on it.

Each shelter included a raised cement finished plinth and a small veranda area covered by an extended truss roof.

Education and health facilities were formalised with semi

permanent or permanent structures of wood and brick construction. The original temporary latrines were also replaced with blocks built of bricks.

Eighteen months after the occupation of the site, kitchen gardens and a market selling foodstuffs, household items and handicrafts had been established. Small businesses, including restaurants, carpentry workshops and an art gallery were also established, although the primary source of income comes from work off site.

The school was adopted as a government institution with ministry of education providing salaries for teachers.

Following the occupation of Sector 4, further development of adjacent sites continued to allow for further relocations including 178 families affected by Hurricane Tomas in November 2010.

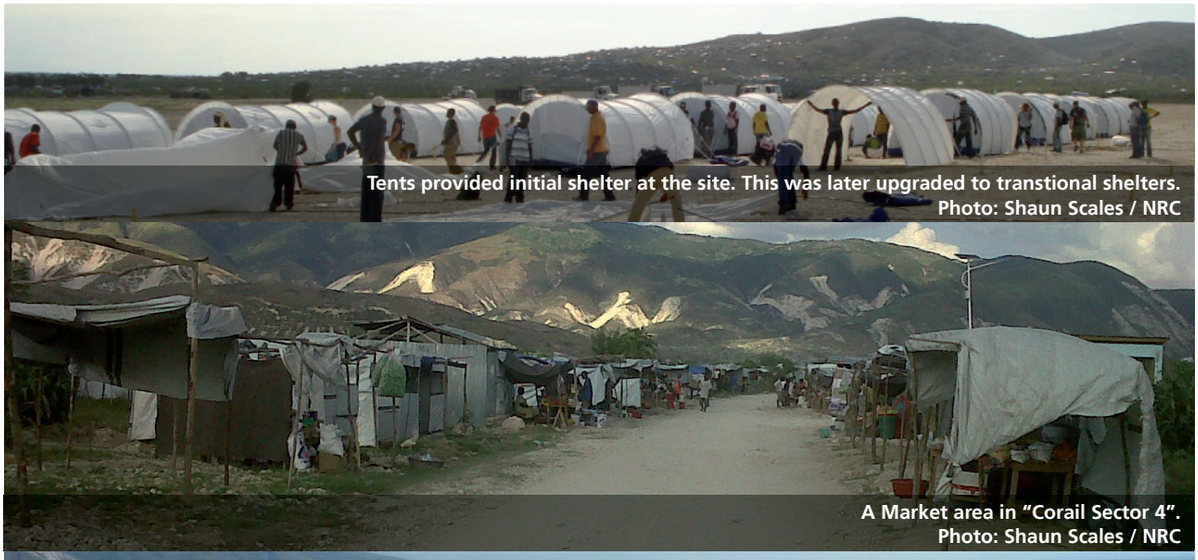
The longer term

Almost two years after the earthquake, people in camps in Port au Prince continued to receive limited free services in water, education, health, and other assistance. However services were falling back as funds fell and organisations began to close projects. It was recognised that camp based services could contribute to the sustained presence in camps however an acute shortage of return solutions for the majority of the displaced population of former tenants, remained the primary factor hindering camp closure. This may have contributed to the sustained presence of camps.

A typical street in Corail with transitional shelters.
Photo: Shaun Scales / NRC

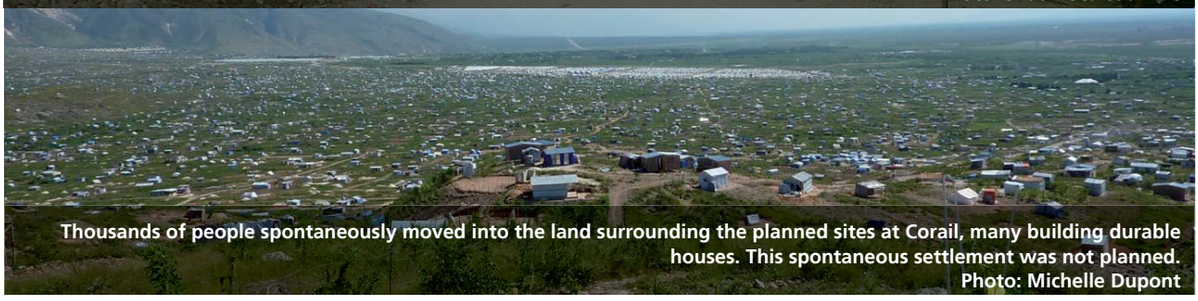
Two years after the earthquake, the future for camp based populations across Haiti remained unclear. The exit strategy for Corail was always the closure of the camp following delivery of durable solutions for the displaced population. However a lack of reconstruction continues to hinder this process, and Corail was not likely to close soon.

Corail was less densely populated than many spontaneous sites in Haiti. Transitional shelters were built, and this caused some confusion regarding the 'status' of the site. The future closure of Corail would require the same efforts as other emergency and transitional settlements. It also became surrounded by thousands of Haitians who had built their own shelters and houses.



Tents provided initial shelter at the site. This was later upgraded to transtional shelters.
Photo: Shaun Scales / NRC

A Market area in "Corail Sector 4".
Photo: Shaun Scales / NRC



Thousands of people spontaneously moved into the land surrounding the planned sites at Corail, many building durable houses. This spontaneous settlement was not planned.
Photo: Michelle Dupont

A.10 Haiti - 2010 - Earthquake

Case study:

See "Haiti - 2010 - Earthquake - Overview", p.12 for background.

Country:
Haiti
Disaster:
Earthquake
Disaster Date:
January 12th 2010
No. of houses damaged or destroyed:
180,000
Project target population:
Families with disabled persons
Shelter size:
12m², 18m² or 24m² with a 6m² porch dependent upon family size and land.

Project timeline

Project description
The project targeted displaced disabled people in rural locations in the south of Haiti. The project used a participatory approach to build durable shelters. The project re-engineered a well known traditional technique known as *clissade* making it more durable, suitable for mass assembly and later upgrade by beneficiaries.

Strengths and weaknesses

✓ The construction technique of *clissade* is well known by the local population as it has been traditionally used in rural Haiti. As a result it is easy and affordable to maintain and upgrade.

✓ The shelter was designed in panels. Each panel has the same width as a door, allowing beneficiaries to create new openings in their shelter.

✓ The project paid particular attention to beneficiaries with disabilities. Each individual shelter and its sanitation facility was adapted to the type of disability. It was accompanied by a rehabilitation program for people with disabilities, to increase their mobility and build capacities in the use and access to the latrine and the shelter.

✓ The project worked with students from a youth vocational training centre. It aimed to increase their capacity to join the labour market.

× Beneficiary selection depended on a referral system from other organisations. It proved very time and resource consuming to receive beneficiaries referred in this way. This increased the logistical challenges as beneficiaries were identified as the project progressed and were not identified from the start.

× If the beneficiaries do not upgrade their shelter by covering their panels, water could enter and it could be cold.

× Logistics were demanding and slow as rural locations meant that some families could not always be reached by vehicles.

× The project and the design was very labour intensive.

- The shelter was prefabricated in pieces in the central workshop and sent to the field for assembly by beneficiaries themselves. The concept was that shelters could later be moved if required.

Before the earthquake

See "Haiti - 2010 - Earthquake - Overview", p.12.

Before the earthquake, the majority of Haitian families who lived in rural areas lived in self-built houses. Many were built using *clissade*, a Haitian technique of weaving bars of palm wood to make walls. These walls were later covered by mud and cement. The roof was covered with corrugated zinc.

After the earthquake

In general, the *clissade* houses resisted the earthquake much better than the concrete houses. Where they were damaged in the earthquake, the injuries to the occupants were not as severe as those caused by collapsing concrete houses.

Pilot shelter

The project began with a participatory process that lasted 10 days. During this time, community groups were organised in a remote village. The focus was on understanding the daily activities of each member of the family, including working, cooking and sleeping. This process lead to a shelter design being developed that could be used for a pilot shelter.

A location for building the pilot shelter had to be negotiated with the local authority. It was intended that the pilot shelter would be useful for the community. In the end it became a treatment centre for disabled people.

Once a site was identified, it took another 10 days to organise teams and materials to build. The pilot shelter allowed different technical solutions to be tested. Different technical and design corrections were made to the pilot in order to improve it and to fit it in the budget. The shelter was assessed by structural engineers offered by another organisation. Specific changes including additional bracing and hurricane straps were required to ensure that it could withstand 100 mph (161 Km/h) peak wind speed.

The shelter was later adopted by the local authority and by several other non-governmental organisations. Once designed, the next three months were spent negotiating with donors, tendering, organising logistics and preparing workshops. The workshop was designed and organised with a chain of production producing around 30 shelters per week with almost 45 persons working inside.

The programme included a sanitation component providing with access to latrines or an adapted sanitation solution. Both the shelters and the sanitation component were adapted to the disability of the beneficiaries of the shelter.

To build the shelters, 60 USD was given to the beneficiaries to pay local workers. The organisation provided skilled workers to lead the construction.

Less than 40% of the families owned their land. For these families, a multi-party document was signed to keep the beneficiary on the land for free for at least for 3 years. This was signed by the beneficiary, the landowner, the community leader, the mayor and the organisation. After 3 years, the beneficiary will remain the owner of the shelter and the owner will keep the latrine.

At its peak, the project had a staff of over 150 people working in the workshop, on site, in logistics and as social mobilisers.

Day	Stage	Worker days
1	Ground preparation	2 x technical advisor, 6 x beneficiaries
2	Digging foundatrions	6 x beneficiaries
3	Bolting and fixing columns	1 x chief carpenter 1 x chief mason 6 x beneficiaries 6 x labourers
4	Embankments	6x workers
5	Installation of panels and carpentry	1 x chief carpenter 6 x beneficiaries 3 x workers
6	Paving and drainage	1 x chief mason 6 x beneficiaries 3 x workers
7	Fixing roof windows and doors	1 x chief carpenter 6 x beneficiaries 3 x workers

Selection of beneficiaries

The project targeted vulnerable families affected by the earthquake, including people with disabilities. A survey form was prepared to select the most vulnerable people amongst those who were referred to the organisation. A social officer worked in close collaboration with the organisations field office, with other non-governmental organisations referring families with disability cases and with local organisations and associations.

The shelters were built using a traditional technology known as clissade. Photo: David Sacca

A traditional shelter that survived the earthquake.
Photo: Joseph Ashmore

A completed shelter, based on vernacular styles.
Photo: David Sacca

Technical solutions

The T-shelter was made from pressure treated pine wood. Panels were prefabricated in the workshop and were then transported to the field. Once on site, the pieces were bolted together. All the nails and screws (the panels were fixed with nuts and bolts, not nails) were double hot dip galvanized.

For roofing, corrugated bituminous sheets were selected. They were selected due to their 15 year guarantee, their thermal properties and their strength.

The site for each shelter was prepared by a team who were tasked with taking into consideration possible risks, such as landslides, of each plot. The field teams were expected to conduct work to mitigate the risks.

Each shelter is raised by between 30 and 50 cm from the level of the ground preventing water entry in case of floods.

The shelter was designed and tested by structural engineers to be resistant to hurricane, earthquake and floods. It was also designed to ventilate naturally.

Logistics and materials

Once the shelters had been prefabricated in the workshop, it proved challenging to get the components to remote locations in the mountains of southern Haiti.

Many of the raw materials had to be imported to Haiti. For example the timber used was pressure treated pine that was not available in Haiti. Most were shipped in and then trucked into the workshop in Petit Goave. In the workshop, the whole shelter was pre-fabricated in panels and trusses. The pre-assembled components were then transported to the site, by truck or by hand in difficult to access areas.

Materials list

Materials	Quantity
Timber 2"x2"x14' (50x50mmx4.3m)	4 pieces
Pine 2"x4"x14 (50x100mmx4.3m)	89 pieces
Pine 1"x4"x14 (25x100mmx4.3m)	23 pieces
Pine 1"x6"x14 (25x150mmx4.3m)	3 pieces
Plywood 1/2" (13mm)	3 pieces
Plastic mosquito net 48" (1.2m)	20' (6m)
Wood Glue	0.5l
Corrugated fastener 1"x5"	unit
Corrugated roof sheets (Onduline)	19 pieces
Ridge (Onduline)	9 pieces
Twisted roofing nails for wood 2 1/2"x9" (60x230mm)	
Threaded rod 3/8" 80" (10mm)	23' (7m)
Nails: 1 ½"-5" (30mm-125mm)	
Coiled strap (Hurricane strap)	15 m
Hinge 4"x4" (100mmx100mm)	1
Hinge 3"x3" (75mmx75mm)	2
Bolt 4", 3"(100mm, 75mm)	2
Wood screw 3½"x10	
Cement	18 bags
Sand	6 m^3
Gravel 5/25	4 m^3
Cement blocks	70 pieces

Some areas were difficult to access and materials needed to be transported by hand.
Photo: Olivier Dorighel

A.11 Haiti - 2010 - Earthquake

Case study:

See "A.4 Haiti - 2010 - Earthquake - Overview", p. 12 for background.

Country:
Haiti
Disaster:
Earthquake
Disaster Date:
January 12th 2010
No. of houses severely damaged or destroyed:
185,000
Project target population:
8,450 households after 24 months
T-Shelter size:
Aim for 18m² minimum
Less considered when insufficient space
Materials Cost per household:
T shelter: 2,800 USD
500 USD livelihoods grant
Project cost per household:
T-shelter projects: 4,500 USD

Project timeline

- 36 months – (Anticipated) - On-going monitoring
- 24 months – 8450 households supported
- 20 months – Decongestion of camps: Delmas 75
- 18 months – Decongestion of camps: Croix de Bouquests
- 13 months – Decongestion of camps: Simon Pele
- 11 months – Decongestion of camps: Annex de la Mairie
- 10 months – Decongestion of camps: Sint Luis de Ganzague
- 8 months – Decongestion of camps: Carradeux
- 6 months – Project start
- January 12th 2010 – Earthquake

Project description
The project supported people to leave overcrowded camps and encouraged them to lead their own recovery process. It provided transitional shelters for those with land, cash for those who needed to rent, and relocation grants for those who moved to different areas. It also subsidised health care and provided livelihoods grants which were used to help re-establish businesses, or to support children going to school. Camp decongestion required at least one year of monitoring and support after families had relocated.

Strengths and weaknesses

✓ The project took a broad approach to shelter, looking at the overall settlement issues.
✓ Households were involved in identifying a shelter solution with which they felt comfortable.
✓ Families were able to quickly pick up some threads of normality with the cash support to develop income generating activities.
✓ Physical security for people was improved once they were out of the camps.
✓ Cash gave people a greater degree of choice and permitted them to spend money according to their own priorities. This in turn helped to maintain people's dignity.
✓ Cash had potential benefits for local markets and trade.

× The process was very labour intensive and required constant monitoring and support.
× The process for cash transfers was cumbersome and needed to be shortened.
× Technical support for some construction aspects has been limited. In particular, viewing the land and identifying the work that was required before construction could begin.
× Camp committees were difficult to manage as they believed that they should be receiving a salary.
- Some people did not want to leave the camps as they believed that they would continue to receive goods if they remained there.
- Some households split across multiple sites to receive a greater total amount of assistance.

Background

See "A.4 Haiti - 2010 - Earthquake - Overview", p. 12.

After the earthquake

Up to eighty percent of the population in Port-au-Prince rented either the house or the land. In other urban centres such as Leogane, up to seventy percent of the population rented.

Reconstructing houses would restore the assets of the landlords, but would not ensure the availability of this accommodation to the former tenants who are currently shelter-affected.

Residential reconstruction activities therefore included measures to ensure that former tenants received benefits in kind through agreed rent-free tenancies for a defined timeframe, separate cash grants linked to rental accommodation, or shared usage rights.

Settlement approach

The organisation implemented projects using a 'settlement approach'. Communities and infrastructure were supported, integrating other sectors such as water and education. Many of the projects had strong economic and social 'livelihoods' components.

Shelter was seen as including support to all of the settlement options chosen by affected populations, including host families, rental accommodation and, where necessary, camps. In choosing between options, families and groups can make best use of their coping strategies.

Five months after the earthquake, the shelter team began registering people in four camps in an area of Port au Prince. A variety of solutions to support households were identified.

The interventions were based on assessments and discussions with families. Three areas of support were identified:

- an improved shelter solution,
- support for livelihoods,
- an option to help their children return to school.

The project also had a significant information component and the organisation actively promoted public health messaging. Photo: Julien Goldstein

Different options offered

Different options were provided depending upon the context that the family found itself in:

1) Own land

Some people had the option to move back to where their house was or to a piece of land to which they could show ownership. They received a T-shelter on their land and received a 150 USD grant.

8% of families received this form of assistance.

2) Access to land

Some people knew someone who had a plot of land who agreed that they would be able to reside on the plot for two years. They had to produce a signed document stating that they can live on the land for two years, and a copy of the ownership documents and their identification

They received a T shelter built on the land and a 150 USD grant.

3) Repairable houses

People who had houses classified as green (having minor damage) were offered cash or a voucher to access the needed materials, an unconditional business grant, and training on earthquake resistant construction.

In the first two years of the project, no families chose this support option.

4) Resettlement in Port au Prince

Families identified accommodation within Port-au-Prince that they could rent. If the accommodation was deemed to be secure, had water and sanitation facilities and was seen as a safe dwelling, the family received up to 500 US dollars to resettle. This sum covered a year´s rent.

Often, people moved towards the areas they lived in previously as they were familiar with the area.

72% of families in the project chose this option.

5) Resettlement in the provinces

19% families chose to return to their provinces of origin. These families received a resettlement grant.

Additional support

All Families additionally received:

- A livelihoods grant of 500 USD divided into two distributions of 250 USD. The first was one month after having left the camp and the second was after three months.
- A training was provided on managing finances and business opportunities of their choice.
- Families were supported with health insurance for one year. The health insurance was provided by a local organisation. The insurance was 1 USD monthly per person, and entitled them to free consultation at clinics run by the organisation. It also limited their payments for medicines to a maximum of 150 USD. They could also have low cost medical investigations.

The project included support for livelihoods , support getting children back to school and access to improved health care.
Photo: Julien Goldstein

The small minority of families who did not take up any of the support offered signed a document to show that they had refused the offered support and would remain in the camps. Once families moved out of the camps, sometimes other families might settle in space made. It was the responsibility of the Haitian authorities to deal with these cases.

Monitoring and evaluation

The organisation was asked to intervene in the camps that it is working in either by the government, local organisations that were involved there or by the communities themselves. In some cases camps under threat of eviction asked the organisation to help.

All families in the camps were eligible for one of the support options above. The focus was on people without a land title. After registration, people were responsible for organising their preferred accommodation.

Camp decongestion did not end with finding shelter solutions and moving families out of the camp. At least one year of monitoring with support in livelihoods and vocational training followed.

The organisation provided transitional shelters for those with land to build on. It provided cash grants to help people other rent or resettle elsewhere.
Photo: Julien Goldstein

All families were provided with cash grants and training to allow them to establish livelihoods.
Photo: Julien Goldstein

A.12 Indonesia - Sumatra - 2009 - Overview

Case study:

Summary

On 30th September 2009 a series of earthquakes struck West Sumatra, not far from the provincial capital of Padang. 13 out of the 19 districts in West Sumatra province were affected. Between earthquakes and landslides nearly 250,000 houses were destroyed or heavily damaged.

The Government of Indonesia responded rapidly, with the assistance of the national and international humanitarian community. Whilst non-government agencies focused on emergency shelter, distributing an average of 2 tarpaulins per family, the government focused on rebuilding provincial government capacity, search and rescue and emergency relief. The emergency phase was declared over within 8 weeks.

The Government of Indonesia committed to providing affected families with a community based economic stimulus package for permanent housing reconstruction, leaving the provision of emergency and transitional shelter to the humanitarian community, many of whom also focused on Disaster Risk Reduction based construction skills training.

Earthquake damage to a former 3 story government building in Padang.
Photo: Dave Hodgkin

Emergency distributions of two tarpaulines per household were made by reponding organisations.
Photo: Dave Hodgkin

Before the earthquake

West Sumatra is located at the convergence point of four tectonic plates and is highly prone to earthquakes. A recent earthquake in 2007 had damaged or destroyed over 43,000 houses.

As a result of numerous disasters, both the provincial and national government had significant experience. The recently formed National Disaster Management Agency deployed a Technical Advisory Team to assist in the immediate response and assist in the formation of it's provincial equivalent.

Although established national building codes, including seismic resistant construction guidelines for "Permanent" (masonry) houses, for "Semi Permanent" (part masonry), and for "Non-permanent" (timber or bamboo) houses, however, limited certification (15%) along with poor compliance and enforcement had resulted in a low quality of general construction.

In West Sumatra, most homes were privately owned particularly in rural areas, with most inherited through matrilineal ownership systems. They were constructed incrementally often with the support of remittances from male family members working in the "Padang" restaurants across Indonesia and Malaysia that the area is famous for.

Whilst rural housing was commonly self-built, urban housing was more commonly commercially constructed with a mixture of rental and non-rental housing.

After the earthquake

The disaster caused an estimated 2.3 billion USD damage to infrastructure and housing. Over 30% of housing stock in the affected areas was destroyed, making shelter a priority.

Initially rural and semi-urban areas were prioritised. In these areas, many families were living in inadequate, unsafe makeshift shelters, under tarpaulins within their plots of land, or staying in other people's homes or gardens.

200 USD "transitional shelter" of dissapointing quality built by an international organisation. Photo: Dave Hodgkin

Rural self help shelter built by earthquake affected family. Photo: Dave Hodgkin

Concerns over the approaching rainy season added to the sense of urgency.

Previous experiences within Indonesia indicated that public outreach programmes on earthquake resistant construction were important to ensure safe reconstruction.

Response capacity

The first few weeks saw intense international media attention and an ensuing influx of international and national funds. Over 200 agencies both national and international responded rapidly. Many had prior experience in Yogyakarta earthquake and/or remnant capacity in nearby Aceh and Nias Island from post tsunami and earthquake projects.

However many organisations, including the newly formed provincial disaster management agencies quickly found themselves overstretched. Many were still responding to an equivalent scale earthquake in West Java less than one month before. Many of the international agencies soon had to relocate capacity to the Haiti earthquake.

Emergency response

Extensive collapse of commercial and government building in Padang resulted in an initial focus on search and rescue with 21 teams of various sizes being deployed.

The Indonesian Government announced an end to the search and rescue phase within weeks, and allocated an initial 10 million USD to emergency relief.

An international coordination team arrived within four days of the earthquake to assist the Indonesian government in coordinating over 200 national and international responding agencies.

The initial shelter strategy was agreed eight days after the earthquake. The strategy focused on the distribution of tarpaulins and tents for the emergency phase, whilst identifying the need for transitional shelter and disaster risk reduction activities in the recovery phase.

Despite an overwhelming initial response to the disaster there remained a shortfall in funding, particularly in shelter and livelihoods. A total of 170,000 families were supplied with emergency shelter within the first two and a half months.

Recovery shelter

The Early recovery phase saw the government focusing on the development of permanent shelter assistance programs, whilst non government agencies focused on transitional shelter needs through a range of shelter packages. Most assistance was in the form of cash grants or material supply, to small community groups in line with government proposed methodology for community built reconstruction.

Transitional shelters commonly had timber frames. They were mainly clad with corrugated iron or tarpaulins for roofs and tarpaulins, plywood or timber for walls. Shelter packages commonly included a technical advice component. Many included advice on permanent reconstruction. 63,000 transitional shelter packages were provided with a cost varying from 200 USD to 500 USD per household.

Later assessment highlighted a lack of assistance to urban areas, with a range of agencies then running clean operations in these areas. Delays in material supplies and limited capacity saw transitional shelter projects continuing for over 9 months after the earthquake, overlapping significantly with the arrival of permanent reconstruction funds.

Government response

The government of Indonesia provided grants of approximately 1,500 USD for heavily damaged houses, 1,000 USD for medium damage (from the State Budget) and 100 USD for lightly damaged houses.

Two years after the earthquake, not all funds had been released, though much of the community had self funded reconstruction. The 2010 earthquake in the West Sumatra district of Mentawai Islands, further stretched and expanded provincial response capacity.

The initial government decision to focus only on permanent shelter was later reviewed in light of outstanding transitional shelter needs, with funds then allocated to transitional shelter in West Sumatra, and again in Mentawai Island and other later responses.

A.13 Indonesia - Sumatra - 2009 - Earthquake

Case study:

See "A.12 - Indonesia - Sumatra - 2009 - Overview" p.38, for background

Country:
Indonesia, Sumatra, Padang
Disaster:
Earthquake
Disaster date:
September 30th 2009
No. of houses damaged:
115,000 destroyed houses
135,000 damaged houses

This was a market assessment into brick production and so did not directly lead to the construction of shelters

Project timeline

Project description
This project surveyed brick production and anticipated supply and demand. It was conducted one month after the earthquake. The survey was conducted as a trial of the EMMA (Emergency Market Mapping and Analysis) methodology. The survey findings were used to inform the adopted strategy of using cash to support the construction of shelters that used both timber and bricks.

Strengths and weaknesses

✓ The assessment was conducted with team members from nine different organisations. This process increased buy-in to the findings of the assessment report, and helped to form consensus on the issues surrounding markets in the response.

✓ The bricks survey findings were used to advocate for a cash based response, and for a move away from solid masonry buildings which potentially carried a greater risk of causing injury in an earthquake.

✓ The survey came at an opportune moment after the earthquake. The timing of the survey needed to be long enough after the earthquake that team members could be identified, access was possible and those working at brick kilns could easily be found. Had it been any later it would not have been able to inform the strategy.

× Surveys looked at the use of bricks but not the use of timber to make the bricks.

× The survey did not address issues of the living and working conditions for those in the brick kilns.

× The survey used human resources, meeting time and vehicles that could otherwise have been used in implementing the response.

- It is difficult to accurately measure the impacts of this survey. Whilst it used human resources and absorbed time during an emergency response, there is some evidence that it helped to inform the strategies and programmes adopted.

- There are many markets that could have been surveyed. Bricks were chosen following experiences in Aceh (2004) and Yogyakarta (2005).

Poorly built brick-masonry buildings were a significant cause of the damage to housing.
Photo: Unknown

Background

See "A.12 - Indonesia - Sumatra - 2009 - Overview" p.38.

After the earthquake

The earthquake in September 2009 destroyed or damaged over 200,000 houses in West Sumatra. Poorly built brick based masonry caused many of these buildings to collapse.

The Indonesian Building Code specifies that a "Permanent House" means masonry, "Semi Permanent" means masonry sub walls and timber above, whilst "non-permanent" means timber or bamboo.

Experience from previous disasters in Aceh (2005) and Yogyakarta (2006) showed that the demand for bricks for housing reconstruction quickly outstrips the available supply. This often led to an increase in the price of bricks, and / or periodic supply shortages that delay reconstruction progress.

What is EMMA?

This research was conducted to trial EMMA (Emergency Market Mapping and Analysis). EMMA is a tool designed to analyse markets following a disaster. EMMA uses background research, interviews, and graphic representations of market systems to help inform humanitarian response options. EMMA defines a market system as "a web of people, businesses, structures and rules that take part in producing, trading and consuming a product or service."

For more information on the EMMA methodology, download the EMMA Toolkit from: http://emma-toolkit.org

Brick making in Sumatra

Brick making involves five steps and is labour intensive.

1. **Mixing:** Clay, sand and water are mixed together in open pits by foot, shovels or water buffalos. Larger manufacturers use mechanical mixers.
2. **Shaping:** The mix is compressed in wooden frames. On average, a skilled labourer can produce 1,000–1,500 bricks per day.
3. **Air drying:** The bricks are laid to dry in the sun for 5 days. Bricks are then stacked and air dried for 30-60 days, depending upon the weather.
4. **Kiln drying:** The dry bricks are loosely stacked in open air kilns without chimneys. These kilns are rectangular or circular shapes. Mud is plastered around the outside of the brick kilns to trap the heat from the fire, with space for smoke to escape and oxygen to enter. The average height of a brick kiln is 2m tall. Bricks are typically kiln dried for 10 – 14 days.
5. **Distribution:** Manufacturers sell their bricks directly to masons, home owners, brick distributors, and / or building supply stores. Transportation charges are typically 30 - 60% of the total brick price.

Damage to supply

The survey suggested that over 50 million bricks were damaged in the earthquake.

The majority of the supply was through small scale suppliers. There

Many of the bricks were made by hand.
Photo: Unknown

Much of the capital for small scale manufacturers was the bricks in their kilns.
Photo: Unknown

were 1,800 small scale brick manufacturers, who produce an average of 15,000 bricks per month. These were the most severely affected of all brick manufacturers. The financial capital of these producers was often tied up in the number of bricks they had in their kiln, making it difficult to restart manufacture.

Medium scale manufacturers (45,000 bricks per month) also suffered production losses due to the earthquake, but their stronger financial position meant that they were better able to resume production. It was estimated that it would take 6–8 weeks for these manufacturers to bring new bricks to the market.

Most of the larger scale brick manufacturers were located up to 90km North East of Padang. Some large brick manufacturers reported losing 35% of their brick production in the earthquake, while others did not report significant losses.

Brick prices and financing

Pre-earthquake brick prices ranged considerably according to quality, seasonality and transport costs.

Following the earthquake brick prices from suppliers for mid range quality bricks increased by between 25% and 50%. The assessment found that these prices were likely to continue to rise to 150% of their pre-earthquake cost.

Two years after the survey, brick prices in Pedang were between 60% and 100% higher.

Both small and medium scale brick manufacturers used informal credit and selling arrangements with their customers and distributors. Local supply stores typically paid small-scale manufacturers for bricks once they had sold them.

All brick manufacturers, but especially small and medium scale producers, had limited storage and warehousing space. These space limitations forced manufacturers to move their bricks to market quickly. It encouraged large suppliers and distributors to increase their prices to meet speculative market demand.

The survey used teams from nine different organisations working together. Photo: Unknown

Brick demand

60% of all households interviewed indicated that they would re-use as many bricks as possible. A rough estimate suggested that many households would be able to salvage 800-1200 bricks from the rubble. As an average size brick masonry house of 10m X 12m used approximately 10,000 bricks, approximately 10% of this demand would come from recycled materials.

Although 67% of all households interviewed said they lived in a brick masonry house before the earthquake, 54% of the brick masonry households indicated they would prefer to rebuild timber and brick houses. Safety concerns were most often cited as the reason for this preference, followed by cost considerations.

There was some concern raised that recycled bricks would not perform so well as new bricks because as cement mortar cannot bind to them so well.

Gender issues

Women made up 40 - 60% of the labour force of small and medium scale brick manufacturers. They were typically paid on a piecework basis for each brick they made. Male brick labourers are likely to receive a daily wage for their work.

As current brick production for many small-scale producers is affected, the ability of brick making women to earn wages was temporarily disrupted.

Possible scenarios

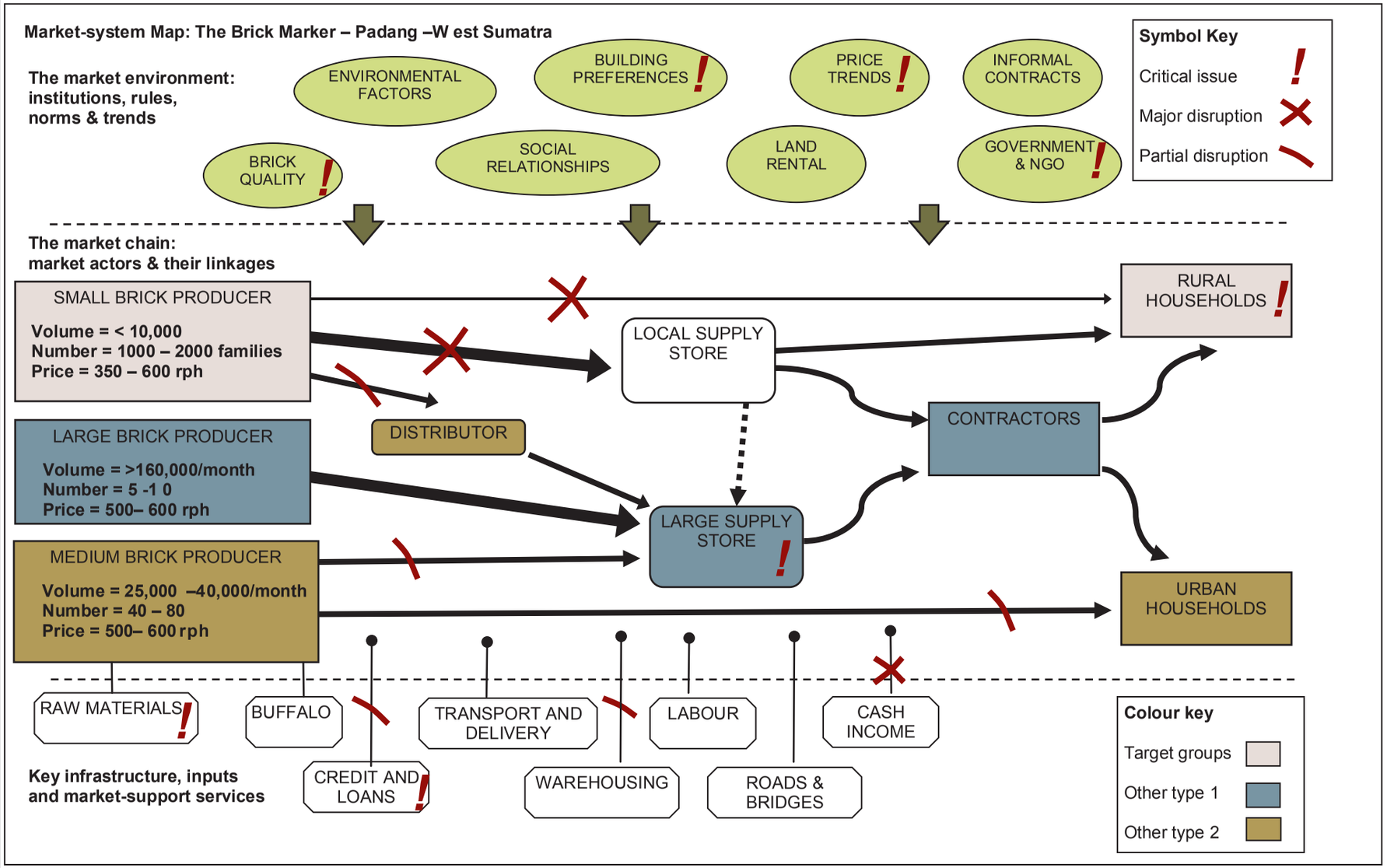
The analysis suggested that:

- Earthquake damage to regional brick production capacity would likely lead to higher brick prices and delays in rural housing reconstruction. Large brick manufacturers were likely to reach previous production capacity within two months. Resulting transportation cost increases could lead to a price increase of between 100% and 150% per brick.
- Small - scale brick manufacturers would be slow to resume pre-earthquake production levels without financial assistance or favourable credit terms. Their ability to resume production was restricted due to capital shortages, or favourable credit arrangements.
- The demand for timber and bricks was high, and was likely to increase. Over 60% of earthquake affected households interviewed in this survey indicated that they planned to rebuild (or would prefer) timber frame houses with brick masonry infill walls over full masonry construction. Concerns over seismic safety, speed of construction, and lower costs were the main reasons for this change in preference.

Impacts of the survey

Because the survey was conducted by teams from many organisations, it helped to get support for the findings. Although not all of the recommendations were implemented, it did help organisations and coordination teams to form an advocacy position away from building full masonry structures, instead promoting semi-timbered structures with support provided in cash.

A main tool in EMMA is the Market-System Map. This helps to visualise the difference between the markets before and after the earthquake. This map is for the brick market in Pedang following the earthquake. The black arrows show how bricks reached homeowners from the different scale suppliers, and the red lines show which supply routes were interrupted.



A.14 Indonesia - Sumatra - 2009 - Earthquake

Case study:

See A.12, "Indonesia - Sumatra - 2009 - overview", p.45 for background.

Country:
Indonesia, Sumatra, Padang

Disaster:
Earthquake

Disaster date:
September 30th 2009

No. of houses damaged:
115,000 destroyed houses
135,000 damaged houses

No. of people affected:
Approximately 1,250,000 people affected through total or partial loss of shelter and livelihoods

Project target population:
Shelters for 750 families
Household items to 30,000 families

Occupancy rate on handover:
Unknown

Shelter size:
Variable

Materials cost per household:
275 USD

Project timeline

Project description
Cash was distributed to allow 750 families to build transitional shelters. It built on the initial emergency shelter response in West Sumatra in which a package of shelter materials, toolkits, common household supplies and basic hygiene items had been supplied to 30,000 families. Each beneficiary household received approximately 275 USD and technical training on safe construction and minimum standards for shelter. A partner organisation provided technical advice on construction.

Strengths and weaknesses

✓ Cash grants helped people buy what they needed for construction. People had flexibility to build what they wanted.

✓ The injection of cash into the markets boosted the local economy and has assisted the self-recovery of other community members, who are also starting to rebuild their homes.

✓ Despite the amount of money being insufficient to complete all work required, it gave people a strong starting point to begin recovery. Many people became motivated to begin construction.

✓ Existing relationships between project staff and communities helped trainings and cash distributions run smoothly, even though there was some unrest from those who had not received support.

× The sum of money was too small for all construction.

× Project timeframes may have rushed construction and not have encouraged families to build safely.

× There was some resentment from those who did not receive cash grants. There were sometimes very slight difference between recipients and non-recipients circumstances, which made it hard for some to understand why they had not received support.

× Transitional shelter support should have arrived earlier. After three months of living in inadequate shelter, many households were ready to build semi-permanent structures.

× The half day of training provided to beneficiaries was insufficient. House improvements were not covered in trainings.

- There are strict rules that limit logging locally. Many beneficiaries only used trees from their own land.

- The local cost of materials did not increase. However, there was a reported increase in the cost of skilled labour, which was in low supply and high demand.

Background

See "A.12 - Indonesia - Sumatra - 2009 - Overview" p.38.

Distributions

The organisation initially responded with non-food items. This started 4 days after the initial disaster. Rapid response was made possible by pre-positioned stocks in Indonesia, held in the cities of Medan, Jogjakarta and Ambon.

From October to December 2009, shelter kits, tool kits, household and hygiene items were distributed to 30,000 families.

Transitional shelter

In January 2010 the organisation shifted its focus to transitional shelter through cash programming. This was aimed to complement the organisation's previous work and give earthquake affected people the flexibility to purchase materials and construct homes that met their needs.

The approach of providing cash to enable self build was encouraged by the government, as it complemented its own program to distribute larger cash grants to facilitate permanent construction.

Selection of beneficiaries

The selection of the community was based on the organisation's existing knowledge from its initial response and consideration for the need to have a close liaison with local authorities and key stakeholders.

In each community, the organisation presented the information in meetings. The communities then elected local committees. The organisation requested that these were gender balanced and representative of different age and social groups.

The committee's role was entirely voluntary and a Memorandum of Understanding was signed with each committee to lay out clearly their roles and responsibilities.

Each local committee was asked to produce an initial list of beneficiary households, whom they believed matched the targeting criteria. These lists were then posted publicly.

Project staff verified each household recommended by the committee and selected 620 names for the final beneficiary lists giving priority to the most vulnerable and needy, taking into account the targeting criteria.

Implementation

The organisation distributed cash grants in two instalments.

An initial cash grant of 80% was followed by house by house monitoring to assess whether cash was being used for shelter and the compliance with minimum standards.

A second grant of 20% was distributed. For both payments, vouchers were given that were later exchanged for cash by the mobile post office.

Delivery mechanism:

The organisation initially considered using a bank to distribute funds, but not all beneficiaries had a bank account or could go to the nearest town to collect the funds.

After consulting the communities and other organisations working in the sector, the Indonesian postal service (Pos Indonesia) was selected as the best way to distribute the cash grant.

A mobile post office distributed the cash grants directly to each beneficiary in their village. Other organisations had already used this system and its feedback was very positive. Since cash grants would be distributed directly to each beneficiary, there was no need to establish beneficiary groups and train their members to manage the funds.

Market analysis

In order to monitor the impact of the cash injection into the local economy; market surveys were carried out at 3 project intervals. A baseline market survey was conducted prior to cash distribution, in order to establish the local availability and cost of materials. This was followed by two further market surveys after the disbursement of the first and second instalments of the cash grant.

Technical solutions

Technical support was provided through two different kinds of trainings:

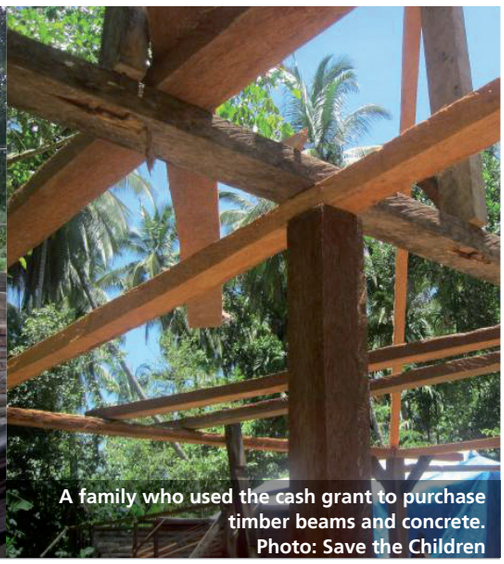
1) Training facilitators

Project staff received training from an international organisation. While the training provided on T-Shelter gave staff sufficient grounding in good T-shelter construction both for community training and monitoring, they were not sufficiently equipped to assess

Many materials could be salvaged. Cash grants allowed people to pay for materials and labour according to their needs.

Temporary shelter built whilst owner was awaiting labour to complete his house. Photo: Save the Children

House for 9 people under construction in the foreground.
Photo: Save the Children



A family who used the cash grant to purchase timber beams and concrete.
Photo: Save the Children

semi-permanent structures or renovations to damaged homes which the majority of beneficiaries had opted for.

2) Training beneficiaries

Project staff held 11 two hour workshops in the villages, to disseminate technical information about construction standards and methods among selected beneficiaries. At the end of their training, beneficiaries received vouchers to be exchanged by cash.

Complaints response mechanism (CRM)

1) At the targeting level

The committees posted the final list of names on community notice boards. At the same time, boxes were installed to collect complaints from those who had not been selected, so they had an opportunity to make their case. Three days later, boxes were collected. After analysing the messages and complaints, meetings were to be held with committees. If those who had complained qualified, they would be added to the final beneficiary list.

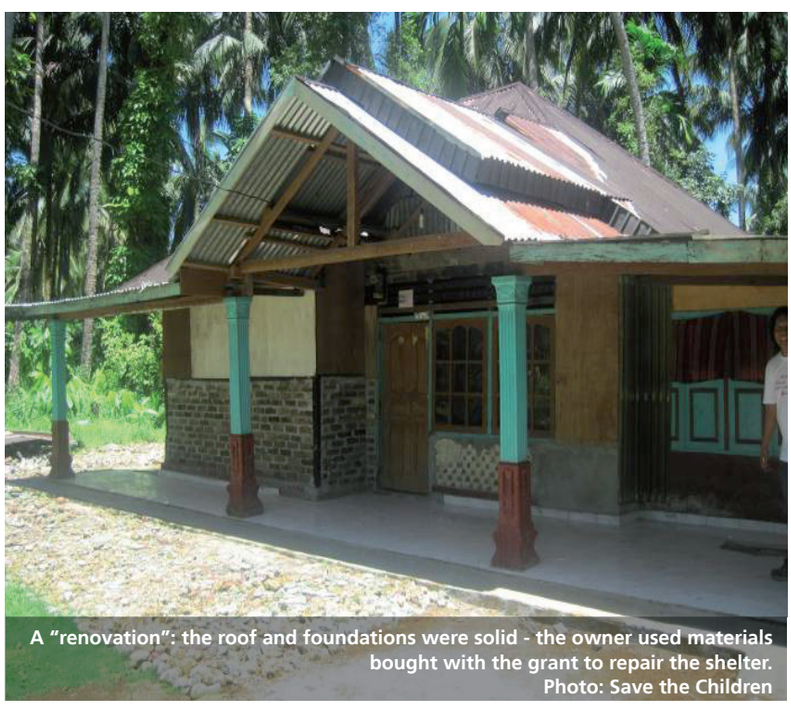
2) At the implementation level

The community would be able to file complaints and give feedback throughout the entire duration of the project, not only during the selection phase. The communities would have the opportunity to meet directly with staff during their visits, approach shelter committees or drop a note in a confidential complaints box. During February the monitoring and evaluation team also enabled a "complaints hotline" for all sectors, so people could call or send their comments using text messages.

Monitoring

During the monitoring phase, the team used guidance and an agreed format to check the compliance with the following cluster-agreed minimum standards:

- Materials and construction should allow for 24 months of use.
- A minimum of 3.5m^2 covered living area per person.
- A minimum of 2m from the ground to the eaves.
- The roof should provide adequate strength and have a pitch of at least 25^0.
- There should be adequate ventilation.
- The shelter should provide protection from rain.
- There should be at least one internal division for privacy.
- Building should use safe construction techniques to minimize the impact of further natural hazards.



A "renovation": the roof and foundations were solid - the owner used materials bought with the grant to repair the shelter.
Photo: Save the Children

A.15 Indonesia - Sumatra - 2009 - Earthquake

Case study:

See "A.12 - Indonesia - Sumatra - 2009 - Overview" p.38 for background.

Country:
Indonesia, Sumatra, Padang

Disaster:
Earthquake

Disaster date:
September 30th 2009

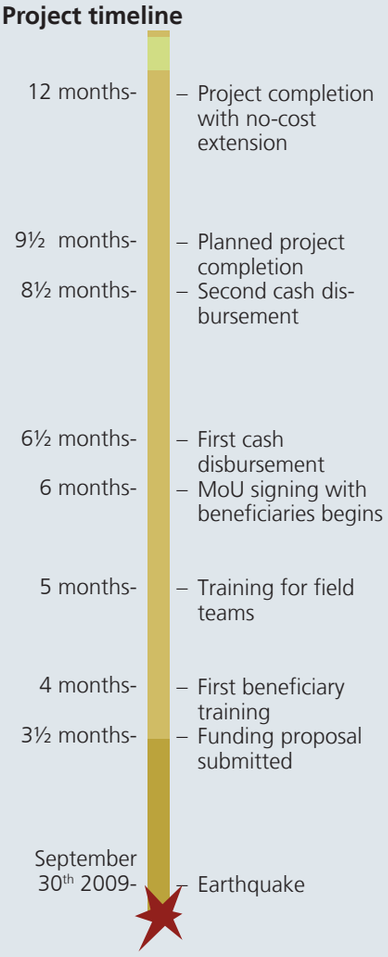
No. of houses damaged:
115,000 destroyed houses
135,000 damaged houses
(approx. 70,000 in Padang city)

Project target population:
3,400 households (3% of overall houses destroyed)
Occupancy rate on handover:
66% of all shelters occupied 12 months after the earthquake.

Shelter size:
Variable

Materials Cost per household:
Cash grants for T-shelter:
330 USD per unit
Government estimates for reconstruction of a destroyed houses: 1,600 USD

Project timeline



Project description
An international non-government organisation working through a local partner provided cash grants for shelter. Conditional cash grants were given to 3,400 families in two instalments. The local partner used six mobilisers to give technical support. Beneficiaries paid for materials and labour to build timber homes. Most shelters took 10 weeks to build. 77% of the shelters were completed within 12 months of the earthquake.

Strengths and weaknesses

✓ Each family was able to build according to their needs and wishes. This improved ownership.

✓ Families built shelters that they felt were permanent. Families invested and built quickly.

✓ A transparent complaints mechanism helped with the perception that beneficiary selection was fair.

✓ The project worked in remote rural remote areas because people had space, owned that space and owned non-productive coconut trees.

× A disaster risk reduction opportunity was missed for people with damaged housing.

× The 120 field monitors and community volunteers had only a few days technical training. It was not realistic to expect them to check the construction quality of 3,400 unique houses.

× People without land or with damaged housing did not get cash or any technical assistance and often rebuilt dangerous brick structures.

- Standard designs would have made quality control much easier. However this would have curtailed the freedom of the beneficiaries to build according to their needs.

- Donors had some concerns that permanent housing had been built with emergency funding.

- The houses built might have been "safer", but It is a mistake to refer to them as earthquake or hazard resistant.

Background

See "A.12 - Indonesia - Sumatra - 2009 - Overview" p.38.

Before the earthquake

In West Sumatra, most families owned their houses before the earthquake. The region has a matrilineal system with women owning and inheriting land and housing. On marriage, the new husband will move on to the land of his wife's family. Housing has symbolic and social importance.

Family houses are built bit-by-bit. In rural areas people usually paid local builders to build or sometimes built houses for their own families.

Houses are not purely a financial investment. Remittances are a major source of housing finance and cash incomes are irregular and seasonal.

Organisational capacity

Before the 2009 earthquake, the organisation had significant practical emergency experience. Both the international organisation and its partner understood the need for experienced staff and sufficient time for community engagement.

The organisation also had experienced senior managers and partners who knew the community and spoke the local languages. The local partner organisation additionally had good and long term relationships with the affected communities. This reduced the need for lengthy formal assessments.

After the disaster

The earthquake of September 2009 destroyed 115,000 houses, and damaged 135,000 houses. In Padang the government responded with assessments and the promise of compensation. Many households affected by the 2007 earthquake were only just receiving compensation at the time of the 2009 earthquake so families did not expect compensation to arrive quickly.

Beneficiary selection

The communities were selected because the partner organisation knew them well.

To be included in the project, beneficiaries had to have land for a shelter and a destroyed house. Selected families were in a good position to complete their shelters as:

- They were in less urbanised areas and had previously lived in single storey buildings.
- They had access to timber and experience of using it.
- They saw the transitional shelter as a permanent home, worth finishing and worth investing in.

More than 9000 households were surveyed and given a vulnerability and eligibility score. Selection criteria included female and senior headed households, low-income families, pregnant women and children under 5.

Feedback and complaints

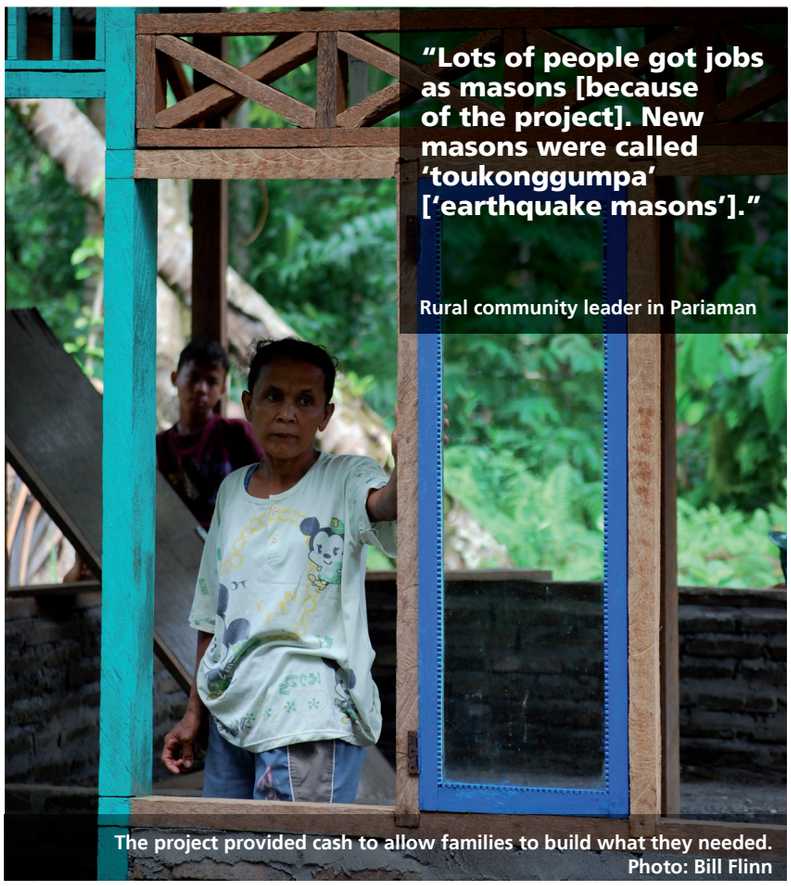
The community feedback and complaints mechanisms were essential to the running of the project. This system built on lessons learned from the 2005 tsunami response and Jogyakarta / Central Java earthquake response programmes.

The draft lists were posted in the communities along with posters explaining the selection criteria, detailed definitions of the project, an outline of a step-by-step implementation plan, and a hotline telephone number to call or SMS feedback, complaints or requests for information.

Senior project managers operated the phone and were available for office visits and had after hour telephone numbers posted on the office door. Each and every case was followed up on an individual basis with village government and community committees.

Implementation

Assessments and existing experiences showed that communities had the capacity, access to materials, labour and community cohesion to manage cash to build transitional shelters. A cash approach was also promoted by the Shelter Cluster. Beneficiaries built according to their needs, wishes and resources. This encouraged fast construction and a sense of ownership leading to high



The project provided cash to allow families to build what they needed. Photo: Bill Flinn

Monitoring safety of the structures was very challenging given that each family had the freedom to build according to their needs. Photos: Bill Flinn

completion rates and additional investment by beneficiaries. This was despite their low and irregular incomes.

The amount of cash was agreed with other agencies. It was enough to build a shelter if supplemented by salvage and available resources. The cash was given in two instalments (3 million rupiah or 330 USD). People could only get the second amount if they built a safer house.

Grants were delivered via the Indonesian post office in two stages. First the participants received 75% of the funds to complete 85% of the construction. In the second phase, the remaining 25% of the grant was disbursed.

At the outset of the project, families had to sign a Memorandum of Understanding that committed them to spend the money on timber framed transitional shelter and not on a permanent house or repairing an original house.

Technical

Four models of shelter were designed, but beneficiaries were free to build according to minimum standards.

A 60-strong team of mobilisers was established to motivate beneficiaries to build to an agreed quality and on time, over 10 weeks.

Participants received technical trainings on construction and how to use salvage materials. Better construction was promoted through minimum construction standards; training for field staff, beneficiaries and masons; production of posters and pictures; and weekly technical monitoring visits for all recipients of the cash.

Logistics and materials

Outsourcing material procurement and cash distributions was decided to be more effective than using the organisation's internal and limited capacity.

Good roads for material supplies and spare local capacity for labourers and suppliers to start up helped the project.

It was possible that more remote communities might have to pay higher prices for transport and labour. However, it turned out that people further from roads paid only slightly higher prices. The fixed cash grant for all families was seen as fair.

Impact

Twelve months after the earthquake: 77% (2,603) of the transitional shelters were complete, 11% (369) of the shelters were incomplete but in progress, 8% (265) of the shelters were incomplete and without sufficient progress to receive the second cash instalment, and less than 5% (163) had not been built.

Participants interviewed during the final evaluation stated that they had spent between 500 USD and 1,000 USD of their private funds in completing the shelters, and that the grant served as an "injection of motivation to a traumatised population".This resulted in variations in final shelters with many exceeding the minimum quality standards.

It is difficult to evaluate impacts on a local economy (especially without baseline data) but new jobs as "earthquake masons" and as "chainsaw masons" were created by the project. The injection of cash and short time frame for building briefly inflated the prices of some labour and some materials. Cash also appeared to have pushed some new businesses to open (e.g. a hardware store).

Completed homes were likely to be "safer" than the construction practices that have become prevalent over the past 30 years but cannot be described as earthquake or hazard resistant. The freedom which was a strength also lead to a wide variation in quality and divergence from design principles.

Guidance used for a feedback and complaints handling mechanism

- Ensure that simple complaints and feedback mechanisms are written into project strategy and budget.
- Ensure that 'complaints handling' is written into job descriptions of staff at all levels of the organization, and that staff are adequately prepared and trained in handling complaints.
- Consult communities and select context appropriate means of communication and technology to receive feedback and complaints and provide a response (e.g. phone or email systems, visiting hours, feedback boxes).
- Define the process for complaints handling including timeframes, appeal process and explain the complaints you can and cannot handle.
- Ensure the mechanisms are safe, non-threatening and accessible to all.
- Inform communities about the complaints process, explain it is a right and encourage communities to use it.
- As much as possible, involve local community members, leaders and authorities in the handling of registered complaints.
- Provide communities with relevant and timely information about project criteria and parameters to use the feedback and complaints mechanisms, and of improvements and changes made to the project (or why changes are not possible).
- Ensure sufficient time and flexibility of implementation to respond to complaints.
- Keep records of incoming feedback and complaints, and evidence of follow-up to allow senior management supervision and external evaluation.
- Ensure mechanisms are in place for serious complaints, like allegations of sexual abuse, fraud or other sensitive issues.

Various types of structure were built during the project.
Photos: Bill Flinn

A.16 Kyrgyzstan - 2010 - Conflict

Case study:

Country:
Kyrgyzstan
Disaster/conflict:
Civil disturbances
Disaster/ conflict date:
June 10th–11th 2010
No. of houses damaged:
2,000 compounds damaged
1,690 completely destroyed
No. of people displaced:
300,000 people in Kyrgyzstan
75,000 refugees in Uzbekistan
Project target population:
1,668 family shelters
(13,400 people)
Shelter size:
28 m² covered living area
(2 rooms of 14 m²) with an additional verandah of 16m²
Materials Cost per household:
Up to 5,100 USD per shelter (materials) depending on the level of damage
Project cost per household:
5,900 USD per shelter excluding operating costs.
People building their own houses received 800 USD

Project timeline

- 6 months – Project completion
- 5 months – All construction complete
- Floor/windows complete
- 4 months – Walls, ceiling, roof complete
- 3 months – Foundations complete
- 2.5 months – Reconstruction can begin
- 2 months – Clearing Debris and demolition
- 6 weeks – Emergency shelter strategy approved
- 120 tons of aid airlifted
- 3 weeks – Project start
- 2 weeks – Offices opened
- Rapid joint shelter assessment
- June 10th-11th 2010 – Disaster/ conflict

Project description
Working through international partner organisations, the lead agency was able to build 1,668 seismically resistant winterised homes in time for winter. Homes were rebuilt using locally procured materials on the foundations of destroyed properties. Teams of engineers, foremen, community mobilisers were hired to ensure that all families received the material and technical expertise needed.

Strengths and weaknesses

✓ Shelters were designed with the beneficiaries. Families were allowed to make modifications.
✓ The homes were built using better material than previous dwellings.
✓ Homes were insulated and seismically resistant in line with national codes and international standards.
✓ People built their own shelters and were assisted in their work through contribution towards labour costs.
✓ Homes were built in existing compounds. This allowed the families to monitor the construction.
✓ The project was structured so that implementing organisations shared responsibilities.
✓ The implementing partners had good numbers of site engineers to oversee the work and provide advice.
× Materials were difficult to procure in volume. Transportation costs were high, flooding of quarries stopped sand production, timber was delayed at the border, and some suppliers withdrew from contracts.
× Small access roads, and lack of security on site meant materials could only be delivered in small volumes.
× Removal of debris was slowed by lack of heavy machinery and heavy traffic.
× Lack of proper documents prevented payment through the bank. Security made other means of payment challenging.
- By building their own houses, work was delayed and quality reduced, but the process acted as training.

A man stands in front of a destroyed building in the neighbourhood of Kizil Kishtak in Osh, Kyrgyzstan. Photo: Rodrigo Ordonez

Before the conflict

In Krygyzstan, families tend to live in compounds, containing an average of 2 families (15 persons). Households are defined as 'one or more nuclear families related by blood or law who share the same compound. Most compounds contain 2-4 small houses.

The main type of house is a "Private One Storey", and each compound has around 300m^2 of covered living space. The vast majority of homes have plastered walls and timber floors. Over 80% of the houses have a slate roof.

Nearly every house had access to water before the crisis through the municipal tap network. A minority has access to a private well. Some neighbourhoods had collective wells.

After the conflict

The inter-ethnic violence of 10-11 June 2010 prompted a large scale displacement of mostly ethnic Uzbeks from within the Kyrgyz population. The displacement occurred rapidly within 3-4 days.

After the violence of June 2010, more than 1,500 families were without basic shelter or supplies in the south of Kyrgyzstan.

The damage led to large amounts of rubble and debris, including asbestos. Winter was approaching and temperatures would fall significantly below zero.

Selection of beneficiaries

The project was for displaced families. The agreed selection criteria for beneficiaries was:

- Displaced people living outside (homeless) or in collective centres.
- People returning to (refugees and IDPs) their damaged homes.
- Displaced people (including separated family members) who were unable to return to their homes due to damage. In particular, where five or more displaced people are living with a host family.
- Very vulnerable individuals, and their displaced or returning family, including, but not necessarily limited to, single parented headed households and families supporting disabled or chronically sick people.
- Households who lost family members in the fighting.

Emergency response

Tents and non-food items were initially distributed as an emergency measure.

A planning figure of 2,000 was used for damaged / destroyed shelters. This initial figure was arrived at through analysis of satellite imagery, and was based on two areas, Osh (1,500 households) and Jalalabad (500 households).

Needs assessment

A house-to-house survey was conducted, assessing every recently damaged residential structure. Information on structural damage, as well as pre and post conflict data about the household was collected.

The survey started with a pilot phase on 3rd July 2010. The survey was completed for Osh city on 10th July. The Jalalabad component was carried out from 11–13th July 2010. Surveys included staff from different agencies.

Preliminary results gave an indication of the damage: 770 houses in Osh city, which is an estimated 38% of the expected overall total of houses that were damaged in Osh.

Technical solutions:

The "emergency transitional shelter strategy" was developed by the Shelter Cluster participants with the Ministry of Emergencies and the State Directorate for Reconstruction. Technical issues such as selection of the building materials for the emergency transitional shelter was developed by the Shelter Cluster Technical Working Group which included representation of the government engineering team.

The actual design of, and support for, the emergency transitional shelter was based on the level of damage to the existing structures and the living space requirements of the house owners / users. The main building in the shelter assessment was assigned a damage categorization consisting of four levels, with corresponding entitlement to support:

- **Category 1)** minor damage. Up to 500 USD of materials.
- **Category 2)** moderate damage. Up to 1,500 USD of materials.
- **Category 3)** major damage. Up to 3,000 USD of materials.
- **Category 4)** Full reconstruction required. Up to 5,100 USD of materials.

75% of housing units assessed were fully destroyed (category 4).

Left: Construction workers pour concrete for the base foundation of a home. Right: A construction worker lays bricks for a new home.
Photo: Rodrigo Ordonez

The following prioritisation principles were applied:

- A minimum of two rooms of 14m^2 each per family. If there is more than one family per compound, support for additional rooms was provided.
- All damaged houses or compounds were provided with materials under a controlled monitoring regime, technical support and some support for labour. This was to ensure appropriate and warm living space for the family during the harsh winter. The estimated requirements were limited per level of damage.
- Families were engaged in the reconstruction / repair process. They had to provide labour through a self help programme. Family composition and capacity were taken into account.
- Priority was given to the most vulnerable households.
- All partially damaged houses were provided with support that ensures that their homes were repaired to the same standard and quality.

Shelters were designed on a case-by-case basis, taking into account the time frame, structural integrity of the existing foundation, availability of skilled communal labour (masons in particular for brick laying), bricks, and the amount of living space required for the household members. Nonetheless, the basis of the project was modular, with two-room units providing 28 m^2 covered area.

This modular approach allowed for flexibility. In situations where a full structure could not be completed, the superstructure could be made of panels instead of brick and mortar. All other structural details remained the same for the sake of equity.

The majority of homes did not have indoor latrines prior to the conflict. Damage done to the outside sanitary facilities was not as extensive as to the main buildings. However, latrines were restored, as needed, to meet the toilet needs through the winter.

Given the scale of the challenges and the cost of the project, a third party neutral monitoring scheme was established to provide objective information with regular feedback on what was working, and what needed to be improved.

The State Directorate for Reconstruction provided cash transfers to affected families, after which the affected families purchased supplies directly from government construction suppliers. All efforts were made ensure that all organisations worked to similar approaches and specifications.

Logistics and materials

The government was committed to support the temporary / transitional housing scheme and offered tax exemptions for building materials, warehousing and transport.

Implementing agencies had to quickly source and purchase large amounts of construction material, including sand, cement, bricks and timber. Each day, 300,000 bricks had to be sourced, procured and delivered, as well as 800m^3 of sand, 600 cubic meters of gravel, 750m^3 of aggregate, and many more materials. In total, the programme used around 10 million bricks as well as 7,350 metric tons of cement.

Level of assessed damage**	Number of houses	Estimated cost (USD)	Total amount (USD)
Category 1	92	500	46,000
Category 2	94	1,500	141,000
Category 3	271	3,000	813,000
Category 4	1,419	5,100*	7,236,900
Unconfirmed category	6	unknown	Up to 30,600
Total	1,876		

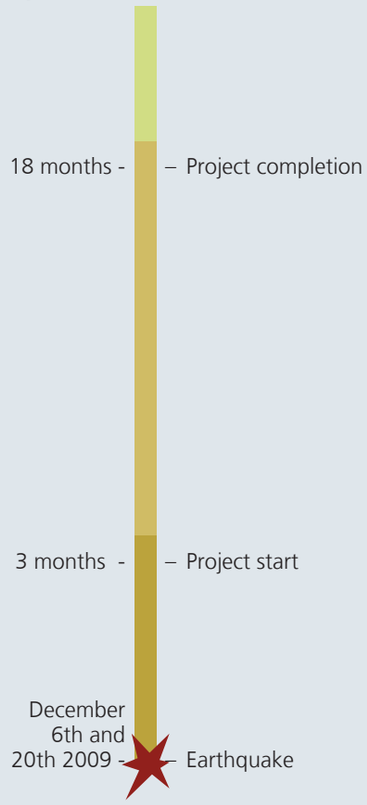
*** Assuming that there are on average two families per compound**
**** As per preliminary results of shelter assessment**

A.17 Malawi - 2009 - Earthquake

Case study:

Country:
Malawi
Disaster:
Earthquake
Disaster date:
December 6th and 20th 2009
No. of houses damaged:
6,000
No. of people affected:
24,000
Project target population:
2,400 people (rural and urban)
Government construction guidelines also developed.
Shelter size:
New build houses - 45m²
House repair - 20m² to 40m²
Materials Cost per shelter:
House construction (including labour) approx 2,400 USD
Repair grants were 310 USD / household

Project timeline



Project description
The project provided materials, cash grants and training to build and repair houses. The project led to national guidelines on safer house construction that were adopted by the government. The project also provided psychological support, hygiene promotion, sanitation facilities for households and schools, and disseminated better building practice.

Strengths and weaknesses

✓ Strong links with communities, government, and other organisations enabled access to the affected communities.

✓ Communities and local government were responsible for developing the selection process that was managed and implemented by the communities.

✓ International links provided access to technical support and specific assistance, especially during the first phase of the emergency.

× The national organisation lacked the technical experience to implement large scale shelter programmes and had to rely on external support, especially during the first phase of the programme.

× The organisation was the main, and often the only, provider of assistance after the earthquake. Deploying and sharing the resources of other ongoing programmes was a challenge in terms of personnel, vehicles, office space, and finance and administration systems.

× The projects had to be implemented within a short time to coincide with the dry season, to meet donor requirements, and to meet the expectations of the community. This created a constraint in terms of time available for staff development and training, maintaining quality assurance, and the timely resourcing of the programme, such as the purchase of equipment and access to funds.

- The recovery programme was able to engage with other initiatives that were running prior to the earthquake, such as housing and urban planning projects, and disaster risk reduction planning and preparedness. Through the support of an international agency, partnerships were formed with government and other stakeholders to develop a disaster risk reduction strategy to assist reconstruction.

Before the earthquake

Malawi is one of the lowest income countries in the world, with many households having cash income below one US dollar per day. The population is manly rural, living in scattered communities focused on agricultural activities. Land is allocated through traditional authorities. In urban areas property and land is bought or rented.

Traditional houses are built from wattle and daub with thatched roofs. While lacking durability, these dwellings were largely undamaged by the earthquake, provide good thermal comfort, and are constructed using local materials. All other buildings are of brick and block construction.

At the low-income end of brick construction, houses are built with un-burnt brick and mud mortar. Where there are sufficient resources, bricks are burnt using locally sourced firewood.

To economise on the use of bricks, walls a single brick thick were often built. These walls are not earthquake resistant. Additionally, the position and size of doors and windows and the type of un-braced roof construction, added to the structural failing of the buildings.

Houses are generally constructed over a period of time, as families gain the resources to purchase the required materials.

In rural areas most households owned the houses they lived in. In the urban areas many were tenants and had less opportunity to build or repair their homes.

Issues of public health were greater in the urban area. Latrines in the rural areas were generally constructed using local materials, whilst in urban areas many were built of brick, but were no longer usable.

After the earthquake

The first earthquake on the 6th December destroyed and damaged thousands of houses, hundreds of schools and public buildings, cracks appeared in the ground and the levels of the earth altered in some locations.

The project lead to the establishment of national guidelines on safer house consustruction and had a strong training component. Photo: Jamie Richardson

The number of deaths and injuries were relatively low but, as this part of Malawi had never experienced an earthquake, the population was traumatised by the event and was fearful of going back to their homes.

On the 20th December there was another earthquake.

In some areas near the town of Karonga, the land is lower than Lake Malawi, and there was the natural fear that the earthquake may cause fissures that would lead to flooding. This community moved to an area of high ground where the government and other agencies established a temporary camp.

In the first months after the emergency most households slept in temporary shelters outside their houses. There was a limited distribution of tents, but for most, temporary shelters were constructed using local materials such as timber and thatch.

Implementation

One of the guiding principles for the project was that householders, communities, and government were responsible for providing safe and adequate housing. The organisation would provide support were there were gaps in skills, knowledge, and resources.

The following parallel activities were implemented:

- Construction of new houses
- House repairs
- Construction of latrines
- Training of hygiene promoters
- Training of artisans
- Beneficiary dissemination workshops
- Guidelines for safer house construction

Two project officers were appointed to manage the urban projects and the rural projects and both shared resources and staff.

Guidelines for safer house construction

During the emergency phase of the response, an international shelter specialist assisted. This expertise led to the organisation taking a national lead in shelter and allowed an alliance to develop with government, other agencies and non-government organisations working in housing and shelter. This group was given the responsibility by the government to produce guidelines on house construction to assist the recovery process. The guidelines were produced as a manual and as a series of posters.

It was recognised that information should be made available nationally to reduce the risk of all hazards, including earthquakes. The guidelines would be the start of a process to create national guidelines and standards for construction.

Construction of houses

The Government of Malawi had already produced designs for rural housing and these designs were adopted and modified to improve structural performance.

Every beneficiary was given a range of designs to choose from. They were given the possibility to make further modifications so long as these met the design guidelines.

Both householders and artisans were provided training to ensure that important construction details and methods were implemented. The organisation provided construction supervisors to monitor and assist the construction process.

Cash grants were provided to the householder to purchase materials and pay for labour. Payments were made in tranches aligned with the phases of construction. The householder was responsible for the construction.

The houses were constructed using locally made burnt brick, mud and cement mortar, timber for the roof structure and joinery, and iron sheeting for roofs.

House repairs

The construction supervisors, with the householder, surveyed the houses to identify the repairs and produce a prioritised schedule of work and an approximate budget.

The householder was paid a grant in two phases to carry out the work. Repairs focused on strengthening each element of the structure.

Hygiene promotion and sanitation

The urban part of the recovery programme identified a need for better sanitation and hygiene practice. In addition to house repairs, 250 household latrines and school sanitation facilities were constructed.

Selection of beneficiaries

The project targeted the most vulnerable within the communities. Vulnerability criteria were collaboratively identified.

Community groups were established to identify beneficiaries, to process the application, and to have officers from government and the organisation verify the applications. An appeals process was established to allow for the review of an application.

Houses were built through cash grants. Cash was transferred by mobile phone. Families were encouraged to purchase work in groups to obtain lower prices. Photo: Jamie Richardson

This method of selection empowered the communities, allowed government to have responsibility for the administration of the recovery process, and enabled the organisation to provide support and monitoring of the process.

Technical solutions

There were many constraints in terms of available materials, financial resources, skill level, and cultural aspiration. This led to the choice of brick construction.

Proper brick bonding, the use of lintels to brick openings, the bracing of roofs and methods in connecting the brickwork, were not previously applied. The position and size of door and window openings was addressed, as was the design of unsupported masonry such as gables and internal partition walls.

Cash transfers

The transfer of funds provided a challenge in the rural areas, and was implemented through a partnership with a mobile phone company.

Beneficiaries were given a phone and funds as credits were transferred to their phone. These credits could be exchanged for cash through the phone company's outlets, or exchanged for materials at specified hardware stores.

Logistics and supply

Beneficiaries were encouraged and supported to buy materials in groups. The suppliers could then maximise efficiency and minimise rates charged by delivering in quantity. The organisation provided four wheel drive vehicles for transport when required.

Local suppliers were used for all materials other than the doors and windows, which went out to tender and were purchased in the capital.

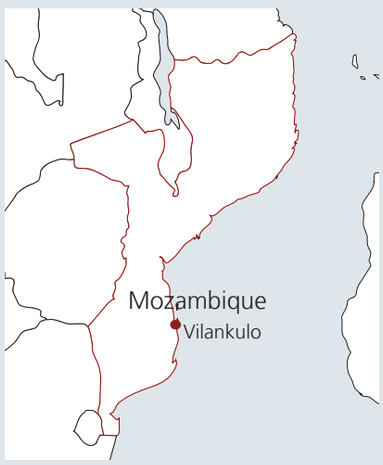
Materials list

Materials	Quantity
Timber 1"x8" (25x200mm)	17
Bricks (230 x115x 75mm)	8400
Wire mesh	25 m^2
Chlorodine (Anti-termite treatment)	1l
Cement	22 bag
Reinforcement bars 12mm x 12m	17
Supporting plain bars 6mm x 6m	5
Solignum (timber treatment)	1l
Damp proof course	3
Quarry stones for the ring beam	3 Tonnes
Timber 2" x 3" (50x75mm)	16
Timber 2" x 4"(50x100mm)	3
Timbers 2" x 6" (50x150mm)	25
Wire nails 2" (50mm)	5Kg
Wire nails 3"& 4" (75,100mm)	7Kg
Wire nails 5" & 6" (125,150mm)	15Kg
Roofing nails	18Kg
Galvanized ridges	5
Iron Sheets 28 gauge x14' (4.3m)	28
Sand for pointing, plastering, flooring	8 Tonnes
Cement for pointing, plastering, flooring	26 bags

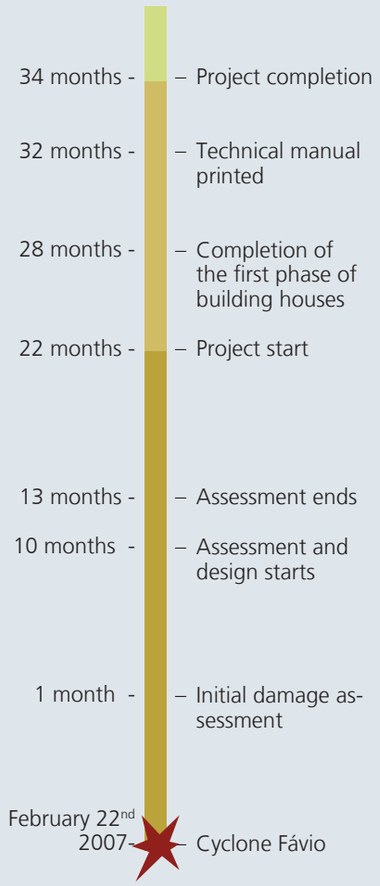
A.18 Mozambique - 2007 - Cyclone Fávio

Case study:

Country:
Mozambique
Disaster:
Cyclone Fávio
Disaster date:
February 22nd 2007
No. of houses damaged:
6,500
No. of people affected:
160,000 people
Project target population:
10 communal cyclone shelters
Shelter size:
35 m²
Materials Cost per shelter:
3,500 USD
Project cost per shelter:
5,000 USD



Project timeline



Project description
The project identified and tested innovative small-scale mitigation interventions for cyclones. It used participatory approaches and focused on local capacity building in vulnerable pilot areas. The major focus of the project was to disseminate the initiative and prepare the conditions for future replication. It also built 10 cyclone shelters.

Strengths and weaknesses

✓ A construction handbook was developed and accepted by local governments as a building code. This was translated and disseminated in other countries.
✓ The project focused on mitigating the impacts of future events.
✓ Continuous technical support provided by architects and civil engineers. Training of local master builders.
✓ Construction techniques were accepted by local population, local master builders and the municipality.
✓ The city council remained the owner of the shelters. They were freely provided to the most vulnerable households in the city.
✓ The houses serve as community cyclone shelters for the neighborhood sheltering about 1000 people.
× The design did not allow the houses to be modified or extended.
× High cost of ferro-cement for the context prevents large scale uptake.
× During the first phase, kitchens, latrines and water wells were not included in the project.
- There was a process of experimentation and "learning by doing".
- Some architecture students and other municipalities that have the same risk were interested by the project.
- After the project, some residents constructed houses using the ferro-cement roofing technique, and the council decided to replicate the vaulted structure in a school.
- Some humanitarian institutions were interested in replicating the construction techniques in new schools and emergency infrastructure located in disaster prone areas.

The project built 10 cyclone shelters, but used the project to advocate nationally for safer construction.
Photo: Arianna Francioni

Before the cyclone

Mozambique has a large coastline exposed to the Indian ocean leading to the threat of cyclones. Additionally Mozambique is prone to floods, droughts and earthquakes. The number of events has dramatically increased this century.

Coastal areas of Mozambique are very prone to cyclones. However, at country and local level, there was neither interest nor technical knowledge on how to build resistant houses and / or community shelters.

Vilankulo municipality is a geographically exposed coastal town that has been hit several times by cyclones and strong winds.

In the urban context of Vilankulo municipality, infrastructure and houses were very vulnerable to strong winds.

After the cyclone

In 2007, Cyclone Fávio hit some coastal areas of the central region of Mozambique, generating torrential rains and wind speeds up to 220 Km/hour. It hit an area that had already been flooded the month before. High wind speeds caused the majority of damage.

Field assessment

One month after cyclone Fávio, a technical team conducted a field assessment in order to determine damage on houses and public facilities, and realised that most of the buildings were not resistant to strong winds. This was due to the construction techniques and quality.

The study reported that it was more sustainable to reconstruct in a resistant manner than to spend money every two or three years rebuilding after cyclones.

Catalogue of housing

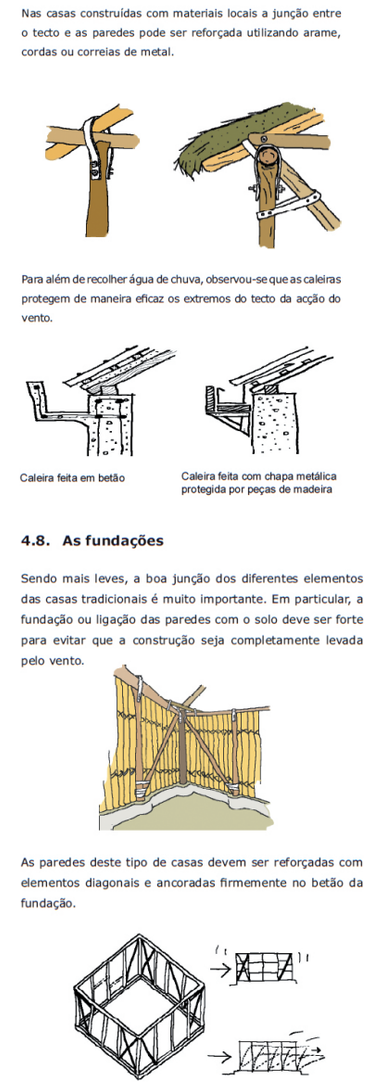
Following the cyclone, a catalogue of different housing solutions adapted to urban contexts in Mozambique was produced. It included some pre-industrialised techniques and materials. The catalogue targeted master builders and technical staff.

Prototype testing

To support the introduction of cyclone-resistant construction techniques in the country, and to demonstrate the real feasibility of the technical proposals in the manuals, different prototypes using different materials were tested by being built in the field.

In building the prototypes ways to improve them would be identified. It was also hoped that by building them replication would also be encouraged, as craftsmen would "learn by doing".

The site where the shelters were built was located in a council owned land in a suburb area, home to some of the most vulnerable people in the city. The original houses that were built on the site with local materials were destroyed by the cyclone.



A construction manual was developed, adopted nationally and shared regionally.

The organisation worked with the municipality at local level, and the National Institute of Disaster Management at country level. This allowed different government institutions to be involved and allowed for advocacy at different levels.

Implementation

Some of the techniques tested were already available in Mozambique and others were imported from different countries around the world. Architects, engineers, and students of the national university participated in the process of design and building.

As part of the project a manual, posters and other materials were developed. Credit: Eduardo Feurhake

"The purpose of demo projects is to ultimately influence national and local policies, so that if proper building techniques are integrated in the codes and regulations, then the scale of the impact is both national/local."

Project technical director

In the town, local master builders and municipality technical staff were very involved in the construction of the shelters. They received special trainings on the new techniques and practiced by building the shelters.

Inhabitants of the suburb could see the site and visit the houses. This involvement allowed local people to become aware of the importance of building resistant houses, and which techniques to use.

In the municipality some families are now building their new houses replicating the techniques. The municipality is also building new facilities according to the building recommendations and new techniques.

At national level, the building process was periodically presented to national government institutions and other stakeholders (including humanitarian institutions, universities and private sector), which were also invited to visit the construction site.

Manual developed

A first manual with simple recommendations on how to improve local construction techniques had been developed before the cyclone.

With the experiences gained during construction of the prototypes, the existing manual "Building with Winds" was reviewed and reprinted. It was targeted at technicians and local communities. It included simple graphic designs and explanatory texts. Its content was used for developing posters that can be put up in the communities. The online version of the manual is now available and spread worldwide in different languages.

In building the cyclone shelters, local builders "learnt by doing". Photo: Fernando Ferreiro

Different institutions from the government and humanitarian agencies are interested in the experience and want to replicate the building techniques for public facilities such as schools and health centres.

The purpose of developing technical manuals and implementing pilot projects was to ultimately influence national and local policies, so that proper building techniques and be integrated in the codes and regulations.

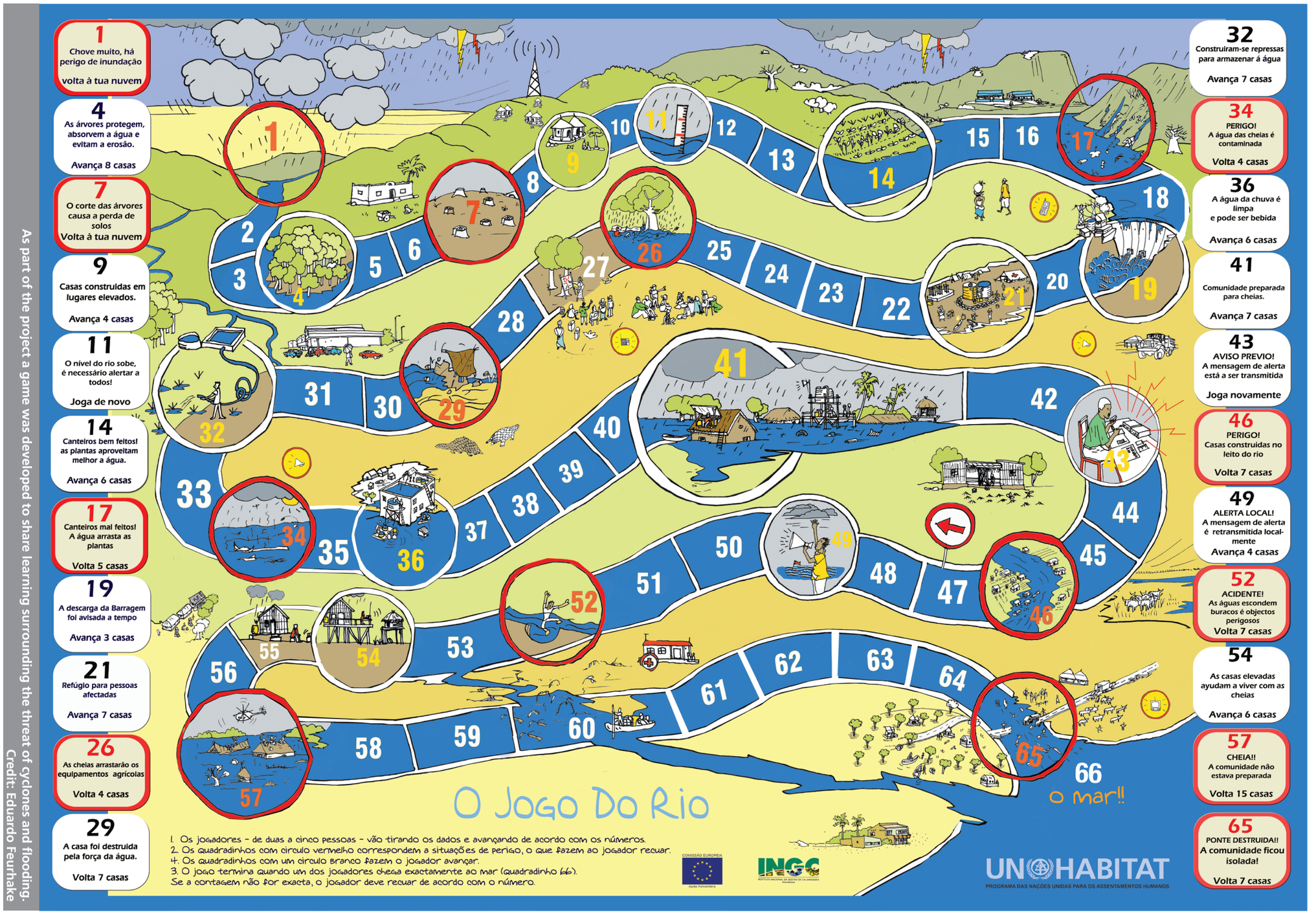
Technical solutions

The cyclone shelters were built with reinforced concrete structure (foundations, columns and beams). Walls were made from concrete blocks (first phase) and compressed earth blocks (second phase).

Different solutions for covering were tried:

- 3cm thick ferro-cement vaults (0.70 x 6m) manufactured on the ground and then raised.
- 8 cm thick concrete vaults (3 x 6m) using a metal formwork on the beams for easy assembly and disassembly.
- Self-supporting dome made with compressed earth blocks.

The houses were built by local masons (the beneficiaries are very old or handicapped people so they could not participate in the construction).



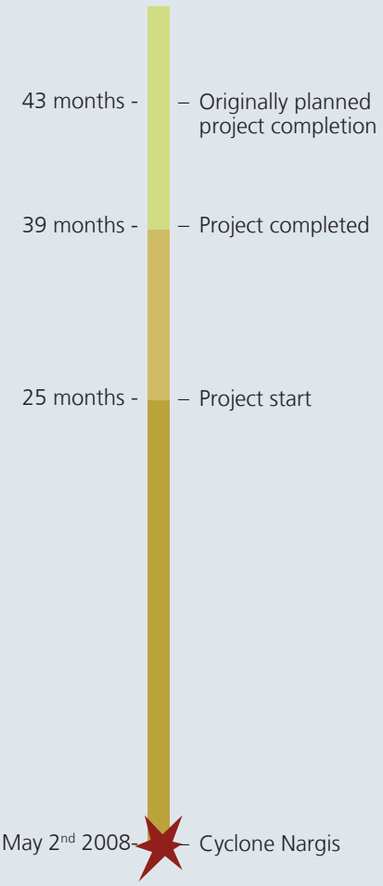
As part of the project a game was developed to share learning surrounding the threat of cyclones and flooding.
Credit: Eduardo Feurhake

A.19 Myanmar - 2008 - Cyclone Nargis

Case study:

Country:
Myanmar
Disaster:
Cyclone Nargis
Disaster date:
May 2nd 2008
No. of houses damaged / destroyed:
42,194 in Dedaye Township (172,000 in all Nargis affected areas)
No. of people affected:
160,000 in Dedaye Township (2,433,300 in all Nargis affected areas)
Project target population:
1,658 households (8,250 people)
96 carpenters employed
Shelter size:
15.6m² covered space per family
Project cost per shelter:
650 USD

Project timeline



Project description
850 shelters were built and 800 shelters were retrofitted. All 1,650 shelters were provided with a latrine and a ceramic jar for water collection. The project aimed to address multiple issues of security, shelter recovery, livelihoods and future disaster resilience to provide a sustainable and holistic solution for the affected population. The project was implemented through the "People's Process" where people organise themselves to identify and prioritise their needs and together take decisions on their recovery.

Strengths and weaknesses

✓ Local communities were at the centre of the process of decision-making and all activities performed at the local level were recognised and owned by them. This led to the project concluding four months before the originally planned completion date.

✓ Communities benefitted from complementary water and sanitation activities such as reservoir ponds, tube wells, water tanks and school latrines.

× The project did not start until 25 months after the cyclone.

× Buildings made from toddy palm timber can withstand strong winds, but are not as strong as buildings made from hardwood timber. Hardwood timber was too expensive for the available budgets.

× The shelters will not be sufficient to withstand another event of the magnitude of Cyclone Nargis.

× The project met the needs of less than 4% of the affected population.

× In one village, beneficiary selection became highly contentious because nearly everyone in the village had suffered great losses as a result of the cyclone.

× Some timber on shelters scheduled for retrofitting, turned out to be rotten on the inside requiring additional work and materials.

× While some of the target villages were located in remote areas of the township, the project was less successful at reaching individual households or clusters of households that were far from village centres.

- It is hoped that villagers who are not direct beneficiaries of this program will take note of the Disaster risk reduction components of the project.

Construction was managed by Village Reconstruction Committees who handled all of the funds required.
Photos: UN-Habitat Veronica Wijaya

After the disaster

Cyclone Nargis hit Myanmar in May 2008 damaging or destroying an estimated 800,000 houses. 450,000 of these were totally destroyed. Damage was caused by a combination of high winds and a storm surge up to 4m tall in coastal areas.

Village selection

The 50 worst affected villages in Dedaye were selected for community-wide interventions. Of these 50 villages, 32 were selected. Selection was based on damage assessments, perceived vulnerability to future cyclones and flooding. The selection was based on the experience of Nargis and other more recent storms.

The villages selected were located in relatively inaccessible areas and had benefitted the least from aid and recovery efforts by other humanitarian organisations during the two years following Nargis.

Village recovery committee

Community mobilisers visited the affected areas to establish a rapport within the communities and to help to organise mass meetings during which residents were encouraged to understand the need to organise themselves.

At these meetings, the communities nominated the individuals to represent them on the Village Recovery Committees. The committees worked directly with the implementing agency during the project.

The committees were generally comprised of 10 to 12 members, of which 4 members occupied the leadership positions of Chairman, Secretary, Treasurer, and Assistant Treasurer. Of the 287 members of the 32 committees, 46% were women, and 42% of members in management positions were women.

Training was provided to guide members in best practices for committees, such as ensuring representation of all village inhabitants, training on quality control, procurement, finance and bookkeeping. To ensure fairness of the procurement and certification process, lists of materials and local labour wages and charges were obtained from township and village authorities and upheld during the implementation process.

Selection of beneficiaries

Within villages, the community members were responsible for selecting the individual beneficiaries. The basic selection criteria was that the families and individuals were not capable of repairing or rebuilding their own homes. This included, for example, female-headed household, widows, the elderly and persons with disabilities that had no family support.

Priority was given to people currently living in structurally unsafe dwellings such as tents, camps or makeshift huts precariously constructed from weak, low quality and/or temporary materials like tarpaulin roofing. All of these families and individuals had faced acute water and sanitation problems.

Training of carpenters

Selection of carpenters began as soon as villages were selected. Training began during the third week of August 2010. The training emphasised cylone-resistant building techniques, consistent with the goal of "building back safer".

The basic criteria for selection of carpenters, as identified by the committees, included that the candidates come from the beneficiary village, maintain a strong sense of community spirit and service, and practice carpentry or a similar trade as a livelihood activity.

A total of 96 carpenters were trained, and each trainee received a tool kit containing 21 tools.

Community contracts

Once designs for house construction / retrofitting were agreed upon, 32 Community Contracts were signed with the 32 committees. These specified the work to be performed, its duration and the schedule of payments.

The allocated funds were disbursed in two instalments; 80% of funds were released at the inception and the remaining 20% were given once a benchmark of works stipulated by the Community Contract was completed.

The Village Reconstruction Committees were responsible for paying the carpenters, other artisans and labourers, and for disbursing funds for the purchase of materials. In the interest of transparency, the amount given to each committee and then to each group of beneficiaries, was publicly posted so that it could be reviewed by anyone in the community.

Community meeting. People organised themselves to identify and prioritise their needs and together take decisions on their recovery. Photo: UN-Habitat Veronica Wijaya

Women's participation

The project gave equal attention to involvement of local women in target areas. Out of 287 members of the Village Reconstruction Committees, 46% were women.

Women community facilitators played key roles in empowering and involving local women in activities of the programme in the field. Some committees had actively mobilised women in procuring, supervising and monitoring the retrofitting and construction of shelters in their villages.

Women participating in purchasing and transportation of construction materials, land cleaning and levelling, construction, supervision and monitoring of works and management of funding, gained confidence and benefited from learning programme implementation activities.

In all village reconstruction committees, the treasurers were women.

Environmental mitigation

Materials used such as toddy palm and bamboo are natural products and are sustainable sources of timber (growing locally and quickly). While concrete was only used for the footings of the shelter, the mixing of concrete can contaminate water sources if care is not taken. Carpenters and masons were trained to avoid this through the use of a system of settling ponds.

Crude oil was used as a wood preservative only for key structural components of the shelter. Only the exact amount of crude oil needed was bought.

Complementary activities

The programme had household water and sanitation facilities built in to the budget, so that every household receiving shelter support also received a water storage jar and a latrine.

The latrines provided are called "Fly-proof Latrines" because the toilet is covered with a wooden lid and waste goes directly into a septic tank before it can attract flies or other pests. Very little maintenance is required for these units. They can be flushed with water.

Hygiene education had previously been given to all communities.

Communities were also engaged in upgrading village roads and footpaths, upgrading or constructing village flood protection dykes and embankments, upgrading and construction of small bridges and pond renovations.

Shelters were built using locally available materials including toddy palm and bamboo. Photo: UN-Habitat Veronica Wijaya

A.20 Myanmar - 2008 - Cyclone Nargis

Case study:

Country:
Myanmar
Disaster:
Cyclone Nargis
Disaster date:
2nd May 2008
No. of houses damaged:
172,000
No. of people affected:
2,433,300
Project target population:
533 households
Shelter size:
20m²
Materials cost per household:
600 USD
Project cost per household:
970 USD approximately

Project timeline

Project description
The project constructed 533 shelters by providing materials and carpenters, and was in response to a review one year after the cyclone which found many families remaining in poor shelter. The project had a significant training component, but had significant issues with procurement of materials of suitable quality.

Strengths and weaknesses

✓ The beneficiaries who received support were pleased with their new houses.

✓ The training of the carpenters was efficient and the work was well organised. This is particularly in evidence in the consistent good standard of construction.

✓ The houses are much stronger than contemporary houses built by families on their own.

✓ The beneficiary families were familiar with the key principles of safer construction, and were able to explain the majority of the points. However it was not clear how many non-beneficiaries learnt the techniques.

× Some families were not entirely happy about the beneficiary selection process. It would have benefitted from more transparency and community participation.

× Construction materials supplies and quality are the weakest point of the project. Yangon based suppliers were initially used, and there were problems with quality and timeliness of materials. Using local suppliers later in the project reduced these issues.

× The bill of quantities should have been better defined.

× There were missed opportunities to engage the beneficiaries in making the bamboo mats for walls and floors and in preparing the thatching panels.

× The project only provided shelters for families who had land to build on.

× The beneficiaries think the house will last 4 to 5 years, but some components will have to be changed before that time.

- Families said that the size of the house is fine for a quite small family, but for a large family it is a bit cramped and they wished to add on extensions. By the end of the project, many families were already adding a small extension to the rear of the house.

A model house built as part of the project to illustrate improved cyclone resistant techniques. Photo: Tina Salsbury

Before the cyclone

The four villages in the project area were home to 4,213 households. The region is largely flat and low lying, with salt flats and paddy fields, and is divided by streams and a few navigable waterways. Many houses were in sites that were exposed to the wind.

The main livelihood activities were fishing, fish drying, salt production, coconuts, rice, stone cutting and stove production, and some vegetable production. The inhabitants were poor and had a low capacity to improve their homes without support.

Most housing had a framed structure, bamboo secondary structures with thatched roofing and thatched walls. Some houses had sawn timber frames and plank walls with corrugated galvanised iron (CGI) roofing. There were a few masonry or stone block houses.

Houses did not incorporate any features designed to resist the impact of high winds. They relied on vertical posts for strength, but many of these snapped off at ground level.

After the cyclone

One year after the cyclone, 120,000 families were still living in inadequate shelter that was neither sufficient to protect families against the current monsoon, nor able to resist any future cyclones.

In May 2009, a review showed that the majority of the households that reported severe and complete damage to their house could not undertake repairs due to the absence of cash or materials.

Very few of the houses built after the cyclone incorporated significant disaster risks reduction features. There was a lack of bracing, connections were not good, and many roofs had too flat a pitch.

Implementation

The project initially targeted 569 households, focusing on the most vulnerable families, to assist with the provision of materials and the construction of shelters that are disaster resilient. Subsequently, the number of households was adjusted to 533, taking account of revised construction costs at the start of the project.

Institutional setup

The international organisation would partner with a local community based organisation which had been working on the island in support of local families.

At the beginning of the project, the international organisation trained the implementing organisation in:

- Safe construction: this covered the technical issues related to safe houses – which resulted in making some changes to the proposed design of the house. A full scale house was then built in Yangon over four days so that all the details could be worked out.
- Training on fraud awareness, on accountability and humanitarian accountability partnership principles. Guidelines were provided for activity and financial reporting.

There were requirements for monthly reporting, but in practice this was not very detailed. This made it difficult to clarify questions relating to the selection of beneficiaries that arose later.

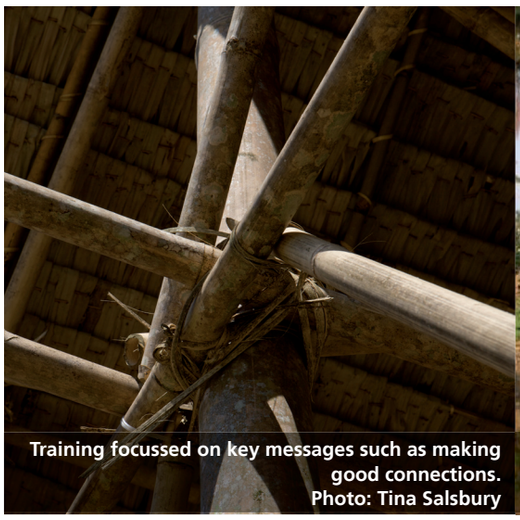
The international organisation had a full time engineer to oversee the project. It also conducted support missions for technical and administrative control.

Training

Through seven workshops, of which two in Deedukone and the rest in five other villages, a total of 607 people were trained (carpenters, beneficiaries, local authorities and leaders). 46 village leaders were given information about the principles of safe construction at the beginning of the project.

The project reached 2,607 people through the awareness raising activities. 83% of these were non-beneficiaries of the project.

1,148 people participated in a competition about the safer construction principles, with 115 people



Training focussed on key messages such as making good connections. Photo: Tina Salsbury

Households were later able to upgrade their shelters.

winning the contest in 31 groups spread through the four villages.

13 teams of 4 carpenters were trained and helped to build the full scale model house in Yangon at the start of the project, so that they were familiar from the outset about the ten principles of cyclone resistant construction and about the different techniques being proposed to make the houses more storm resistant.

Posters were distributed. These showed ten key principles of safe construction and details about safe bamboo and frame construction. They were put up on nearly all the houses and in the villages.

Most groups of families could remember many of the ten key points, and in several cases this was done with considerable animation and mime. Non-beneficiary families also knew some of the principles.

In a project evaluation, carpenters knew the construction principles, but could not always articulate this verbally. They said that they did not know how to convince clients to spend money on greater safety.

Tools

The teams did not get any tool kits. Each house required about 110 holes to be drilled. The holes for bolts were made with an auger, which was laborious. The carpenters said that the work would have been easier if each team had been adequately supplied with good tools.

A table from an end of project evaluation assessing the quality of shelters and the shelter design

1: Choose location to avoid force of wind		Poor adaptation to local site : some sites flooding at high tide ; some on rock required different foundations.	✗
2: Use simple regular shape		Good.	✓
3: Keep roof angle above 30°		Good.	✓
4: Separate roof, avoid large roof overhang		No lean to structures were planned, and only at the end of the project have families started to add on to their house. Most know about having a separate roof and respecting the key principles.	☑
5: Good connections		Yes, quite good; families have difficulty to find the same fishing line, and suggest using nylon fishing string, which would be ok; people like the use of nuts and bolts.	✓
6: Diagonal bracing		Yes, well integrated.	✓
7: Fix roof down		Yes, with bamboo trellis frame over the thatching panels.	✓
8: Opposing openings		Yes.	✓
9: Window/door leaves shut		Yes.	✓
10: Plant trees as wind breaks		Many sites so far have nothing on them, and planting may be difficult because of terrain in 89 cases on rock.	✗

✓ Strong enough

☑ Acceptable quality, needs to be improved

✗ Poor, needs more attention in future

A.21 Pakistan - 2009 - Conflict

Case study:

Country:
North Pakistan, FATA and KPK

Conflict:
IDP (Internally displaced people) crisis

Conflict date:
July 2009

No. of houses damaged:
More than 30,000 houses

No. of people affected / displaced:
2.7m people internally displaced

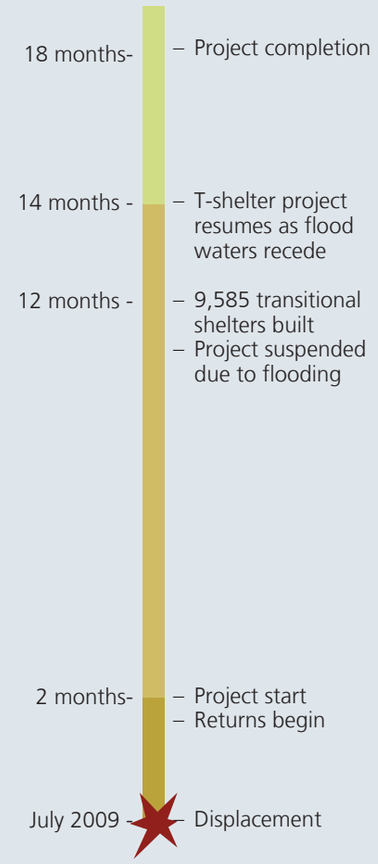
Project target population:
16,260 households (approximately 115,000 people)
Occupancy rate on handover: 93% at time of floods (July 2010)

Shelter size:
Approximately 25m²

Materials Cost per shelter:
682 USD (including kitchen, latrine, purdha wall and tools)

Additional costs per shelter:
44 USD (partner costs)
132 USD (design and monitoring)
25 USD approx. (cash for work)
Staffing / admin costs excluded

Project timeline



Project description
The lead organisation worked with six partners and established community committees (jirga) to provide shelter for people returning to damaged or destroyed houses. Kits for constructing transitional shelters, including a kitchen and latrine, were distributed. Households were given cash towards the construction cost on completion of their house.

Strengths and weaknesses

✓ The project considered cultural needs; with separate kitchens and latrines for men and women, and purdha walls for the women's privacy.
✓ Community organisations (Jirga), consisting of a diverse range of community members, were established to be involved in the selection of beneficiaries.
✓ The project used unskilled labour from within the community for construction work. This contributed to good relations between families that received shelter and those that did not.
✓ Each household received 2,000 PKR (22 USD) upon completion of the shelter. This ensured the timely completion of the shelter and reduced the later sale of shelter materials.
× The depletion of local material resources and skilled labour led to varying costs of shelters, as well as delaying the delivery of shelters.
× Landless families depended upon land being allocated to them.
× Procurement delays, material transport problems, security concerns and flooding in 2010 led to the project being delayed and extended by 8 months.
× Initially partner organisations collected construction materials from the central warehouse, leading to delays. It took many months to readjust the project to allow partners to procure their own materials. Occasionally, the wrong materials were delivered.
× Timber in particular was not procured quickly enough to meet the planned programme.
× During the first phase of the project the vulnerability assessments were not carried out. As a result some families never occupied their shelters.
× Limitations on movement and access often created problems for material delivery which lead to delays.

Transitional shelters were built for people returning after being displaced by conflict. Material and cash were provided and skilled workers were hired by partner organisations. Photo: Schellenberg

Before the conflict

People lived in three main types of houses prior to the conflict:

- *Pucca houses* with a reinforced cement concrete frame and foundation. The walls are made out of burnt bricks, blocks or stone, with sand and cement mortar. The roof is made from tiles, slates, reinforced concrete, cement sheets, or metal sheeting.
- *Semi-pucca* houses are similar to pucca houses but do not have a reinforced concrete frame. They have good quality masonry walls cement mortar and a reinforced cement concrete or corrugated galvanised iron (CGI) sheet roof.
- *Katcha* are houses with mud or dry stone masonry walls and a mud roof with wooden panels, wooden beams or CGI sheets. Most Katcha houses have a timber frame.

After the conflict

Following the military operations in FATA and KPK provinces in July 2009, more than 2.7 million people were internally displaced. When the area was considered safe, the Government of Pakistan started a returns process.

On return, most returnees found their houses either partially or completely destroyed. A damage assessment was made, using the following classifications:

1) Repairable

- *Pucca houses:* the reinforced concrete structure remained in good condition, even if walls were completely destroyed.
- *Semi-pucca houses*: the structure was in good condition and damage to the walls or roof was away from the corners.
- *Katcha houses*: damage was limited to a small section of the wall or roof away from the corners and not affecting the structural integrity.

In all cases, any surface damage, such as bullet holes, cracked plaster, broken windows and doors, etc, could be repaired.

2) Non-repairable

- Houses that were completely destroyed as well as those with significant structural damage.
- All Katcha houses with any structural damage.
- Pucca and semi-pucca houses, those with more than 40% structural damage.

According to local tradition, privacy screens (purdah walls) were built around shelters. Photo: Arif

Selection of beneficiaries

Shelter assistance was prioritised for vulnerable people who had non-repairable homes. People whose houses were repairable but not habitable were also eligible for assistance, but other vulnerability were considered. These included:

- health status (chronically sick people, people with disabilities, etc),
- financial assets (regular income or resources family size),
- social assets (position within the community, social network, etc),
- natural resources (ownership of land, forests, orchards, water resources, etc),
- number of dependents (children under 18 and women),
- family situation (widowed, orphaned, elderly without family, etc).

Community organisations

Community organisations, known as *Jirga*, were formed. Each contained at least 12 members from different tribes, and at least one school teacher, imam, khan and *nazim* (village councillor). It was encouraged that there should be women in the *Jirga*.

The *Jirga* were involved in the selection of beneficiaries along with the six implementing partner organisations. A survey form was completed for each beneficiary to verify their eligibility for support, and the information was stored in a database along with GPS data to record the locations prior to the distribution of materials.

Land allocation

To receive shelter assistance, a family required a plot of land. Implementing agencies had no responsibility for the provision of land so families without land relied on the *Jirga* to negotiate with the community, allocate land and resolve any community conflicts.

Material distribution

The implementing organisations were responsible for transporting construction materials from the central warehouse to the villages, and on to the site where the shelter would be built. Once delivered to the site, security of the materials became the responsibility of the beneficiary.

"It may not be a mansion but our shelter certainly provides some relief to the returning population, whose houses have been partially damaged or even completely destroyed. We try our best to come up with a design that suits the environment and local traditions."

Implementing partner

Implementation

The construction of the shelters was the responsibility of the beneficiaries. Cash was paid for unskilled labour. Technical support was provided by the implementing agencies and social support came from the local *Jirga*.

One partner organisation was responsible for overall technical assistance of the project. This included the following activities:

- Preparation of shelter standards and bill of quantities.
- Quality control of materials in the central warehouse.
- Training and orientation for field staff of implementing partners.
- Support for initial beneficiary selection and re-verification of beneficiary lists.
- Mobilisation of communities and technical assistance to implementing partners.
- Construction of model shelters.

A group of transitional shelters showing external purdah walls. Photo: Arif

- Monitoring of project progress.
- Issuing completion certificates.
- Coordinating with local authorities, the army and implementing partners.

Where people were unable to provide the labour, the implementing organisation was responsible for the construction of the shelter.

Skilled labourers, such as masons and carpenters, were organised by the *Jirga* and paid by implementing organisations. Cash was only paid to the beneficiary once the shelter was complete.

Shelter design

Each transitional shelter was designed to accommodate a family of seven, with space for a living area, a kitchen and a latrine. Families with more than seven members were entitled to additional materials in order to meet minimum standards.

Within one year of the conflict, a total of 9,585 transitional shelters were constructed.

After the flooding

In July 2010, floods inundated many areas of Pakistan displacing millions of people. This led to the construction of shelters for people displaced by the conflict being put on hold until the flood waters receded.

This katcha house was one of those repaired. Photo: Arif

Initially these flood affected families were provided with emergency non-food items and were sheltered in public buildings, such as schools, or in tents and make-shift shelter on higher ground.

KPK was the first province where the flood waters receded, and from September 2010 to January 2011, a total of 6,675 transitional shelters were constructed for people affected by both the floods and the conflict.

In total, 16,260 transitional shelters were constructed for conflict and flood affected people in the 16 months from when the conflict returns began.

Materials list

Materials	Quantity
Timber pole 2" (50mm) dia Timber pole 3" (75mm) dia	100m 69m
Coverings: Plastic sheet (5 sheets) Bamboo mat	 120m^2 61m^2
Nails 6" (150mm) (number 2) 5" nails (125mm) 2" nails (50mm) nail caps 1.5"dia (40mm) Rubber washers 1.5"dia (40mm) Hinge, hold fast iron size 4" (100mm) Nails 1.5" (40mm)	6kg 5kg 3kg 3kg 150 2 1
Doors (using poplar timber) Timber 3"x1" (75 x 25mm) Timber 3" x 1.5" (75 x 40mm) Timber 2" x 2"(50x50mm) Bow handle Door lock	 26m 6.5m 4.4m 2 2
Locka (Plant matter used for insulation)	80 bundles
Iron strip for reinforcing joints 30 gauge 12" x 1" (300x2.5mm) GI wire 16 gauge	60 34m
Corrugated Iron 26 gauge 10' x 3' (3x0.9m) Iron sheet for ridge 24 gauge 18' x 2.5' (5.5x0.75m)	14 5.5m
Rope (cotton 1 head, 13mm)	55m

A.22 Pakistan - 2010 - Floods - Overview

Overview

Summary

The 2010 monsoon season caused the worst flooding in Pakistan's history, and one of the larger humanitarian crises of this century. The floods affected every province, over half of the districts in Pakistan, and one-tenth of Pakistan's population. They damaged or destroyed 1.8 million homes, from the mountainous north where winters are cold, to the south where flooding caused the most damage. The scale was vast, but the funds did not meet the needs.

For the first months, the government of Pakistan and many organisations working in the affected areas distributed tarpaulins, tents and other non-food items. The government also made cash payments to registered flood affectees using a "WATAN Card".

Following the emergency response, a "one room shelter" approach was adopted, by which organisations supported families to build a permanent shelter, which families could later extend. However the scale of the floods was such, that less than 10% of those who lost a house received such a shelter.

Before the floods

Pakistan has a strong and recent experience of dealing with humanitarian emergencies, from conflict displacements (including the Afghan refugee crisis and the 2009 IDP crisis) to natural disasters (with major earthquakes in 2005 and 2008 and floods in 2007). As a result there was significant experience in dealing with the aftermath of disasters. However much of this was focused in the north of the country.

There were also significant stockpiles of relief items some of which got flooded. Additionally there was a manufacturing industry, being one of the world largest manufacturers of humanitarian tents and other key relief items.

After the floods

The floods began in the north of Pakistan in late July 2010. Heavy rains lead to flash flooding, landslides and areas becoming inundated. Before the end of July, over half a million people had been affected and the emergency response began.

It was another six weeks before the full extent of the floods became known. The initial United Nations floods appeal was launched as waters were still rising in Punjab and Sindh in the south of the country.

By mid-September 2010, the National Disaster Management Authority (NDMA) estimated that the floods of 2010 had damaged or destroyed 1.8 million households in Pakistan and that approximately 75% of the flood devastation was concentrated in Punjab and Sindh provinces.

The floods led to wide scale displacement. Some people were displaced for days. In other areas flood waters took six months or longer to recede.

Surveys indicated that 9% of flood-affected individuals stayed with host families, 13% in collective centres, 19% in planned camps, 10% in spontaneous settlements and 40% returned to, or remained in, their place of origin by September 2010. Many schools were used as collective centres.

Of the flood-affected areas in Pakistan, Sindh province was the worst affected, with more than 80% of affected houses either heavily damaged or completely destroyed, while in Punjab province 65% of affected houses were heavily damaged or completely destroyed.

Response capacity

The disaster management capability of each affected province was quite different. In Khyber Pakhtunkhwa province, where earthquakes and other natural disasters occur more frequently, the Provincial Disaster Management Authority (PDMA) was relatively well-pre-

The floods caused significant damage to infrastructure and made 11 million people homeless. Photo: Joseph Ashmore

Over 1 million tarpaulins 380,000 tents were distributed. Additionally there was also a very large scale, though less coordinated, response from Pakistani civil society.
Photo: Joseph Ashmore

pared to coordinate and manage the flood response. However, in Punjab and Sindh provinces which were the most affected, the capacities were much smaller because they had not previously managed a natural disaster of this scale.

As temperatures in the north were due to fall below zero a few months after the floods, shelter would become a lifesaving priority. However, particular focus was needed in the south as delayed flooding meant that the response was four to six week behind the north and there was an urgent need to encourage an increase in capacity.

Although strong national shelter coordination was established, the scale of the disaster was so large that coordination efforts were challenged, especially at district level.

Emergency response

The Emergency response was relatively swift and on a very large scale, especially when taken in comparison with other disasters. Within the first six weeks of the response over 300,000 families had been supplied with emergency shelter items.

By the end of the emergency response, over 1 million households had been provided with a tent or two tarpaulins.

Despite the scale of this response, it only amounted to 67% of the total estimated need. These shortcomings were a result of the massive scale of the disaster, the shortage of funds and shortage of experienced implementing partners in the south of Pakistan.

Recovery shelter

The focus of the recovery strategy was on the construction of one room shelters for those able to return to their place of origin and transitional shelters for those people who remained displaced, those with limited access to land, and for seasonal migrants.

One room shelter (ORS) was defined as "a more durable solution built at place of origin with indigenous materials and techniques." The envisaged lifespan of the one room shelter was 3 to 5 years, which can be extended upon upgrading of the shelter.

Transitional shelter was defined as "a transitional solution that responds to temporary needs, e.g. for those facing extended displacement or those living in frequent flooded areas". Transitional shelters should have had a lifespan of at least 1 year, and a design that allowed for reuse of materials.

In total less than 150,000 one room shelters and transitional shelters were built. Although this is one of the largest shelter responses in history, it met only a small fraction of the total needs.

WATAN cards

To support families during the relief and reconstruction phases, the Government of Pakistan established a WATAN card scheme. The WATAN Card is an ATM card that the government was able to make payments to. It was distributed to people in affected villages.

In the 12 months up to August 2011, the government of Pakistan issued WATAN Cards to 1.6 million households, through which they received grants of 225 USD each.

A planned second phase would support 1.1 million households with cash grants of 450 USD per household.

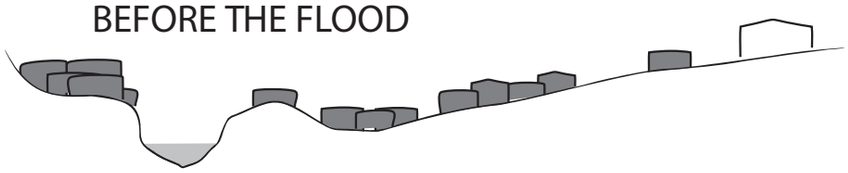
"The floods of 2010 are being termed as SUPER FLOODS for Pakistan due to their large scale devastation in the country. They have laid new benchmarks for the country both in terms of preparedness and response. The floods affected 21% of cultivable land of the country and uprooted 20 million people from their homes and lands. Shelter, being the private asset, was once again the focus of attention for the government as well as the humanitarian community. It was important to help people get back to their homes quickly to avert another food disaster in the country..."

Waqas Hanif - Advisor National Disaster Management Authority (NDMA) and focal person for Shelter Cluster

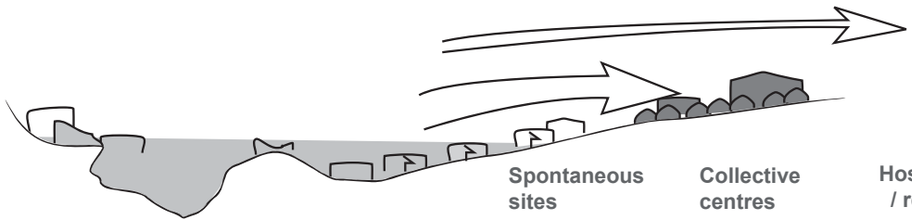
"Nobody was prepared for the magnitude. We were trying to think big, but that was not enough. We went to provincial coordination, to hub coordination, to district coordination; this had never happened before..."

Arshad Rashid - Shelter cluster coordinator Pakistan floods

BEFORE THE FLOOD



DURING THE FLOOD - People are displaced to higher ground.

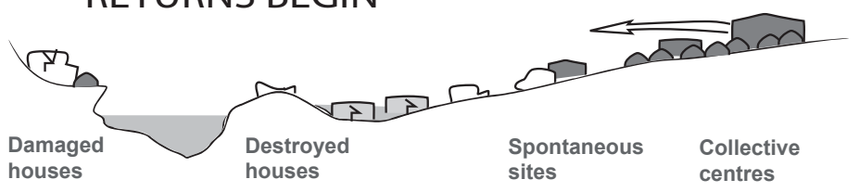


Spontaneous sites | **Collective centres** | **Host families / rental** | **Camps only where absolutely necessary**

Tarpaulins & fixings or Tents, Household kits

Note: Spontaneus sites includes dispersed shelter where one or two familes settle on elevated land near their houses.
Camps require significant resources and can increase the challenges in return and recovery.

RETURNS BEGIN

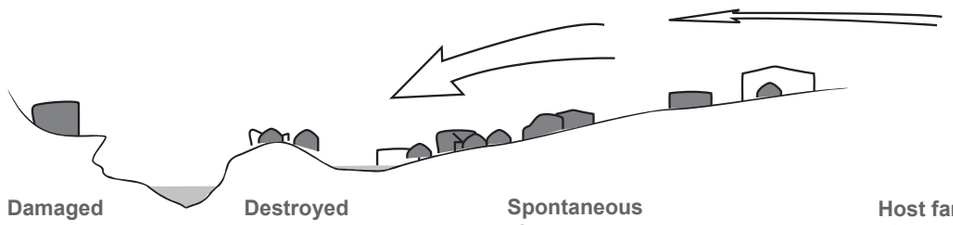


Damaged houses | **Destroyed houses** | **Spontaneous sites** | **Collective centres** | **Host families / rental**

Tarpaulins & fixings or Tents, Household kits

Tents not required for houses that can easily be repaired, nor for collective centres.
Tool kits and Community clean up kits for damaged houses.
Collective centres rehabilitated.
Cash and vouchers should be considered where local markets are able to support the needs.

RETURNS CONTINUE - Some people have lost their land and are unable to return.



Damaged houses

Tarpaulins & fixings,
Construction materials
Tool kits,
Household kits
Community clean up kits

Destroyed houses

Spontaneous sites
Longer term solutions should be sought

Host families / rental

Tarpaulins & rope,
Tool kits,
Household kits
cash

As returns continue:
- Most people move to the land where their damaged or destroyed house was.
- Collective centres and many spontaneous camps close. sites and buildings are rehabilitated.
- Organisations consider transitional shelter as support.

Livelihoods support
Advocacy
Public information
Support for return
Targetting of vulnerable individuals
Damage assessments
Displacement tracking
Coordination
Analysis of gender differences and needs
Monitoring and review

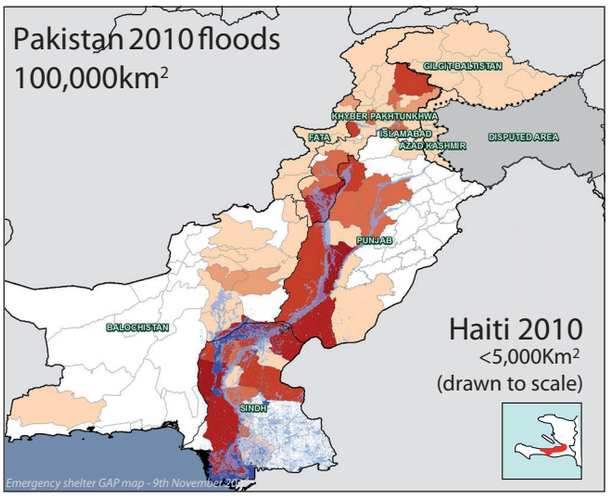
IASC Inter-Agency Standing Committee PAKISTAN FLOODS SHELTER CLUSTER

www.shelterpakistan.org

PAKISTAN FLOODS RESPONSE AFTER 8 MONTHS

Although the disasters compared in this document are very different in nature, human impacts, and challenges, this document makes some numeric comparisons based on data collected from the shelter cluster for different responses.

Area affected



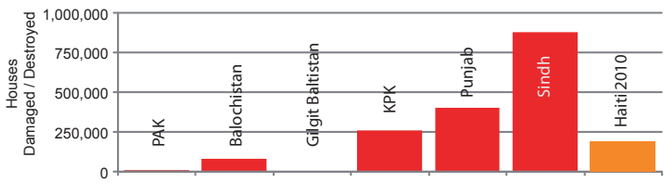
People who lost their houses

11 million
Pakistan floods 2010

1.5 million
Haiti 2010 earthquake

The 'slow tsunami' that hit Pakistan in 2010 damaged or destroyed an estimated 1.7 million houses, leaving at least 11 million people homeless.

In Punjab alone, twice as many houses were damaged destroyed by the floods than by the 2010 Haiti earthquake.

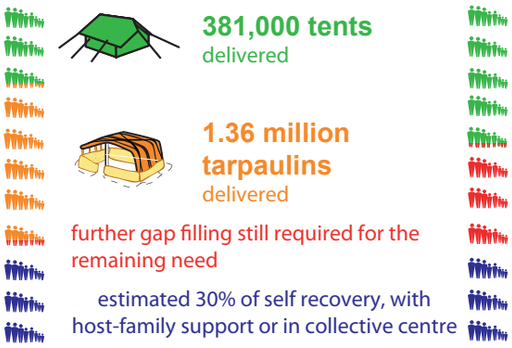


EMERGENCY SHELTER RESPONSE

The cluster estimated that 70% of those with damaged and destroyed houses will need emergency shelter support.

Emergency shelter has been delivered to over 1 million households. Despite the scale of response, only 67% of the emergency shelter needs have been met.

Other Non-Food Items distributed are 438,600 bedding sets, 603,200 kitchen sets and 94,500 tool kits.



381,000 tents
delivered

1.36 million tarpaulins
delivered

further gap filling still required for the remaining need

estimated 30% of self recovery, with host-family support or in collective centre

2.5 million blankets
delivered or on their way

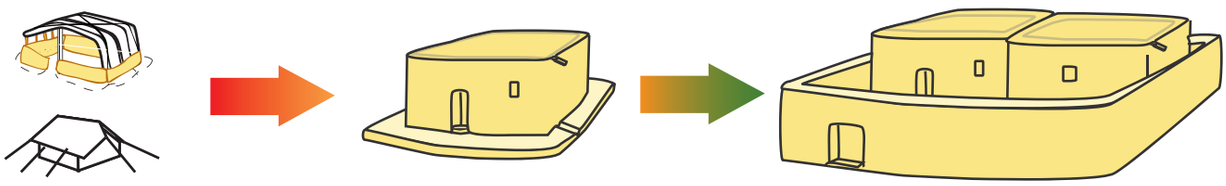
1.5 million
more required

SHELTER CLUSTER FUNDING

US$ 322 million requested

48% funded | $168 million unmet requirement

EARLY RECOVERY SHELTER RESPONSE



Emergency:
Tents or tarpaulins

"One room" shelters
Technical guidance

As time progress families upgrade one room shelters to form a home

One Room Shelters are simple traditional structure made from mud or brick, that allow families to upgrade and extend when they have the means to do so.

Transitional Shelters are lightweight structures that can be relocated. They are for those who cannot return to permanent land.

Technical guidance for the ongoing self recovery process, includes outreach messages and training of skilled labour and local engineers.

To date, Shelter Cluster members have constructed over 40,500 one room and transitional shelters and are committed to supporting the construction of over 247,000 in total. - a rate similar to that following other major disasters.

Current commitments will, however, **only meet 31%** of the total need.

Large numbers of families have started rebuilding on their own the Shelter Cluster's priority is to support communities' capacity for self-help. Other forms of support such as **training centres** are urgently required to provide technical assistance and help families to rebuild more safely.

Data sources: cluster websites for Haiti and Pakistan, FTS.
Some graphics reproduced courtesy of Stanford Kay Studio.com and JosephAshmore.org.
31/03/2011

A.23 Pakistan - 2010 - Floods

Case study:

See A.22 "Pakistan - 2010 - Floods - Overview", p70 for background.

Country:
Pakistan, Sindh.

Disaster:
Floods

Disaster date:
July 2010

No. of houses damaged:
About 1.8 million in 77 of 139 districts across Pakistan

No. of people affected:
More than 20 million

Project target population:
Pilot project 175 households

Occupancy rate on handover:
100% as of 10 March 2011

Shelter size:
25m²

Materials Cost per shelter:
USD 740

Project timeline

Project description
This pilot project built 175 one room shelters for flood affected families in South Pakistan. It was later followed by a much larger scale project (building thousands of shelters over 18 months). Working through partners, the agency provided the construction materials and paid for skilled labour. Each shelter was built from burnt brick and had an accompanying kitchen and latrine.

Strengths and weaknesses

✓ Conducting a pilot project allowed issues with the project process to be identified before a large scale project was implemented.

✓ The returning families were supported to return to their original locations.

✓ The community were consulted and involved throughout the project, including the needs assessments process, shelter design, materials sourcing and shelter construction.

✓ Skilled labourers from nearby villages also benefitted from the opportunity to work on the shelter construction.

✓ The projects were flexible for the different needs of each village, depending on the social situation and the preferred balance of shared facilities and privacy.

× Once the project was started, the planned project duration of 4 weeks proved to be insufficient. Although it was extended to 6 weeks, the actual time taken to build the 175 shelters was 11 weeks. This was due to time taken to mobilise the community and rain interrupting work.

× Lack of planning a delivery schedule and use of a single supplier led to the late supply of construction materials.

× Lack of detailed specifications led to poor quality of materials. This was compounded by lack of ownership by the flood affectees leading to additional damage of materials during transport and unloading.

× There was a problem accommodating labourers from other villages, so tents had to be provided.

× While the affected population were involved in the project they could not focus on normal livelihoods activities, so the provision of food became an issue.

The project was a pilot for a larger construction programme.
Photo: Kpakpo

Before the floods

See Background: A.22 "Pakistan - 2010 - Floods - Overview", p70.

Selection of beneficiaries

A village assessment was carried out to select three villages in one district in Sindh for the pilot project.

A family assessment was then used to identify eligible beneficiaries. Each selected village had between 40 and 80 families who were eligible for the project.

Community mobilisation

Community meetings were organised to discuss the needs of the returning families and participatory rapid assessments were carried out. Community based organisations were established to manage the projects. Members were trained on mobilising their communities.

The projects were coordinated and monitored through a district coordinator and senior engineer, regularly reporting to the District Coordination Office and the District Disaster Management Authority. In addition, each village had its own site engineer and logistics assistant.

Shelter design

The one room shelter was designed to the following brief:

- minimum floor area of 25m^2,
- separate latrine and kitchen,
- durable foundations,
- brick/ concrete block construction with cement mortar.

Due to site conditions and consultations with the beneficiaries, modifications were made to the original design:

- A high water table meant that the height of the foundation wall was increased from 150mm to 450mm.
- 10% cement was added to the mud mortar to increase its durability.
- At the request of the beneficiaries, the pitch of the roof was reduced and the door dimensions were changed to 1.2m x 2m.
- As the sites were dense, the distances between shelters were reduced and sometimes shelters joined.
- To meet individual community requirements, one village, consisting of one extended family, built communal toilets and washing facilities. In other villages where families wanted more privacy, houses and individual toilets were built in long rows.

Land allocation

Before construction could begin, field teams verified that there were no land disputes and a formal Non Objection Certificate (NOC) was obtained. In one of the three villages, all families owned a piece of land, but in the other two villages the land belonged to a landlord, who provided the NOC.

Implementation

The project was designed to ensure a degree of participation by those receiving the shelters. Each family provided unskilled labour, and was responsible for plastering inside the shelter. The community based organisations located and contracted skilled labour from nearby villages.

In the pilot project beneficiaries were not paid. Their contribution to the project was to provide unskilled labour and salvage materials.

Logistics

A single supplier was identified following a tendering process that included taking out advertisements in the newspaper. However, the contract did not stipulate the delivery schedule. As a result no materials were delivered in the first 2 weeks of the project.

Shelters were built from brick with the aim of being more disaster resistant.
Photo: Kpakpo

During the procurement, material specifications only indicated the dimensions of the products and as a result, the quality of material varied. Furthermore there was lack of clarity over who was responsible for the materials once they had arrived on site. As a result, a lot of bricks and roofing materials were damaged during off-loading and moving.

Families were expected to provide around 10% of the bricks that were required through salvaging materials.

Design modifications

Following the pilot project, it was agreed with the local authorities that future projects would include two structural improvements:

- Walls should be strengthened by specifying cement mortar for the full height of the walls and not just the bottom 0.5m.
- There should be greater resistance to earth tremors through the addition of a reinforced concrete ring beam at the top of the walls.

The modifications increased the unit cost from around 740 USD to over 1,100 USD.

In the 10 months after the pilot project, significant numbers (thousands) of one room shelters had been completed for the floods response.

Materials list

Materials	Quantity
Excavation	8m^3
Foundation: 3% cement & soil mixture	4.6m^3
Brick masonry (Plinth) 1:4	4.6m^3
Damp proof course	0.52m^3
Brick masonry (Wall) 1:4	16.13m^3
Lintel (reinforced concrete)	1.7m (long)
Wooden girder (roof)	12.3m
Bamboo	83.4m
Mat (2.4m x 6m)	3
Plastic sheet 6mx4m	1.5
20mm thick mud plastering	32m^2
Door (wooden)	1
Woven mats	12

Different stages of the construction process. Houses were built with a bathroom and a kitchen. Photo: Kpakpo

A.24 Pakistan - 2010 - Floods

Case study:

See "Pakistan - 2010 - Floods - Overview", p. 70 for background.

Country:
Pakistan

Disaster:
2010 Floods

Disaster date:
July – September 2010

No. of houses damaged:
1.8 million houses damaged or destroyed

Project target population:
38,500 households
Estimated 217,617 beneficiaries targeted

Shelter size:
Shelter sizes vary. 225 square feet (70m^2) was recommended
For mud structures, this was the suggested maximum

Materials cost per shelter:
300 USD cash per shelter provided
If DRR recommendations are followed cost to beneficiaries 500 USD for a mud house, 1,000 USD for a fired brick house

Project timeline

Project description
This large scale project provided cash to provide households with the means to buy materials and hire labour. Each household received the cash in 3 tranches. Each payment was made when a group of up to 25 households constructed to an agreed level. Payments were made via an agreed focal point for each group of households. The project was managed by 44 Implementing Partners spread over 3 provinces, most of them local agencies.

Strengths and weaknesses

✓ Cash transfer allowed households to use money in the way they saw fit.
✓ Transferring cash instead of materials meant that materials were purchased locally.
✓ Using community focal points to distribute cash proved to be overwhelmingly reliable.
✓ 25 households built shelters as a group, supporting each other in order to receive the next payment.
✓ Disaster Risk Reduction trainings and messages to communities resulted in safer houses.
✓ A monitoring and evaluation and an information management system ensured that the programme was carefully tracked.
× The banking system in Pakistan lead to cash transfers often being delayed.
× Because households were free to choose the construction materials they wanted, giving out disaster risk reduction advice to each household was difficult.
× Not all of the implementing partners had the shelter experience or the staff capacity to cope with the project requirements.
× Some organisations working in nearby sites provided different amount of money, leading to initial dissatisfaction among recipients and some drop outs.
× Internal requirements on financial accountability led to a significant amount of paperwork, requiring 59,064 separate signed documents (various forms, MoUs, approvals, receipts, checklists, etc.).
- Identifying the most vulnerable households required major efforts from the implementing partners and extra verification from the organisation.

Before the floods

See Background: "Pakistan - 2010 - Floods - Overview", p. 70.

Implementation overview

The project built One Room Shelters (ORS) through a cash transfer system. One room shelters were traditional houses that could be extended later. They were generally built with brick or mud walls.

The project allocated a total of 300 USD to build each shelter. Households were then able to use the money to procure materials and/or labour as they saw fit.

Technical advice was provided to help families to improve their resilience to future disasters.

The 300 USD that was provided to each household was nationally agreed between organisations in November 2010. Some projects that started later, or that worked in areas with seismic risks provided a larger amount per shelter. The organisation continued with 300 USD per household because it allowed more people to benefit.

Many households added their own resources to build their houses, in some cases selling assets such as livestock. Many beneficiaries also used emergency funds provided by the government through the "WATAN" card system.

Most households participating in the project built shelters that were significantly better than the house they had been living in before the floods.

Beneficiary Selection

The village committee was responsible for selecting the most vulnerable households using the following criteria:

1) The house must have been destroyed or heavily damaged as a result of the 2010 floods.
2) In addition, one or more of the following criteria were met: no adult male in the family, disabled family member, medically unfit family member, elderly family member, family taking care of orphans, large family, or poor family.

The implementing partners verified that the targeting had been done using the criteria before people joined the programme. Monitoring staff also verified compliance with targeting criteria.

Groups of 25 households

The organisation insisted that every household participating in the project worked as a group and completed each stage of construction before any household would receive the next tranche of funds.

The group of no more than 25 beneficiary households had to work together as a unit. It was stressed that none of the beneficiaries would succeed unless all of them succeeded.

It was understood that they had to help the most vulnerable people to complete their shelter as a precondition for getting money to construct their own shelter.

Distribution in 3 tranches

Each household received 100 USD as an advance for digging the foundations and constructing the shelter up to the plinth level. Once the implementing partner had verified that all plinths had been completed, a request for the 2nd tranche of 100 USD was made and funds were subsequently distributed.

Once the Implementing Partner had verified that all walls had been completed, a request for the 3rd tranche of 100 USD was made and a final cash distribution was made for the construction of the roof.

Cash transfer focal points

In each village, a representative village committee was established. This was responsible for choosing a highly dependable and respected person from the community who would act as the focal point for the project.

The focal point brought money paid via his/her personal bank to the village and distributed it to each group of 25 beneficiary households.

When the focal point accepted the responsibility, he/she was given a Memorandum of Understanding to sign and told that bank charges related to the programme activities would be covered. Upon the successful conclusion of the project, he/she would also receive 175 USD.

It was explained that when beneficiaries signed the Memorandum of Understanding to participate in the programme, they were also

The project provided cash in three tranches so that people could purchase materials and hire labour.
Photo: Usman Ghani, IOM Pakistan

accepting the focal point to receive money on their behalf. Once the focal point had received the money, it was no longer the responsibility of the implementing organisations.

The focal points brought three separate tranches totalling up to 2,500 USD each to the community. In only a handful of cases were funds not delivered to communities according to plan. This relatively small number of cases should be seen in the context that the programme worked with approximately 1,600 focal points.

The 11 required photographs were:

1. Head of household standing in front of existing shelter
2. Head of household holding CNIC (National Identity Card)
3. Close up of CNIC card
4. Head of household standing in front of the empty plot where they are going to build
5. Head of household receiving first tranche (thumbprint on documentation)
6. Plinth level completion
7. Head of household receiving second tranche (thumbprint on documentation)
8. Wall level completion
9. Head of household receiving third tranche (thumbprint on documentation)
10. Roof level completion
11. Household occupying the shelter

Technical aspects

After testing techniques during the pilot phase, multiple, highly practical trainings for the implementing partners were held. Different messages were developed for different types of construction.

Many field visits were made to ensure that the messages were being disseminated to communities and used in the construction. Three posters were produced that showed the three main construction typologies and techniques that could make shelters stronger and more flood resistant.

Housholder in front of her completed house. This was one of 11 photographs taken per household as part of the required project documentation. Photo: IOM Pakistan

Land rights is a major issue in Pakistan, especially in Punjab and Sindh provinces which have large tracts of land under the control of landlords. In this project, no distinction was made between those owning and those renting land.

Monitoring

Implementing partners were required to fill in forms that established the vulnerability of the household, tracked the progress of the construction and tracked the distribution of tranches to beneficiary heads of households. In addition, the organisation had its own team that monitored around 7% of the households to verify targeting and to ensure that the construction progress reported by the implementing partners was being accurately described.

A great deal of monitoring both by implementing partners and the organisation ensured that households were meeting the construction thresholds.

GPS coordinates and 11 photographs taken during the course of cash distribution and construction were required for each beneficiary household so that construction progress could be comprehensively tracked throughout the process.

All of the information and photographic evidence was uploaded into a large database that was managed by a team of information managers.

In an effort promote transparency and answer any questions relating to the programme, posters in local languages were printed and posted in the communities. These posters had the phone number of a call centre where people could obtain information and make complaints.

Programme management

The programme operated in 3 provinces. The programme headquarters were in Islamabad but the day-to-day management responsibilities were devolved to four hub offices.

In Northern Pakistan, the organisation directly implemented the construction of shelters, whereas in Punjab and Sindh provinces the organisation worked with 44 Implementing Partners, of which all but 4 were local agencies.

Focal Points distributed money paid via their personal bank account to each group of 25 households. Photo: Carlo Gherardi

A.25 Pakistan - 2010 - Floods

Case study:

See "A.22 Pakistan - 2010 - Floods - Overview", p.70 for background

Country:
Pakistan

Disaster/conflict:
Floods

Disaster/ conflict date:
July – September 2010

No. of houses damaged:
1.8 million houses damaged or destroyed

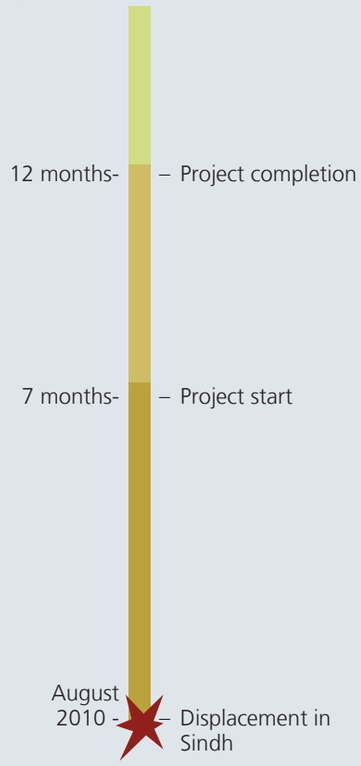
No. of people affected:
More than 20 million people

Project target population:
300 families

Occupancy rate on handover:
Unknown

Materials cost per shelter:
316 USD
The overall programme cost was significantly higher

Project timeline



Project description
Provision of 'One Room Core Shelter' for flood affected vulnerable families in Jacobabad, Sindh Province, Pakistan. This project used a staged voucher system for beneficiaries to source all materials and to pay labour. This reduced logistical delays and greatly increased beneficiary participation. The design incorporated some disaster risk reduction considerations whilst still using predominantly local materials and practices.

Strengths and Weaknesses

✓ Thick mud walls and roof keeps the inside of the shelter cool during summer.
✓ Mud was sourced from the immediate vicinity, reducing logistical delays and environmental impacts.
✓ Beneficiary led material procurement and quality monitoring resulted in high quality materials.
✓ Vouchers redeemable for cash to make labour payments allowed people to use the cash payments for other requirements.
✓ This shelter design was acceptable to landowners. The roof is the majority of the investment and belonged to the families.
✓ The shelters were designed so that during flooding, the mud walls could be washed away leaving the roof intact.
✓ The shelter could be easily extended. Another 2 columns and 1 girder would allow the shelter size to be increased in size by 50%.
× Relatively small scale project given size of disaster.
× Material costs increased by 38% during the implementation period.
× Demands for skilled masons exceeded local supply.
× Harvesting and planting seasons interrupted construction.
× Some local leaders tried to influence community committees and suppliers for political reasons.
× Budget did not allow sanitation facilities to be built.
× Variable security hindered monitoring activities.
× Recruitment of qualified field staff was extremely difficult given the competition and scale of reconstruction in the area.
× Structural integrity of the shelter highly dependent on good quality foundations. This was difficult to monitor.
× The project was unable to provide guaranteed security of tenure for the recipients due to the immense power of local landlords and the entrenched feudal systems of landownership.

The one room shelters were built using vouchers to pay for both materials and labour. Photo: Jake Zarins

Before the flood

See "A.22 Pakistan - 2010 - Floods - Overview", p.70.

Jacobabad district has traditionally not been considered a high risk area for flooding; it was only due to the exceptional flood levels in the 2010 floods (and again in 2011) that the area was submerged and population affected.

There were extremely high levels of poverty before the flood with both bonded labour and a lack of land ownership for the majority. This greatly increased the affected population's vulnerability.

After the flood

Jacobabad district was one of the hardest hit areas during the flooding, with almost the entire district submerged. An estimated 160,000 houses were destroyed and as many as 1.4 million people left without adequate shelter in Jacobabad district alone.

The bowl shaped topography prevented flood waters from receding and much of the land remained submerged many months after the initial flooding.

Selection of villages

Villages were selected through close coordination with other humanitarian organisations, government authorities and relevant local actors to prevent duplication, and also with the organisation's projects in other sectors.

Communities were prioritised where the majority of buildings prior to the flooding had been constructed using traditional materials (mud or '*kacha*') and had been completely destroyed.

Additionally those villages with higher than normal proportions of extremely vulnerable people and groups (single parent families, persons with disabilities, the elderly, and those with no secure land tenure or rights) were given priority.

Selection of beneficiaries

The implementing organisation used the following guidance on prioritising vulnerable groups for assistance:

- Poor families with three or more children.
- Women headed households.
- Households supporting orphans or disabled families and chronically ill family members.

Under these criteria all beneficiaries selected for shelter assistance were considered to be vulnerable.

Community committees

Committees were formed consisting of beneficiary family representatives, village leaders and local decision makers.

These committees, under guidance from the community mobilisation staff assisted in promoting disaster risk reduction activities such as the raising of plinths on which the shelters were to be built. They also led on shelter maintenance initiatives, the planting of trees (flood break/plinth binding) and other aspects of community safety and improvement (e.g. danger of illegal electricity connections).

Committees were also responsible for overseeing the selection of vendors for the supply of bricks and for the monitoring of delivered materials. This group-led procurement allowed communities as a whole to reject poor quality materials and negotiate timely delivery. This empowered communities and reduced the need for the implementing agency to be present during each delivery and ensured unscrupulous vendors could not take advantage.

Beneficiary agreements

Prior to construction each beneficiary signed an agreement clearly stating the roles and responsibilities of the beneficiary, the community, and the implementing organisation. It highlighted that any deviation from the prescribed process or design would be solely their responsibility.

The community committees were also responsible to ensure the conditions of the MoU were reinforced and to assist project staff in dealing with any dissatisfaction or complaints.

If the owners had to move they would be able to keep the materials in the roof. These were the majority of the cost of the structure.
Photo: Jake Zarins

Technical solutions

The design was based upon brick and cement mortar columns. Each column was built on an individual foundation. These columns were aligned to support 3 steel girders and a traditional style flat roof of bamboo, reeds (*Khick*), plastic sheet and mud plaster.

Beneficiaries chose whether to build walls with either traditional compacted mud or with sun dried mud bricks.

The shelter was finished with either a mud or a stabilised mud plaster on both the interior and exterior walls to provide protection from slow rising flood water or heavy rain.

In the event of serious flooding and fast flowing waters the walls between the columns would dissolve leaving the roof intact.

The approach used materials and techniques that are familiar to the targeted communities. The thick mud walls help to keep the interior of the Shelter cool even during the extreme summer heat when temperatures rise above 50^0 C.

Land tenure

The majority of the families in the project were tenant farmers or indentured labour who had for the most part occupied these areas for generations. Due to the complex feudal system of land ownership that dominates the region it was impossible to negotiate secure tenure.

Despite negotiation, the landowners refused construction of any form of full masonry (*Pukka*) structures. Under customary law the landlord automatically owns any part of a structure sunk into the ground. The roof which is the major part of the value of the shelter would still belong to the families. The expensive roofing girders could in theory be removed and taken away if the family were ever evicted.

MoUs were agreed with landowners prior to construction to ensure beneficiary rights were secured as much as practically possible and would not be evicted from their homes to make way for other workers or families.

Vouchers

To increase participation, and in consideration of a highly variable security environment, a voucher system was used which also reduced both the logistical burden and some of the quality control responsibility of the implementing agency.

Beneficiaries were trained in minimum quality requirements of the materials and then issued with a booklet containing phased vouchers for both materials procurement and labour payments.

Vouchers could only be redeemed following sign off from field staff who ensured beneficiaries had undertaken work to the required quality, and reached the next stage in the construction process.

Pre-selected vendors would only receive payment once all vouchers for a community had been signed off by agency staff. Brick factories engaged in the project were monitored to ensure that no child labour was used.

Implementation

Construction was completed in a comparatively short timeframe once project preparations had been finalised. The use of vouchers was extremely successful in ensuring timely delivery of good quality materials. The communities policed the process vigorously and did not hesitate to reject any materials they considered to be of poor quality. Any reloading and additional transportation costs were the responsibility of the suppliers and they rarely attempted to supply poor materials more than once.

At some stages in the project, seasonal cultivation activities reduced the availability of labour.

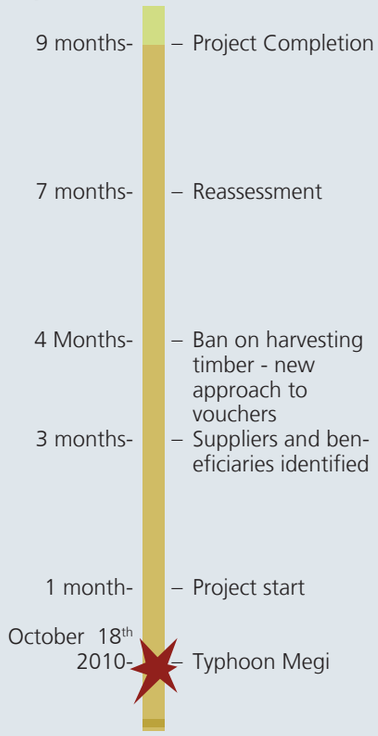
During the 4 months of project implementation, inflation increased material prices by 38%. The use of vouchers meant that the agency could negotiate directly with vendors for any adjustments in the value of the redeemed vouchers without slowing construction.

A.26 Philippines - 2010 - Typhoon Megi

Case study:

Country:
Philippines
Disaster:
Typhoon Megi
Disaster date:
October 18th 2010
No. of houses destroyed:
30,048 (destroyed)
118,174 (damaged)
Project target population:
49,765 people (9,953 households) in Cagayan, Isabela, Kalinga and La Union
Materials Cost per household:
160 USD for damaged houses,
340 USD for destroyed houses through cash vouchers

Project timeline



Project description
Vouchers were distributed to provide materials for the repair of 9,953 shelters. Two types of vouchers were tried. Initially people could choose from a given list of materials. Due to supply issues the project was adjusted so that people could choose the materials that they wanted up to a given value and from an approved list of suppliers. Families also received information on how to reinforce their homes against typhoons.

Strengths and weaknesses

✓ The cash voucher approach ensured that beneficiaries played a bigger role in their own recovery.

✓ According to a project evaluation people assisted felt that orientation and information sessions enabled them to understand what they were entitled to receive.

✓ Recommending several hardware stores allowed people to shop around, but also allowed them to choose the most convenient stores.

✓ Vouchers allowed people to identify and prioritise their own needs.

✓ The value of the vouchers was sufficient to meet the immediate shelter needs. However many people added their own resources to repair their houses.

✓ The majority of people supported by the project preferred vouchers to direct cash. Their main reason was that vouchers enabled them to avoid spending cash on other needs. It also allowed the organisation to agree fixed prices with the suppliers and guarantee quality.

× Initial attempts to restrict which materials could be used failed due to supply shortages following a government ban on harvesting timber.

× Some dishonest suppliers could cheat beneficiaries of some items and claim them in invoices. Financial controls aiming to prevent this required a very large amount of documentation and massively increased the workload for project and finance staff.

× A minority of beneficiaries colluded with suppliers and used their cash vouchers for other unintended purposes. In part this was due to shelter not being seen by all of them as the highest priority.

× Not all households adopted improved typhoon-resilient construction techniques. The project could have better promoted and trained in safer construction techniques.

Vouchers were provided that could be used to purchase materials up to a given cash value.
Photo: Hajime Matsunaga/IFRC

Before the typhoon

The Philippines has a history of storms. In late 2009 Typhoons Ketsana and Parma caused considerable damage. Three of the districts hit in 2009 were also hit by typhoon Megi in 2010.

After the typhoon

Typhoon Megi caused significant damage to houses, livelihoods and infrastructure. The damage was mainly due to the powerful category 5 winds when the typhoon made landfall. The damage was largely focused on five provinces.

Two weeks after Typhoon Megi, heavy rains caused further damage. The typhoon and the rains combined further stretched community coping capacities.

Implementation

The shelter interventions had two components:

- Category I - shelter repair kits for families whose homes were damaged.
- Category II - shelter repair kits for families whose homes were destroyed.

Initial plan

For Category I shelter repair kits, families were provided 7,000 PHP (150 USD) .They could collect any combination of materials and tools in a predetermined list from a shop of their choosing, as long as the total cost did not exceed the allocated amount.

For Category II shelter repair kits, each beneficiary family would also receive an additional commodity voucher worth 7,000 PHP (150 USD) to obtain the same materials and tools as in Category I shelter repair kits. Under this category the families would also receive the following materials to enable them to place poles in reinforced concrete footings:

- three bags of cement,
- six timber posts - 6”x6” (150x150mm) or 4”x4” (100x100mm),
- eight x 6m, 10mm diameter steel bars,
- four x 6m, 8mm diameter bars.

Revised implementation

In February 2011 a government ban on harvesting timber was established. This lead to a new methodology being established. In this approach, people were provided with cash vouchers, which they then use to purchase their choice of shelter materials.

Families are not given a predefined list of materials. Instead, the organisation conducted price surveys and recommended several shops from which beneficiaries could obtain shelter materials.

Families repaired or rebuilt shelters through *bayanihan*. This is a tradition common in Philippine rural areas, where community members help each other. Through *bayanihan*, those households who are physically unable to build [older people, people with disabilities, households headed by women and households headed by children] are supported by their fellow community members.

The period during which vouchers could be redeemed was limited to a fixed period. This amount of time depended upon the capacity of the shops and number of beneficiaries per shop. Selected shops were required to display fixed prices of main shelter materials throughout the time.

Each voucher could only be redeemed in one shop. However, beneficiaries of Category II shelter repair kits received two vouchers of USD 150 and were able to redeem each voucher at separate shops.

Selection of beneficiaries

As relief operations progressed, the organisation reverified the beneficiary lists. Details were initially provided in lists by the government. During reverification, the sites of all damaged or destroyed homes

Families rebuilt the shelters through community self-help.
Photo: IFRC

The organisation monitored the shops. Photo: Hajime Matsunaga/IFRC

A typical house rebuilt using the grants. Photo: IFRC

were visited, to assess the extent of damage, and check that families met agreed beneficiary selection criteria. This was to ensure that the most vulnerable were supported and that they had not received assistance from other actors.

Shelter assistance targeted families that lacked the capacity to repair or rebuild their homes. In addition to this, the beneficiary selection criteria prioritised families headed by women without income, families headed by children, persons with disabilities, families with young children or elderly family members, families from ethnic minorities and other socially excluded groups.

Team members undertook continuous reverification to ensure that only deserving beneficiaries received shelter assistance. This took into account the reality that other actors could have served some of the targeted beneficiaries in between the initial reverification and the period they were scheduled to receive shelter materials.

Technical solutions

Before the beneficiaries received the materials, they attended orientation sessions organised by project teams composed of carpenters, and project staff. The orientation sessions highlighted basic building techniques. During the sessions, beneficiaries were provided with posters showing how to construct typhoon-resistant shelters to encourage them to construct houses with steady foundations, and to place poles in concrete footings with reinforcement.

In the initial approach of commodity vouchers, carpenters were part of the project team and participated in beneficiary orientation sessions. Their role extended to assisting beneficiaries in selecting materials and guiding them when repairing or rebuilding their houses.

In the new approach of providing cash vouchers, carpenters were no longer a part of project teams. Instead, beneficiaries were encouraged to engage the services of carpenters independently. This was because beneficiaries purchased their choice of materials according to their respective, unique needs.

Logistics supply

Throughout provision of shelter assistance using the cash voucher system, team members monitored the market prices and visited designated shops on a regular basis to observe how families were obtaining shelter materials. Through this monitoring, the team was able to recommend several shops from which people could obtain shelter materials.

These visits ensured that shops applied fixed pricing for basic shelter items as agreed prior to distribution. This helped to eliminate the possibility of shops inflating prices or overcharging beneficiaries.

People in the project were also encouraged to conduct their own independent comparison of prices, to bargain for better prices with the shops, and to decide independently from which of the recommended shops to redeem their vouchers.

Though prices varied slightly from shop to shop, monitoring showed that beneficiaries were able to select shops from which they got most competitive prices and therefore more materials from the fixed voucher amount. The shops saw an opportunity to make profit from larger sales volume rather than per item.

A.27 Romania - 2010 - Floods

Case study:

Country:
Romania

Disaster:
Heavy rain and flooding in 24 counties of Romania

Disaster date:
June, July 2010

No. of houses damaged:
Over 800 houses completely destroyed
More than 7,000 houses damaged

No. of people displaced:
15,000

Project target population:
400 households and 3 school

Occupancy rate on handover:
100%

Shelter size:
60 m^2

Materials Cost per house:
Average 2,500 USD

Project cost per house:
Average 3,000 USD

Project timeline

Project description
This project mobilised 497 volunteers to help build and repair half of the homes damaged by the floods. It also built or repaired three schools. It managed to use donated materials and supplied families with materials and technical assistance to support self-help home repairs and renovations.

Strengths and weaknesses

✓ Beneficiaries contributed their time and labour towards construction of their new homes.
✓ Business partners were fast in reacting and providing much needed materials and financial resources.
✓ Partners mobilised their workers to volunteer at the construction site.
✓ The municipality was involved from the start which helped the project to proceed quickly.
✓ The government endorsement of the campaign helped generate needed resources and partnerships.
✓ Assistance was offered not only in reconstructing homes, but also in supplying and distributing construction materials through the resource centres. This allowed families whose houses were not severely affected to quickly renovate them with their own resources.

× Government delays in delivering on promises for materials.
× Logistics not adapted for acting in multiple locations (10 different locations at the same time).
× Difficulty in engaging the beneficiaries selected for relocation.
× Delay in developing the infrastructure for the plot of land selected for relocation of the new homes.
× The weak involvement of local volunteers interested in renovation activities.
× Severe weather conditions in winter and spring (-10C in April) delayed construction and prevented more local volunteers from taking part in the project as planned.
× Lack of sufficient local capacity in terms of skilled people available for running more resource centres.

Floods destroyed 800 over homes.
Photos: Ovidiu Micsik and Mihai Grigorean, Habitat for Humanity Romania

Before the floods

Heavy rainfalls in June 2010 led to flooding in Romania. Over 800 homes were completely destroyed, more than 7,000 damaged, and over 15,000 people were displaced.

Many of the people most affected by the floods were from low income households, mainly old people or families with young children from rural communities. Two-thirds of Romania's poor live in rural areas. In times of disasters, these are the most vulnerable groups, as many of them find it hard to recover without additional support after losing all possessions and homes.

After the floods

The first stage of the campaign "Now, more than ever!" focused on fund raising. At least 60 companies and over 20,000 individuals raised 650,000 USD in cash and 290,000 USD in construction materials.

Later stages of the response dealt with logistics and implementation. The first resource centre assisted 80 families to rebuild their houses.

Later, the second resource centre was established, and it focused on the distribution of materials in the area. In total, it assisted 240 families with timber for roof, aerated thermal blocks, sand, cement and plasticiser for external and internal walls, polystyrene stucco plaster for insulation and external finishes.

The project also mobilised local volunteers from the business community. 34 teams consisting of 497 volunteers were hosted by the community. These volunteers worked more than 3,200 hours over 54 days.

Implementation

The city hall allocated a new plot of land for the construction of new houses along with the needed infrastructure: running water, electricity, sewage and access roads. All 30 allotments were in one area.

A warehouse was set up close to the main construction site to receive and store in-kind donations and materials, later distributed throughout the resource centre. It also disbursed materials for the construction of new houses. Two local companies were subcontracted to perform core/specialised work both with new constructions and renovations.

A local project team was formed to manage the project. It included a public relations specialist, a volunteer coordinator, a family support officer, and a construction site manager.

Selection of beneficiaries

A selection committee was composed of two representatives from the organization, a town hall representative, and a community representative. Public information meetings were held in the camp for flood victims in August 2010 to explain the housing project, eligibility criteria, conditions for participation and future obligations towards the project.

At the same time, social surveys were conducted for each family on the official victims list of the municipality. Through this process, 43 families were initially selected for the renovation project and 17 families for the construction of new homes during the first phase of the project. The 340 other beneficiaries were selected in the second phase of the project after the project staff team was strengthened and was able to perform an initial needs assessment.

General selection criteria took into account the vulnerability of the family, the urgency of the housing need, willingness to relocate and volunteer. For the renovations, single parent families and families with at least one minor child were prioritised.

The major problem for the selection process was that the number of beneficiaries kept changing, especially for the new builds project. This was mainly caused by that fact that some of the families finally refused to relocate. Other families did not perform the required number of working hours on the construction which was one

Interior of a repaired house. The project mobilised volunteers to build and repair flood damaged houses.
Photo: Ovidiu Micsik and Mihai Grigorean, Habitat for Humanity Romania

of the main conditions for participating in the project. This problem was solved when the town hall approved a final official list that could not be amended.

To encourage families to work equally on all new constructions, the beneficiaries were not assigned a home until the very end of the project.

Technical solutions

For the new builds, the aerated thermal blocks were chosen as a solution due to availability and climate conditions, the type of in-kind donations and related construction costs. All 30 new houses were built on the same plot of land, making it easier to develop the logistics and organise the production and supply chain management.

The houses were finished using standard quality materials for interiors, including drywall, laminate parquetry, stoves or tiles. The bathroom and kitchen were equipped with basic amenities; sinks and showers.

For the renovations of the partially affected houses, the solution was selected on a case by case basis. The bulk of work was on restoring walls, insulation, reinforcing foundations, replacing flooring and internal finishes.

Technical assistance was provided to a large number of families via the resource centres. Families received materials for their own work. Transport from the warehouse to each location was organised and offered to each family.

Construction workers were deployed to provide families with design and technical support in construction, and the use of tools and equipment, house to house in order to ensure the quality of construction and health and safety requirements.

Materials list for 400 houses

Materials	Quantity
Aerated thermal blocks	9,800 m^3
Timber	380 m^3
Windows	120
Cement	250,000 kg
Iron	30,900 kg
Parquetry (flooring)	1,800 m^2
Doors	210
Polystyrene	875 m^3

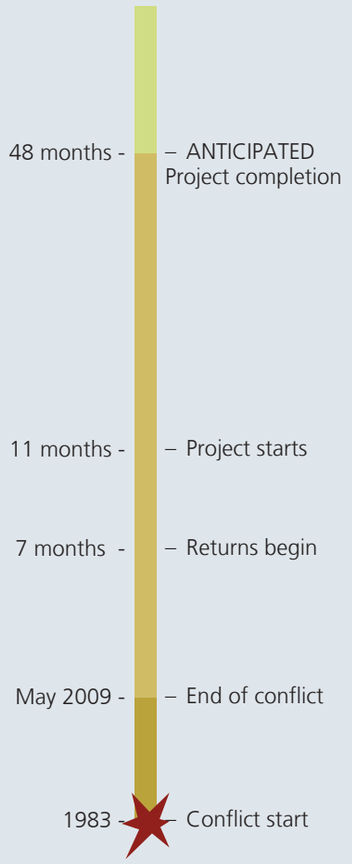
Using volunteers, the project rebuilt half of the houses destroyed by the rain and flooding in Romania. Many of the volunteers were from outside Romania.
Photo: Ovidiu Micsik and Mihai Grigorean, Habitat for Humanity Romania

A.28 Sri Lanka - 2009 - Conflict Returns

Case study:

Country:
Sri Lanka
Conflict:
Population movement due to civil war
Conflict date:
Conflict ended in May 2009
No. of houses damaged:
160,000
No. of people affected / displaced:
300,000
Project target population:
2,511 families
(Estimated 12,555 people)
669 houses built by January 2012
Shelter size:
46m²
Materials Cost per house:
4,600 USD
Additional costs per house:
3,100 USD

Project timeline



Project description
This owner-driven programme provided cash to support people to build houses damaged or destroyed by the conflict. The project aimed to contribute to the sustainable rehabilitation and reconstruction in the north of Sri Lanka. It primarily supported people who have been displaced who were resettling after the conflict.

Strengths and weaknesses

✓ The owner-driven approach with direct cash grants to the beneficiary bank accounts created a sense of ownership.

✓ The project was able to build upon experiences and use staff from the post-tsunami recovery programme.

✓ The shelter projects were part of a larger programme including support in water, sanitation, livelihood, disaster risk reduction, community infrastructure and efforts to rebuild civil society.

✓ The project aimed to empower civil society, and provoke them to take initiatives on behalf of themselves.

× The project was delayed by lack of legal documents.

× Often beneficiaries could not produce evidence of land ownership, such as land permits, birth/death/marriage certificates etc. as they were lost during the conflict.

× Construction skills differ from one family to another. As a result experienced staff were required to ensure that the project was effective.

× Because the project started with beneficiary lists from the local authorities, it was open to some politicisation.

× Each house required a minimum of eight documents and five separate transactions. This led to delays when combined with the processing of funds requests and bank transfers.

× The project aimed for high quality but as a result is relatively small scale, aiming to meet 1.5% of the housing needs. In total all organisations together aim to meet a total of 20% of the overall housing need.

- The organisation was able to establish good relationships with the government and military allowing improved access to difficult to work in areas. However given the context this required significant efforts to be seen to remain impartial.

Houses were rebuilt using cash grants.
Photo: Silvester Kueenseger, IFRC

Background

Conflict between forces of the government of Sri Lanka and Liberation Tigers of Tamil Eelam (LTTE) began in 1983 and continued until 2009.

Between 2006 and February 2009, over 281,000 people became internally displaced. This was in addition to over 214,000 people who had been displaced before 2006, meaning that over half a million people had been displaced by the conflict.

The total population that lived in the Northern Province of Sri Lanka prior to May 2009 is yet to be assessed.

The conflict left hundreds of thousands of people in transit, displaced, and seeking refuge with host families or in government-run camps or centres for internally displaced people. Two entire districts were fully deserted and three other districts had partial displacements as a result of the conflict.

Hundreds of thousands of people lost almost everything and suffered without shelter, water, sanitation, health care, livelihoods or other basic facilities.

The government and humanitarian actors estimated that approximately 160,000 houses in the north of Sri Lanka were in need of reconstruction. This figure excludes more than 100,000 families who were scheduled for return from India and other countries.

Of those houses that needed to be reconstructed, 74% needed to be constructed anew, and the rest required repairs. Considering the size, complexity, and evolving nature of the situation, it had been a challenge to gain access to isolated or inaccessible areas and to assess the needs of the most-affected people.

Implementation

The national organisation with support from its international counterparts received approval from the government to assist 2,511 households.

Of these, 2,181 are new build houses for fully damaged houses, and 330 are repairs for the partially damaged houses. 669 were completed by the end of 2011 with 1,294 ongoing.

Selection of beneficiaries

The organisation was provided with a list of beneficiaries by the local authorities (a list from the District Secretariat, approved by the Government Agent), and given an opportunity to verify beneficiaries and communities.

The final selection was done by the by the organisation after conducting interviews. Each beneficiary in the given list provided the following documents at the interview:

- family details,
- copy of the National Identity Card,
- copy of the bank pass book/ bank details,
- copy of the deeds,
- consent letter by land owner approved by the assistant government agent if the land is not owned by beneficiary,
- plan of the site.

After the selection of the families, each community was given

Rebuilt house in Northern Sri Lanka.
Photo: Silvester Kueenseger, IFRC

a chance to object when the lists were publicly displayed.

Noting that families are re-building their houses on their own land, a site investigation was carried out following the beneficiary selection.

The site audit was done by a project technical officer and a field engineer to satisfy that the house had stood on the site before the war and was completely damaged and to ensure suitability for reconstruction.

Beneficiary files

A beneficiary file was built up for each beneficiary with the file cover clearly marked with the project name and number, beneficiary name and beneficiary address. The beneficiary file consists of :

- a family details form,
- a copy of the beneficiary's National Identity Card,
- a copy of the beneficiary Bank pass book indicating name and account number,
- copies of documents indicating ownership of land (copy of the deed or consent letter by the land owner approved by the assistant government agents if the land is not own by the beneficiary),
- a plan of the site,
- the site audit report conducted by the organisation,
- a copy of the house plan,
- a baseline survey form,
- documents such as affidavits, certificates etc. in the absence of required documents,
- any other documents relevant to the project.

Grants were phased, and each grant was conditional upon the previous level of construction being attained. Photo: Ganga Kariyawasam, IFRC

Housing construction

A cash grant amount of 2,900 USD (LKR 325,000) was paid to each beneficiary through the bank in five instalments. An additional grant of 267 USD (LKR 30,000) was provided to construct the toilet and for the water supply.

Each stage was to be completed by the beneficiary within three weeks of receiving the instalment. On completion of each stage, the next grant should have been received within one week.

The technical advisors and support is given by the technical officers and the field engineers, who supervised 100 families and 500 families respectively.

The standard house under the project is a permanent house of minimum size of 500ft^2 (46m^2) floor area with two rooms. The following elements are required for the house to be considered as complete:

- The house is bounded by brick or block wall and covered by a tiled roof.
- There is one internal lockable room with internal plastering, flooring, doors & windows and sashes.
- There is one internal or external kitchen with internal plastering and flooring.
- There is one internal or external toilet with adequate effluent disposal.

Each beneficiary may adjust the standard design to suit their individual needs, within the parameters of the budget and minimum standards.

Housing construction with each instalment

Instalment	Amount	Work to be completed	Technical details
1	440 USD	Foundation (house and toilet) - within 4 weeks	Laying of 3" screed concrete, rubble masonry foundation in 1:5 cement mortar along with damp proof course plastering and applying of damp proof course tar.
2	790 USD	Construction of super structure (house and toilet*) with brick or block walls up to roof level - within 6 weeks	The brick or block work of the walls up to roof level including the lintel tie beam above the window level using two 10mm diameter tor steel bars in 1:3:4 concrete mixture and toilet super structure.
3	790 USD	Roof (house and toilet*) - within 4 weeks	House - roof work using clay roof tiles Toilet - roof work using clay roof tiles or concrete slab
4	615 USD	Internal plastering and floor concreting of one bed room, kitchen and toilet. Fixing of all door and window frames - within 6 weeks	The internal plastering of one bed room and kitchen in 1:5 cement sand mortar along with fixing of all door and window frames. Also must concrete the floor areas of one bedroom and kitchen with 1:3:4 concrete mixture.
5	220 USD	Flooring of one bedroom, kitchen and toilet. Complete one lockable room (fixing of doors and windows and sashes in one bedroom) - within 2 weeks	The fixing of door and window sashes in one bedroom. Each beneficiary must have at least one lockable room. Also lockable room floor and kitchen floor needs to be plastered and finished with cement.
Total	2,900 USD	Time taken to complete the construction work is 20 weeks. Additional time required for funds request and transfer.	

*Water supply can be provided instead of a toilet

A.29 Tajikistan - 2010 - Earthquake

Case study:

Country:
Tajikistan
Disaster:
Earthquake
Disaster date:
July 29th 2006
No. of houses destroyed:
1,000 destroyed
1,500 damaged
No. of people affected:
16,000 people lost their homes
Project target population:
83 new build houses
120 houses retrofitted
Occupancy rate on handover
100%
Shelter size:
New house - 45 m^2
Reinforcement of two rooms in the house – 32 m^2
Materials Cost per house:
New houses – USD 6,405
Reinforcement of two rooms – USD 895
Loans average 800 USD
Project cost per house:
New house – USD 7,945
Reinforcement of two rooms – USD 984

Project timeline

Project description
This project helped to rebuild communities affected by earthquakes in the Kumsangir district. It also aimed to help prepare remote rural communities against further earthquakes and mud slides. The project used alternative and affordable construction technologies and provided loans to help families to rebuild or repair their homes.

Strengths and weaknesses

✓ The project used local materials to reduce costs and avoid delays in transportation.
✓ The low technology reinforcement and construction technology was simple and was 30 percent cheaper than the standard reinforcement techniques.
✓ The project promoted owner-driven home reconstruction and involved the whole community in the procurement and construction process.
✓ Families were offered loans that they could repay into a revolving fund. This was used to finance later projects.
× The project met the housing needs of 10% of the affected population. However, there was limited response by other organisations.
× Affected villages were located far from each other leading to logistical challenges.
× The technology was viewed positively by the local population. However, many families who were not affected by earthquakes soon forgot or dismissed the risks, as they had other priorities and limited resources.
× Structural elements were more easily applied in new construction than in retrofitting after the disaster. Reinforcement involved the destruction of wall finishes.
× Loans require that families have sufficient income to be able to repay them. The poorest people may therefore be excluded.
- This project involved a number of partners.

Before the earthquake

Tajikistan lies in a mountainous region. Annually, it experiences over 5,000 tremors and earthquakes. In total, from 1980 to 2010, more than 6 million people in Tajikistan suffered from the effects of natural disasters.

The main causes of destruction during earthquakes are poorly constructed homes which lack any earthquake resistant, seismic technology. This is also coupled with lack of knowledge, and limited financial resources to reinforce or even maintain homes.

Around 75% of the population in Tajikistan lives in remote rural areas in the mountains. These are the families that are most vulnerable to disasters. In addition to that, almost half of the population lives on less than 2 dollars a day.

After the earthquake

On 29 July 2006, two earthquakes in separate locations hit Tajikistan. They fully damaged 1,000 houses and partially damaged 1,500 houses. There were concerns for the winter ahead.

1st Phase: 83 new houses

In the initial phase, the organisation, in partnership with international non-government organisations, the government of Tajikistan and the affected communities, supported 83 families to build new earthquake-resistant houses.

Beneficiary families were involved in the whole process of planning and building. They were trained in construction skills, earthquake resistant construction and house maintenance. The families provided all necessary unskilled labour.

2nd Phase: 120 houses reinforced

In the second phase of the project, the organisation worked with the UN to support the retrofitting of 120 homes in earthquake affected districts.

This phase of the project was implemented in three stages:

- research and technology development,
- training,
- construction / retrofitting.

The project rebuilt about 10% of the damaged and destroyed houses using food for work, loans and materials distribution. Photo: Habitat for Humanity Tajikistan

Starting from May 2007 construction team members and an expert at the national seismic institute conducted a joint survey of newly constructed houses in three target communities of Kumsangir.

Based on the results of the survey, the design, technical intervention and the scale of the project were identified. The institute initiated technical research on the effectiveness of using local materials to reinforce mud walls.

Training workshops on house reinforcement using locally available materials were conducted in target communities. During the workshop participants learned about the methods and practiced by reinforcing and retrofitting one house.

Both women and youths were actively involved in the production and mounting of grids made from mulberry branches to reinforce the houses. A permanent project team, made up of engineers and supervisors assisted the families by giving them training and assistance.

An external organisation provided support by providing "food for work" to the project beneficiaries. Families received the food based on the amount of working days they invested in the construction of their houses (wheat flour 2 kg/person/working day, vegetable oil 75g/person/working day, salt 25g/person/working day, pulses 200g/person/working day.)

The families were selected by the Committee of Emergency Situation of Tajikistan, a United Nations agency and the organisation itself.

The criteria for family selection were based on three pillars:

- housing need,
- ability to repay,
- willingness to partner and contribute hours of labour.

The organisation aimed to ensure that it serves the most vulnerable first. However, as the organisation encouraged self-driven reconstruction and ownership of homes, families were required to have a minimal stable income and be willing to work on the construction or reconstruction of their own house and, if needed, neighbouring homes.

"Now my house is solid and I am not in fear of earthquakes as I was in the past. It has reinforcement frames made of wood and mulberry branches and I am sure that it can protect my family from earthquakes in the future"

Shamsov Sharofidin, 58-year-old head of the family

Houses were retrofitted with a mesh of mulberry branches to increase seismic resistance developed by the Tajikistan institute for seismology. Photo: Habitat for Humanity Tajikistan

Technical solutions

A mesh of mulberry branches was used to make rural homes more seismically resistant. This was a new technology to the area. The aim of this was to reduce the risk to life due to building collapse as well as to reduce the chances of reinforced houses being damaged in small or middle magnitude tremors.

The external and internal damaged walls were channelled out to take the structural timber frame, to where the floor and walls joined and the walls and ceiling joined. Filling this, mulberry twigs woven into grids, were attached to the timber framing, and then plastered with an adobe render/plaster, which was fortified with straw and wool.

Mulberry branches were tested for sufficient strength as required by Tajik national building codes and norms. According to the data from the Institute of Seismology in Tajikistan, if the walls are properly plastered, mulberry branches could serve a minimum of 25 years without losing their strength and without getting brittle.

The approach was cheap to build as mulberry branches are free to people living in rural Tajikistan and the total reinforcement process costs 33 percent less than the steel reinforcement bar (rebar) alternative.

To make the grid, branches are bound to each other with steel wire. The wire is also used to fasten the mesh element to the walls and to the wooden structure of the wall.

This approach of adding a grid of branches could also be built into the construction of new homes or retrofitted into existing homes, specifically those already suffering from some earthquake damage.

Loans

The organisation offered loans averaging 800 USD. These were designed to cover the construction and reinforcing costs. Homeowners could repay their loans with 18 USD monthly instalments over a period of 3 years. These repayments went into a revolving fund. Later, this fund was used to offer more loans to families for retrofitting houses in the disaster prone areas. Families paid monthly instalments at the nearest bank in their respective community.

A wall being retrofitted. Photo: Habitat for Humanity Tajikistan

One year after the project completion, the organisation returned to support 206 families with non-profit loans to retrofit their houses to improve their resistance to earthquakes.

Achievements

Perhaps the most important achievement of the project was that at the end of it, families and organised community groups developed vital skills of safer house construction. These skills could be then applied without additional assistance, as well as transferred to other communities.

Materials list

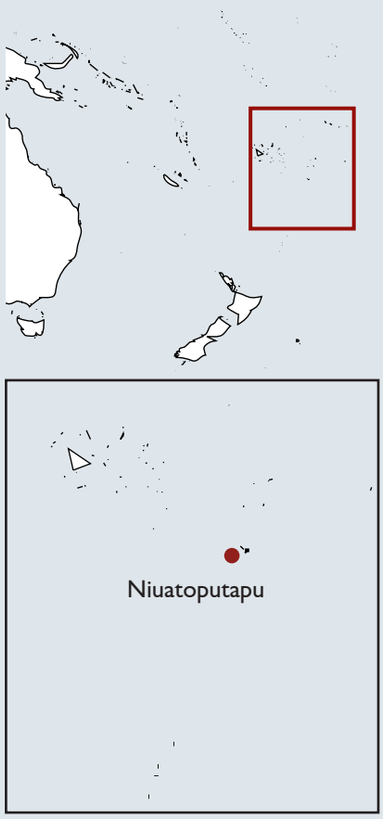
Materials	Quantity
Timber (150mm x 100mm x 2.7m)	16
Timber (50mm x 100mm x 3.2m)	8
Timber (50mm x 100mm x 5.2m)	4
Mulberry mesh 150mm x 150mm	96m^2
Timber (50mm x 150mm x 3.2m)	4
Timber (50mm x 150mm x 5.2m)	4
Timber (for doors/windows) (100mm x 50mm x 3.2m)	16
Timber (for doors/windows) (100mm x 50mm x4.1m)	4
Binding wire	4kg
Tightening wire	3kg
Wire	10kg

Total timber 1.5m^3

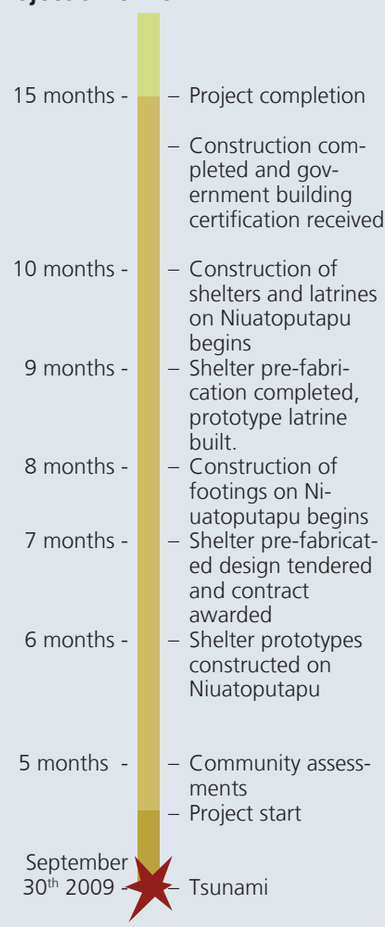
A.30 Tonga - 2010 - Tsunami

Case study:

Country:
Tonga
Disaster:
Tsunami
(known as the Samoa Tsunami)
Disaster date:
September 30th 2009
No. of houses damaged:
79 destroyed, 30 with major damage
No. of people affected / displaced:
465
Project target population:
74 households
Occupancy rate on handover:
Estimated 90% at handover
Shelter size:
18m²
2.4 m tall
Materials Cost per shelter:
4,350 USD
Project cost per shelter:
8,900 USD



Project timeline



Project description
This project provided cyclone resistant transitional shelter, water supply and sanitation to 74 families who lost their homes and elected to remain on Niuatoputapu, while waiting for assistance to re-build permanent housing. The tsunami had destroyed the houses of more than half the island's population. The shelter materials and construction teams were imported from an island 600km away.

Strengths and weaknesses

✓ The project successfully addressed the significant needs of a remote population. For the first months after the disaster no other non-government organisation worked on Niuatoputapu.

✓ Interviews with beneficiaries as part of a project evaluation indicated the shelter had met, and in many cases exceeded, their expectations.

✓ Excellent logistical organisation with the support of a well-established local implementing partner helped to keep the project on time.

✓ Rainwater harvesting was included with the shelters to supplement drinking water sources.

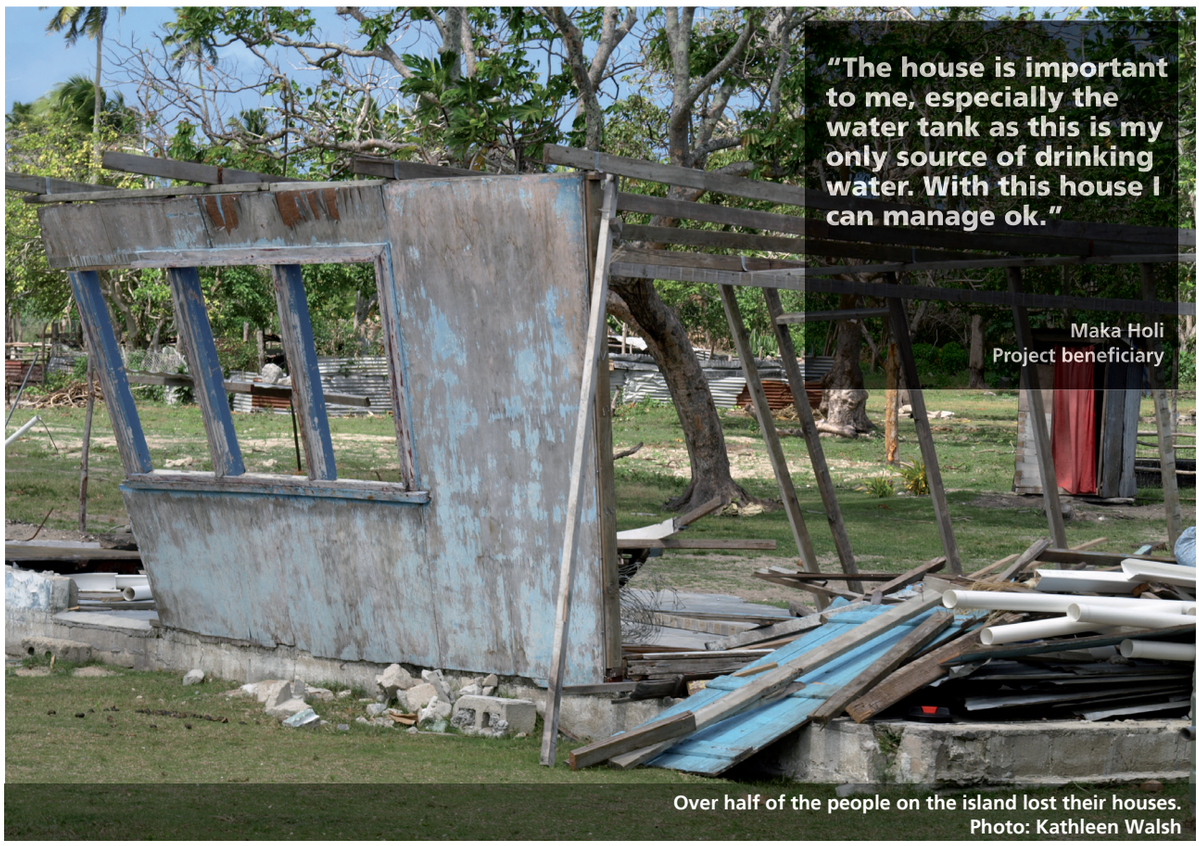
× A formal handover of the shelters to beneficiaries did not take place during the project leading to some uncertainty about ownership.

× Community consultation could have been stronger at critical points of the process of shelter design and latrine construction.

× Construction of latrines was not completed by a number of households in one village. Follow up was required to understand the issues and ensure completion where feasible.

- Initial assistance was requested in water supply only but the deployment of an engineer quickly identified other needs including shelter.

- As this project had a low number of beneficiaries, and high costs, the project team could not be large. It was difficult to provide a range of skills with the limited number of personnel.



Over half of the people on the island lost their houses.
Photo: Kathleen Walsh

Before the tsunami

Niuatoputapu lies at the northern edge of the Kingdom of Tonga and although small, is the main island among the Niua group. Niuatoputapu, occupied by approximately 850 people, is extremely remote and highly vulnerable to natural hazards. It has very limited transport and communications, and just three settlements on its northern shore.

After the tsunami

An earthquake measuring 8.3 on the Richter scale, 300 Km north east of Niuatoputapu caused three tsunami waves up to six metres in height. Nine lives were claimed and four people were left critically injured.

The townships of Hihifo and Falehau were severely damaged, and all government houses and offices in Hihifo were totally destroyed. All essential services including the local hospital, airport, communication offices, ground and surface water were seriously damaged.

The initial assessment indicated that 79 homes were destroyed and 30 had major damage. The total number of people affected at that point was 465. These families were initially housed in tents, often on the land of other families, or shared housing.

Implementation

The locations of houses was discussed with each family separately to ensure that the land was either their own or that they had consent to locate a house and toilet on the site. Each household signed an agreement that this was the case. For the land closest to the sea in the town of Hihifo, there were strong government sensitivities to re-constructing housing in this area, and finally it was decided not to build on this land.

As there was a lack of resources on Niuatoputapu, a contract for prefabrication of shelters, toilets and water tanks was offered to a company based in the capital Nuku'alofa, six hundred kilometres away. They were responsible for shipping materials to the dock on the island with the project manager arranging the shipping.

A contract team of carpenters was set up on the island with a local overseer. The local implementing partner had a representative overseeing the process, supported by the project manager. This contract team accessed materials from the depot of the implementing partner via consultation with the representative. They constructed the footings in phases, leaving time for the concrete to cure, and then in stages, constructed the sub-frames and erected the shelters. There were up to three teams working on the island at one time.

The project manager, local representative and the contractor all had some responsibility for monitoring progress and quality.

To encourage householders to contribute, the toilet superstructure was only provided once pits had been dug by households. Water tanks were only provided once platforms had been constructed. This was only partly successful.

The project illustrated the challenges of running small projects on remote islands with a small project team.
Photo: Paul Davenport

A government building assessor resident on the island provided both interim and final certification for the buildings based on government standards for cyclone resistant shelter.

Selection of beneficiaries

Beneficiaries were those families identified by the local implementing partner in an initial damage assessment. To qualify for a shelter, their home and assets had to have been completely destroyed or lost in the tsunami.

Technical solutions

The technical and resource capacity of Niuatoputapu is very limited. Therefore it was decided to fabricate transitional shelter kits in the capital. These could then be flat packed and shipped to the island. The erection of the prefabricated elements was undertaken by local trades people supported by the householders where appropriate.

Shelters were designed to be cyclone resistant and were certified to be of standard according to Tongan building regulations by the government building inspector on Niuatoputapu.

The design of the shelters ensured they were simple enough to be built in a remote location and that they could be dismantled and re-built as the government was offering land further from the coast to encourage people to move for their future safety.

The project built shelters using contracted teams from Niuatoputapu, 600 km away.
Photo: Kathleen Walsh

A.31 Vietnam - 2009 - Typhoons Ketsana and Mirinae

Case study:

Country:
Socialist Republic of Vietnam
Disaster:
Typhoon Ketsana and Typhoon Mirinae
Disaster date:
September 29th 2009 (Ketsana)
November 2nd 2009 (Mirinae)
No. of houses destroyed:
23,500
No. of people evacuated:
356,790 people evacuated
Project target population:
Around 2,730 people (650 households) in seven provinces
Occupancy rate on handover:
100% (estimate)
Shelter size:
26 m² average
Materials Cost per shelter:
1,650 USD cash grant
1,300 USD average spend on material only

Project timeline

- 15 months – Internal review
- 13 months – 650 houses completed
- 10 months – Beginning of construction
- 9 months – Shelter advisor present (4 months)
- 9 months – Trainings, selection of beneficiaries and house design
- 4 months – Project start
- 4 months – Shelter needs assessment
- 3 months – Household items distributed to 60,286 people
- 2 months – Typhoon Mirinae
- September 29th 2009 – Typhoon Ketsana

Project description
This permanent shelter project was implemented as part of the recovery phase of the typhoon Ketsana response. 650 households who had lost their homes were supported through cash grants to rebuild storm/flood resistant houses. A technical consultant was hired to support a national organisation to organise trainings on safe housing, develop house designs and supervise the construction of houses.

Strengths and weaknesses

✓ Houses were built according to traditional design with necessary reinforcement. Daily construction work was closely supervised by local engineers.
✓ Families decided on the house design and were able to adjust the home according to their individual needs.
✓ Many families made additional contributions as they considered it a lifetime investment.
✓ The conditional cash grant enabled families to select local suppliers and builders whom they trusted, while benefitting from technical advice.
✓ Technical training helped families to follow each step of the construction work while being supported by project engineers.
✓ A participatory approach helped to provide a sense of ownership of their own homes. Some members of ethnic minority groups expressed their appreciation for their houses being reinforced.
× The organisation was slow to start the project. In part this was due to not getting the right people in place in time to start recovery planning.
× Water and sanitation (both hardware and software components) should have been included in the shelter programme as part of the house package.
× The houses were not all culturally acceptable to ethnic minorities. More detailed needs assessments should have been conducted.
× More attention should have been given to the disparities between provinces regarding the availability of local labour and prices for material and transport.

Training was conducted on safe construction techniques. Photo: DWF

Households were allowed to choose from certain given designs and encouraged to adapt them to meet their needs. Photo: DWF

Before the typhoon

The Socialist Republic of Vietnam is a single-party state. The Government at local level is represented by the People's Committee, in every province, district and commune.

Vietnam had been rapidly industrialising and there had been a significant improvement in people's living standards. However there remained wide disparities in income and living standards across the country. The seven provinces covered by this shelter project are among these poorest provinces of Vietnam.

Vietnam has a tropical climate with a hot summer and colder winter (especially in the north). The storm / typhoon season mainly takes place from August to November.

Houses are mostly based upon traditional styles, but using different materials (brick, cement blocks, concrete, corrugated Iron sheet) instead of wood and clay tiles used in the past.

When Typhoon Ketsana struck the central and highland areas of Vietnam at the end of September 2009, the government evacuated over 100,000 households.

Five weeks later Typhoon Mirinae hit central Vietnam, causing floods that swept away nearly 2,400 houses, and hitting the same people who were recovering from Ketsana.

After the typhoon

Houses were destroyed because they were in vulnerable locations, were poorly constructed, materials were used poorly and lacked reinforcement. Houses were destroyed both by the winds and by flooding. The poor quality of construction was compounded by a lack of financial resources and awareness.

For the response the organisation provided support with food, safe water and support for livelihoods. It also distributed basic household items to 60,286 people within the first three months.

Implementation

The project started with trainings in each province to cover the specificities of the shelter programme, beneficiary selection criteria, cash grant distribution process and related guidelines. The trainings were targeted at members of the organisation, People's Committee (representatives of the Vietnamese government) representatives from the province, district and commune levels.

This training was followed by community meetings in each commune to select beneficiaries following agreed criteria.

An international partner organisation was identified to provide technical support and oversight. The houses were constructed according to the following process:

1. The organisation conducted field surveys to assess needs and local conditions for construction, paying special attention to ethnic minority needs and customs.
2. Based on information gained, house designs were prepared in line with Vietnamese national and local government standards, taking into account culture, geography and exposure to hazards. Three standard house designs were developed for each province, and later adapted for each household beneficiary.
3. The organisation approved final beneficiary lists and cross-checked information. Working with the partner organisation, each family was consulted on the design, family contributions, availability of materials and skilled local labour.
4. Trainings were conducted on safe construction techniques. These targeted local builders, project staff and beneficiaries.
5. Construction then began. Beneficiaries received the first allocation of the cash grants following the laying of foundations by local builders. Grants were paid in cash, as are all other transactions at this level in Vietnam. Payment was also made to material suppliers at this time. The organisation and its partner monitored all stages of construction.

6. Within two months, most of the 650 houses were completed. Some delay was experienced due to heavy rain and lack of access to certain communes. Eleven months after typhoon Ketsana, all houses were completed.
7. In the last month of the project an awareness campaign was conducted on "safe housing". This was implemented by the organisation with the technical support of the partner. This included the printing of 1,000 calendars displaying the storm/flood-resistant house designs, a children's play emphasising the basic principles of safe housing, posters of the newly constructed houses in each commune, and the preparation of an atlas displaying typical houses from the seven provinces .
8. In December 2010, the shelter project was externally reviewed.

Selection of beneficiaries

The organisation established the selection criteria that households:

- were listed on the poverty list,
- had lost their means of generating income as a result of the disaster,
- had no labour force (elders, family with young children (0-5 years), pregnant and lactating women, disabled people, single female headed households),
- had no significant support received from other sources.

Village chiefs and members of the organisation chaired the community meetings to select beneficiaries. The number of beneficiaries was defined based on the criteria and on the allocated amount of cash grants.

The list of beneficiaries was then reviewed. All beneficiaries were verified on site and finalised by all levels of the organisation in coordination with local authorities and other community based organisations representatives.

10% of the beneficiaries were later checked through field visits. Once approved, the lists were issued and publicly posted in each Commune's People's Committee office.

Technical solutions

The following technical issues were standardised to make the houses flood/storm resistant:

- reinforcement of the foundations,
- reinforcement of the structure, with reinforced concrete columns (example: 4 steel bars instead of the traditional 3 bars), ring beams,
- reinforcement of the links between roof structure and walls, and roof covering,
- protection of tiled roof with concrete ribs and of corrugated iron sheets, with steel bars in coastal areas (with high risks of strong winds),
- doors and windows which can be securely closed,
- there should be an attic above the flood levels.

Families were given cash to build houses according to given designs. Photo: DWF

Logistics and supply

Households living in highland provinces faced problems regarding the availability of qualified labour force and transport of material. One local company was often building all houses for a selected commune.

In all other areas, families could easily select the builders and buy building materials in the commune shops with credit. Payment was made after receiving the cash grants.

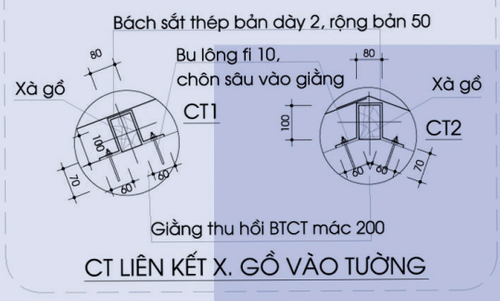
Generally speaking, all materials were available in the localities.

In two provinces, due to lack of capacity, the material supply and construction was done by small local companies paid for directly by the families. In the other provinces where more material and local builders were available, the families paid the material supplier and the local builder directly

Materials list

Example for a house built in Kon Tum province:

Materials	Quantity
Gravel	3m^3
Gravel	3.7 m^3
Cement	3,300 Kg
Sand	12 m^3
Sand	4 m^3
Brick	6,000.00
Steel bar 6mm diameter	55 Kg
Steel bar 8mm diameter	75 Kg
Steel bar 10mm diameter	120 Kg
Corrugated iron sheet	28 m^3
Door 2 opening	2.46 m^3
Door	1.64 m^3
Window	2.4 m^3
Window frame	3
Lime	52 Kg
Tool	1 Kg
Steel wire	10 Kg
Paint	7 Kg
Nail	1.5 Kg
Tiles edge	54
Timber 5mmx10mm	0.36 m^3



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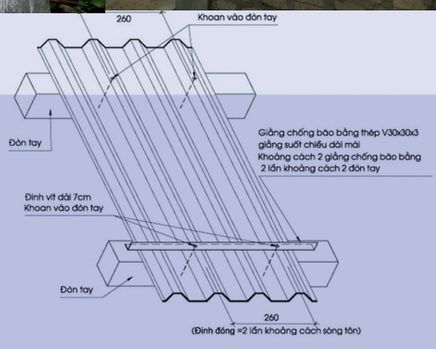

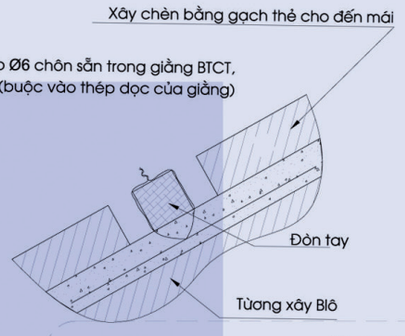

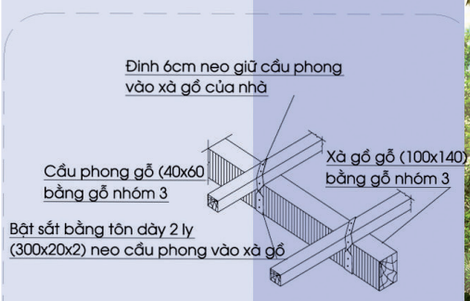

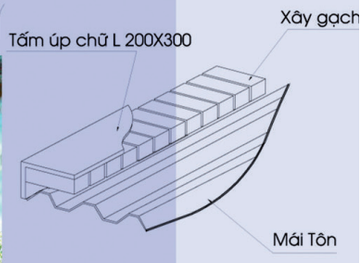

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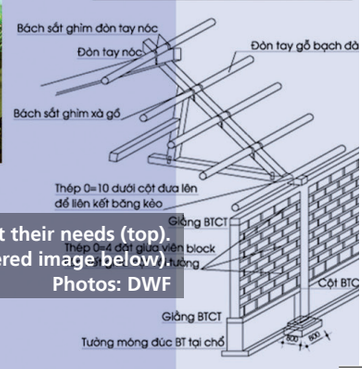
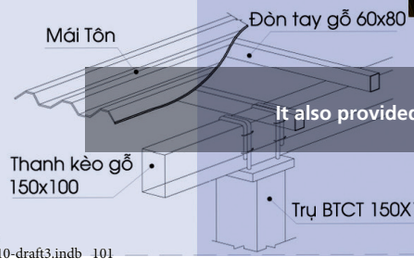
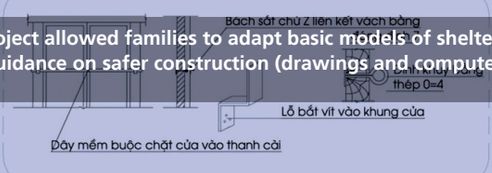


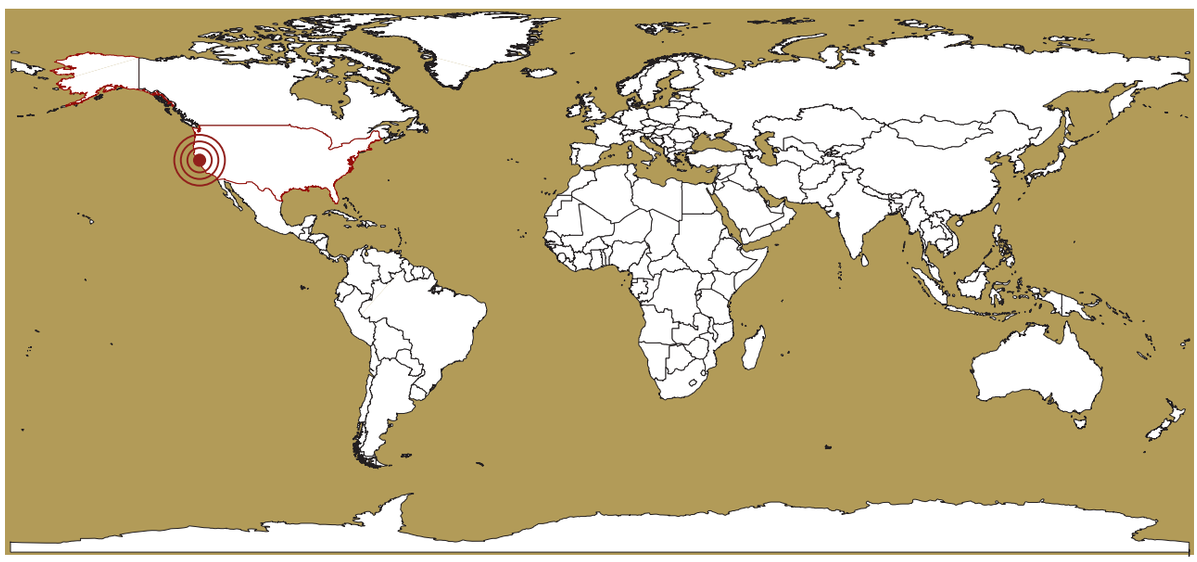




The project allowed families to adapt basic models of shelter to suit their needs (top). It also provided technical guidance on safer construction (drawings and computer rendered image below).
Photos: DWF

SECTION B
Historic

This section contains case studies from projects that started before the year 2000. In this edition we have an update on the Sphere project (B.1) which was launched in 1997, and the San Fancisco earthquake from 1906 (B.2). See "Annex 1 - Index - by country" for more historic case studies.

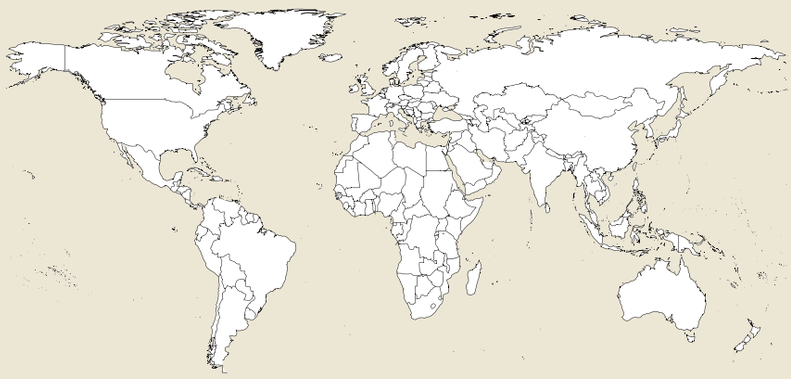


B.1 Sphere Project - 2011 - Global standards

Case study:

Country:
Global

Disaster:
Sphere hand book covers both conflict and natural disaster

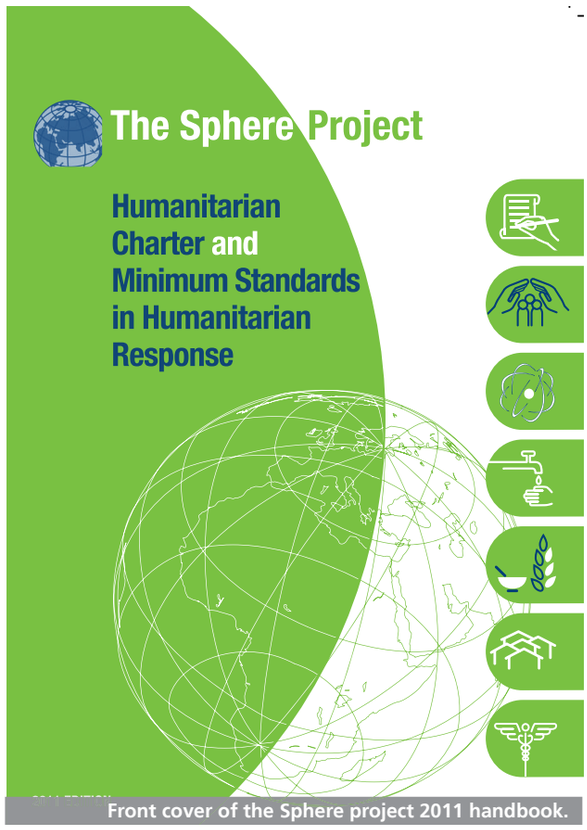


Project timeline

Project description
The third revision of the Sphere Handbook was released in 2011. It built upon the previous two editions and contained a section on "Minimum Standards in Shelter, Settlement and Non-Food Items". This chapter is the closest there is to consensus in humanitarian sheltering practices, and is available for download free of charge from www.sphereproject.org.

Strengths and weaknesses

✓ The shelter and settlements chapter of the Sphere Hhandbook is the best place to get an overview of a commonly accepted understanding of shelter issues.
✓ The shelter and settlements chapter of the 2010 handbook is based on consensus surrounding shelter provision. It was developed during a broad consultation process.
✓ The document can be very useful starting point for establishing advocacy positions with donors, governments and within organisations.
✓ When used well, it can lead to better programming, and as a basis for training in humanitarian shelter provision.
✗ The Sphere handbook is often quoted but seldom read in detail. The shelter chapter is less than 50 pages long.
- The figure of 3.5m² per person is often quoted as being the sphere standard for shelter, however, it is only a "key indicator" under the broader standard of covered living space, and has accompanying guidance notes.
- It can be hard to meet Sphere standards where there are resource constraints or pre-disaster shelter is below Sphere standards. This is now discussed in the introduction to the handbook under "In cases where the standards cannot be met...".



Front cover of the Sphere project 2011 handbook.

Sphere project formation

During the 1990s, humanitarian response was going through many changes. New actors including the military and development agencies were actively engaging in humanitarian operations.

Following the 1994 Rwanda genocide where 800,000 people were killed, a multi-donor evaluation concluded that if humanitarian agencies had done a better job, then more lives would have been saved.

This led to a group of humanitarian non-governmental organisations and the Red Cross / Red Crescent Movement establishing the Sphere Project in 1997.

At the core of the Sphere Handbook is a summary of common principles and values, known as the humanitarian charter, as well as life saving universal minimum standards in key sectors.

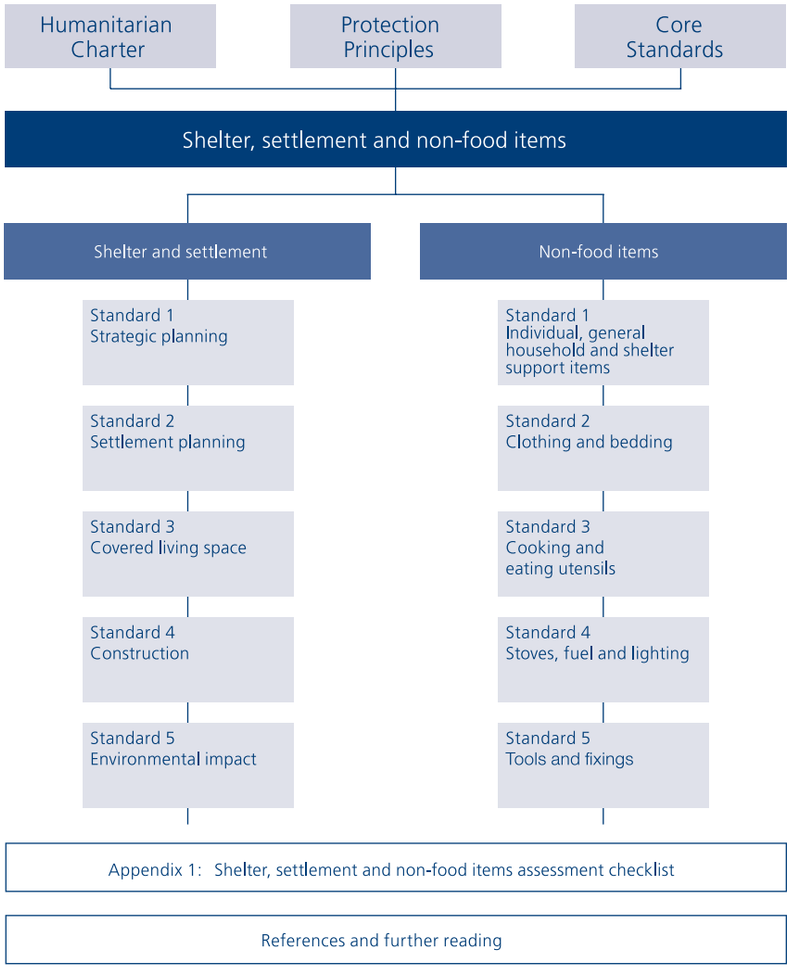
Sphere is based on the humanitarian imperative - that there is the right to give and receive humanitarian assistance wherever needed to prevent and alleviate suffering, protect life and ensure respect for all human beings without discrimination.

Sphere has not been adopted by all organisations. However most of the major organisations working in shelter do aim to adhere to it.

Standards, key actions, key indicators, and guidance notes

The "shelter" chapter in the Sphere handbook now contains 10 standards. Each standard has accompanying key actions, key indicators and guidance notes:

- Minimum standards are qualitative in nature and specify the minimum levels to be attained in humanitarian the provision of shelter.
- Key actions are necessary activities and inputs to be taken in order to meet the minimum standards.
- Key indicators are 'signals' that show whether a standard has been attained.
- Guidance notes are points to consider when applying the minimum standards, key actions and key indicators in different situations.



Structure of the shelter, settlement and non-food items chapter

In addition to the sector specific chapters, the Sphere handbook has core standards in:

- people-centred humanitarian response,
- coordination and collaboration,
- assessment,
- analysis and design,
- performance, transparency and learning,
- aid worker performance.

Shelter settlement and non-food items

Since the inception of sphere, shelter has been seen one of the core areas of humanitarian response. The first edition of the sphere handbook had a chapter on "Shelter and Site Planning". It contained six sections including one on household items.

In the second and third editions of the handbook, the shelter chapter was renamed the "shelter, settlement and non-food items" chapter. This chapter now contains five standards on shelter and settlement issues and five standards on non-food items and their distribution (see illustration of the chapter structure above).

2011 edition

The shelter chapter of the 2011 edition of the sphere handbook, recognises some developments in humanitarian shelter, including:

- The need to consider transitional and longer-term recovery/ reconstruction issues during the initial or emergency response phase.
- Changes in interagency

coordination.
- The integration of risk and vulnerability reduction in shelter programmes.
- The "embedding" of cross-cutting issues in relation to individual responses.
- Access to non-food items or relief assistance is more than distribution. There is now greater emphasis on the use of cash, vouchers and access to local markets.

New in 2011

Much of the content of the 2004 edition has been revised, edited and updated to reflect evolving practice since 2004. Some of the text in the 2004 edition has been cut.

The sphere shelter chapter now contains a diagram outlining shelter and settlement options, as they relate to non-displaced and displaced populations.

Although in practical terms the shelter and non-food items needs may be the same for both populations after a disaster, the settlement options are very different and will in turn impact on the type of shelter assistance to be provided.

2011- changed standards

"Physical planning" has become "settlement planning" to reflect its focus on space planning issues rather than the strategic issues.

The former "design" standard has been merged within standards on "covered area" and "construction".

A new "non-food items" standard has been introduced to provide an over arching standard on ensuring access to relief items, including the provision of cash and vouchers and access to local markets.

The non-food items standard on personal hygiene has been moved to the "water supply, sanitation and hygiene promotion" chapter.

2011- key actions and key indicators

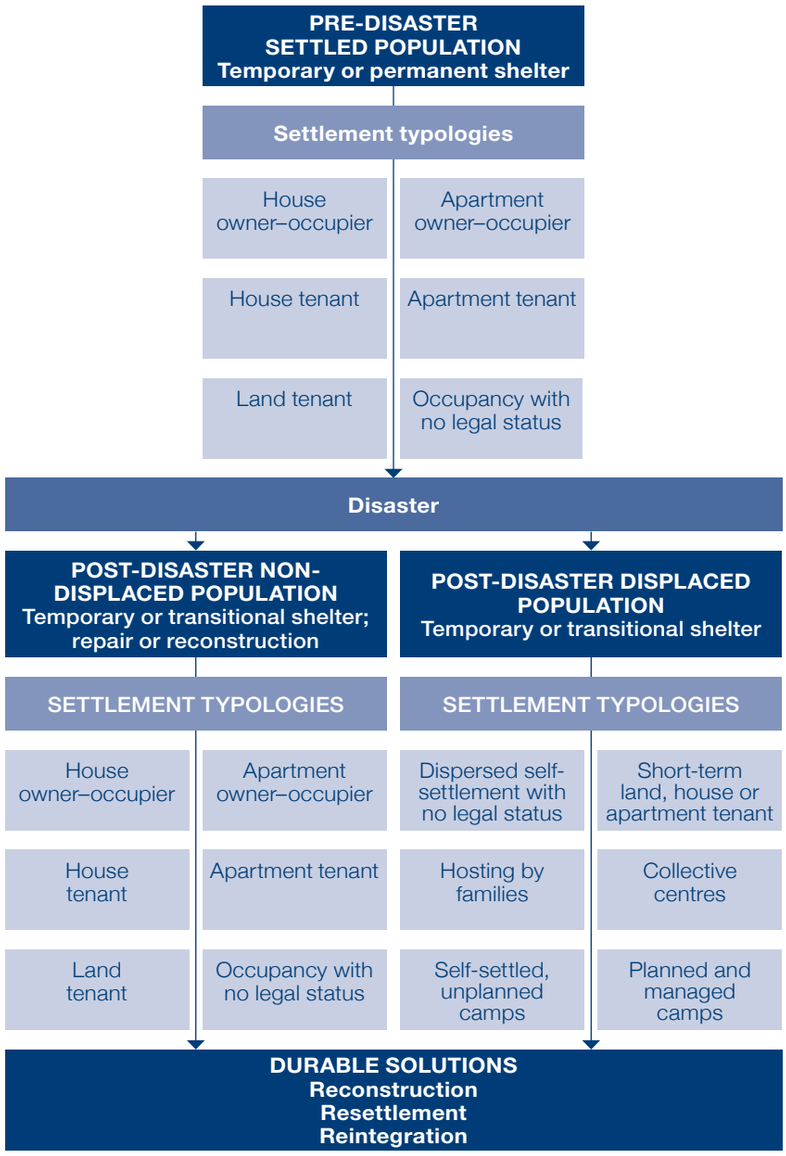
The use of key actions as well as a limited number of key indicators has enabled a review, revision and reprioritisation of themes. A number of former key indicators have now been incorporated into the guidance notes.

The thematic issues incorporated in the key actions and indicators reflect developments in both the sector and in overall humanitarian action. New content primarily consists of new or expanded guidance on cross-cutting issues.

In the 2004 edition, promotion of livelihoods was less of a priority, with the focus primarily on response and not recovery/early recovery. In the 2011 edition, enabling early recovery is an explicit theme, with supporting guidance to match.

While Sphere is still primarily intended for the humanitarian response phase, the guidance given in the 2011 edition can inform preparation for and recovery from disaster. Without significantly affecting content, this orientation has influenced the language and guidance on use of the content.

Shelter and settlement options and response scenarios



The Sphere shelter, settlement and non-food items standards

Shelter and settlement standard 1: Strategic planning
Shelter and settlement strategies contribute to the security, safety, health and well-being of both displaced and non-displaced affected populations and promote recovery and reconstruction where possible.

Shelter and settlement standard 2: Settlement planning
The planning of return, host or temporary communal settlements enables the safe and secure use of accommodation and essential services by the affected population.

Shelter and settlement standard 3: Covered living space
People have sufficient covered living space providing thermal comfort, fresh air and protection from the climate ensuring their privacy, safety and health and enabling essential household and livelihood activities to be undertaken

Shelter and settlement standard 4: Construction
Local safe building practices, materials, expertise and capacities are used where appropriate, maximising the involvement of the affected population and local livelihood opportunities.

Shelter and settlement standard 5: Environmental impact
Shelter and settlement solutions and the material sourcing and construction techniques used minimise adverse impact on the local natural environment.

Non-food items standard 1: Individual, general household and shelter support items
The affected population has sufficient individual, general household and shelter support items to ensure their health, dignity, safety and well-being.

Non-food items standard 2: Clothing and bedding
The disaster-affected population has sufficient clothing, blankets and bedding to ensure their personal comfort, dignity, health and well-being.

Non-food items standard 3: Cooking and eating utensils
The disaster-affected population has access to culturally appropriate items for preparing and storing food, and for cooking, eating and drinking.

Non-food items standard 4: Stoves, fuel and lighting
The disaster-affected population has access to a safe, fuel-efficient stove and an accessible supply of fuel or domestic energy, or to communal cooking facilities. Each household also has access to appropriate means of providing sustainable artificial lighting to ensure personal safety.

Non-food items standard 5: Tools and fixings
The affected population, when responsible for the construction or maintenance of their shelter or for debris removal, has access to the necessary tools, fixings and complementary training.

B.2 USA - San Francisco - 1906 - Earthquake

Case study:

Country:
USA

Disaster:
San Francisco earthquake and fire

Disaster date:
April 18th 1908

No. of houses damaged:
28,000 buildings and 500 city blocks – one quarter of the city of San Francisco.

No. of people homeless:
225,000

Shelters built:
5,610 timber cottages
1,709 housing grants
9,064 housing furniture grants
1573 loans

Project timeline

Project description
Following the San Francisco earthquake of 1906, shelter was initially provided in tents and with the distribution of household items. Formal camps were established and cottages built, which people living in them were allowed to rent and purchase at a subsidised rate. Reconstruction for some households was supported through a system of grants and loans.

Strengths and weaknesses

✓ Immediately after the earthquake, railway and ferry companies provided free transport for those wishing to temporarily leave the city to find shelter elsewhere.

✓ Commitees were established to identify host families outside of the city.

✓ 5,610 timber cottages were rapidly built and rented on a lease-to-buy deal.

✓ Multiple approaches to support recovery were established including cash and loans.

✓ The military established a warehousing system for relief goods where elected civilian chairmen could put in requests for their communities. Cash was given for those whose requests could not be met.

✓ Tents were provided and were easy to move and provided adequate shelter until the rainy season.

× There was a lack of preparedness and planning to reduce disaster risks. A fire caused by the earthquake caused more damage than the earthquake itself.

× Barracks were often dense and lead to crowded conditions with limited sanitation and privacy.

× A "Shoot to kill policy" established by mayor to deal with looters. Many victims of this policy were salvaging materials from their own houses.

× Some minority groups such as chinese-americans were evicted from land that they had before the earthquake and were moved from camp to camp.

- Although significant, the number of schemes for cottages, barracks, loans and grants were not on the scale of the number of houses damaged.

- The quality of the response was dependent upon the decision making of individuals more than pre-exisitng systems. There are documented cases of both positive and negative behaviour by public officials.

- All formal camps were closed within two years of the earthquake.

Before the earthquake

Before the earthquake, San Francisco had a population of 450,000 people.

With the exception of public buildings, and the houses of wealthier city residents, buildings were built from wood.

The city contained significant minorities of immigrants from other countries.

After the earthquake

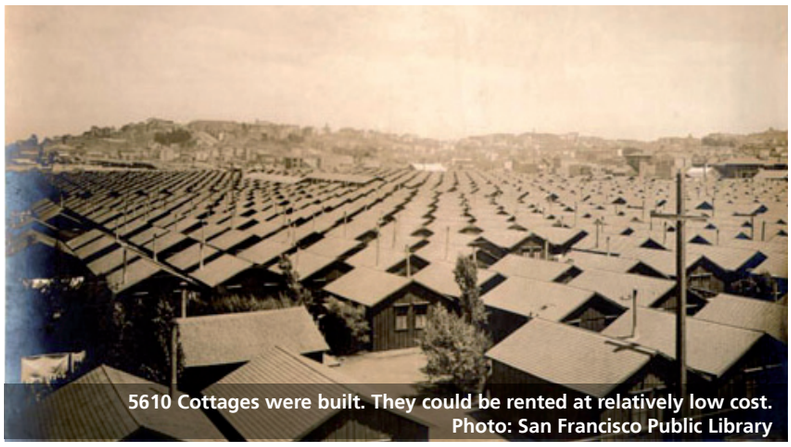
The earthquake hit at 5:15 am on April 18. Immediately after the earthquake, fire broke out. The fires lasted for three days and destroyed 28,000 houses, making 200,000 people homeless. This was nearly half of the city's population. After the fire, rents rose, leading to an increase in homelessness.

Very limited amounts of construction materials could be salvaged. It was estimated that 500 million dollars worth of property was lost (more than 8 billion USD in current value). About 40% of this was insured. On average each citizen lost around 650 USD of property.

On the day of the earthquake, the mayor of San Francisco issued a proclamation that authorised police "to kill any and all persons found engaged in looting or in the commission of any other crime."

Distribution

The first three and a half months of the response were led by the army. They rapidly established supply lines. Ten days after the earthquake, they established a warehouse for second hand clothing, and set it up on the model of a department store.



5610 Cottages were built. They could be rented at relatively low cost. Photo: San Francisco Public Library

In the first month, it handled a daily average of twenty truckloads. Goods included towels, sheets, pillows, pillow cases, blankets, mattresses, stoves, cooking utensils, cutlery, dishes, brooms, wash tubs, washboards, boilers, irons, clothes lines, axes, chairs, tables, and sewing machines.

To distribute the materials, requests came from the cities' elected civilian chairmen. The army handled the goods and the Red Cross verified aid entitlements, following an initial registration.

When the distributions ended, those who had not received items were given the cash value of the articles that they had requested.

Relocation / host families

Immediately after the fires, large numbers of people left the city. From the first day of the fire, free transport by boat and train was provided across the bay, down the peninsula, and to inland locations.

The Southern Pacific railroad transported 300,684 free passengers mainly around the San Francisco bay and to elsewhere in California. This was more than the number of people who lost their houses.

Committees helped to identify communities who were willing to accommodate those affected by the earthquake and fires.

Barracks

Barracks were built by the "committee on housing the homeless".

These were arranged in camps. One of these camps had 18 buildings with 16 two-room apartments in each, separated by an 8ft (2.6m) partition. The rooms were 100 ft^2 (9m^2) in plan and had a front room with a window and a door and a rear room.

The first barracks were occupied one month after the earthquake. The last ones were closed just over one year later.

The barracks were often dense and lead to crowded conditions with limited sanitation and privacy.

Tents

Tents were provided from the first days of the response by voluntary agencies, by the sub-committee on housing the homeless,

The relief operations lasted for 3 and a half months. Many people were provided with tents. Photo: San Francisco Public Library

21 formal camps were established. Photo: San Francisco Public Library


Large numbers of people left the city, free transport was provided. Photo: The U.S. National Archives and Records Administration

by the army and by the American National Red Cross.

Tents were seen as a practical shelter solution for the emergency phase, more effective than barracks. They were easy to move and provided adequate shelter until the rainy season.

Camps

The army gradually assumed control of 21 camps. These camps were known as "permanent camps."

To live in a "permanent camp", residents had to abide by rules of decency, order, and cleanliness.

When a person was ejected from one camp all other camps were notified so that he could not relocate. 488 people were ejected from camps for reasons ranging from drunkenness to disorderly conduct. Discrimination forced Chinese–Americans to be shuffled from camp to camp.

Camps were generally located in parks and squares. One camp had nineteen two-story tenement buildings and a one-story bath-house and laundry building.

Cottages / shacks

Three and a half months after the earthquake, the city corporation launched its plan to build timber cottages, and established contracts for their construction.

Building began six months after the earthquake. It took a further three months, before considerable numbers were available. By the end of the project, 5,610 cottages, 667 "patent flush closets", over six miles of gas and water pipe and over five miles of sewer pipe were built.

The cottages were assigned according to the following priorities - people who were:

- in the official camps,
- in shacks and tents outside official camps,
- in the city who were living in cellars or similar places, those who were receiving shelter from friends,
- citizens living outside the city.

Some people whose houses survived the fires but needed better housing received cottages and moved them to plots for permanent use.

Charges for cottages

A nominal rental (2 USD per month) was charged for the cottages. This was to avoid a culture of dependency and distortion of the economic conditions.

Applicants were required to sign a lease agreement with the "San Francisco Relief and Red Cross Funds" (a corporation) before occupying the cottages. This was a purchase contract that stipulated that the tenant would:

- own the cottage if rent was paid until August 1, 1907,
- pay rent and gas rates,
- abide by the camp regulations,
- not sublet without written permission,
- vacate the house at the expiration of his lease unless all payments had been made,
- on acquiring ownership the tenant would remove the house from the camp at his/her own expense before August, 1907.

When through ill-health a person was not able to pay rent, the Rehabilitation Committee was informed.

708 cottages were purchased on a lease-to-buy deal. The cottage could be bought for 50 USD. These could be moved to plots where were rented by the authorities at 3-15 USD per month.

Whenever a person could prove that he had purchased or leased a lot in the city or county, he was permitted at his own expense to move his house.

In just over two years the cottages were all removed and the camps closed.

Reconstruction

Reconstruction was relatively swift, largely along the existing grid plan of the city. Most of the reconstruction was completed by the Panama-Pacific Exposition, nine years after the earthquake and fire. However there were criticisms that the rebuilding was not to the seismic safety that it should have been.

The majority of the funds for reconstruction came from private capital and insurance payments.

Grants and loans

A committee administered grants and loans for reconstruction. It tailored funding decisions to the needs of individual applicants. Grants were offered in various categories including tools, re-establishing houses, business enterprise and transportation.

- Where applicants planned and built their own houses, the committee set a maximum cost of each house to be erected, with the applicant paying the majority.
- Where the committee planned and directed the construction of the house, the grant:
  - covered the entire cost of the house,
  - supplemented the grant with a loan to be repaid by the applicant,
  - supplemented the grant with a cash payment from the applicant.

1,709 housing grants and 9,064 housing furniture grants were provided. An additional 450 housing relief grants were issued, averaging at 644 USD per household.

Of 2,098 applications for the combined grant and loan plan, assistance was given in 1,572 cases. Loans ranged from 37 - 595 USD,


Burning of earthquake refugee shacks during "Nine Years After" celebration at the Panama-Pacific International Exposition. Photo: San Francisco Public Library

"Souvenir hunters"; the mayor of San Francisco authorised police "to kill any and all persons found engaged in looting or in the commission of any other crime".
Photo: RG 46, Records of the United States Senate, National Archives

A distribution queue, early in the response.
Photo: Records of the United States Senate, National Archives

A military camp, four days after the earthquake.
Photo: Records of the United States Senate, National Archives

Annexes

The Appendices contain a list of case studies in the three editions of this report to date ("Annex 1 - Index - by country", p.114), and further reading, including some of the public documentation on which this report was based ("Annex 2 - Further reading", p.116).

Annex 1 - Index - by country

This index is to help readers find case studies of shelter projects from Shelter Projects 2008, Shelter Projects 2009 and Shelter Projects 2010. it is sorted by country and by date. Projects are colour coded as follows:

Conflicts, complex emergencies or post conflict returns conflicts

Natural disasters

Projects implemented before the year 2000

Annex 2 - Further reading

Websites

www.disasterassessment.org
A site where members of the disaster management community can meet to exchange tools and case studies related to disaster risk assessment.

www.oneresponse.info
The home pages of the project to establish clusters as a coordination mechanism. Includes links to the shelter cluster and the Early Recovery Cluster. Contains further reading and links to current documents for major responses.

IFRC/ICRC Emergency relief items catalogue - website
http://procurement.ifrc.org/catalogue/
Detailed specifications of all items commonly used by IFRC and ICRC

IFRC Shelter video channel
bit.ly/ifrcshelter
Red Cross Red Crescent videos related to emergency shelter

www.reliefweb.int
Up to date information on complex emergencies and natural disasters as well as an archive of information, field reports and situation reports from emergencies since 1996. OCHA situation reports (sitreps) and IFRC appeal documents and operations updates have been of particular use in compiling these case studies.

SDC - Cash transfer Projects
http://www.sdc-cashprojects.ch/en/Home/Experiences/SDC_Cash_Transfer_Projects
Compilation of cash projects by SDC. Includes shelter case studies.

www.shelterlibrary.org
A library of free documents relating to transitional settlement and reconstruction.

www.sheltercluster.org
Home page of the global shelter cluster - the coordination mechanism for shelter responses. Contains links to individual responses.

www.sphereproject.org
Download the sphere handbook, find information on trainings and other activities from the Sphere Project. The Sphere Project aims to improve the quality of humanitarian assistance and the accountability of humanitarian actors to their constituents, donors and affected populations.

Background Documents

Camp management project, Camp Management Toolkit 2008
Available from: www.nrc.no/camp
A comprehensive field manual for camp management organisations and stakeholders involved in camp operations.

Corsellis and Vitale, Transitional Settlement: Displaced Populations, Oxfam publishing, 2005
Available from: www.shelterlibrary.org
Guidelines for the strategic planning and implemention of settlement responses for displaced populations.

IASC, Shelter Centre, Selecting NFIs for shelter - 2008.
Available from: www.shelterlibrary.org
Provides information, case studies and guidance on how to choose the best items to distribute to those affected by natural disaster or conflict.

ICRC/IFRC Guidelines for cash transfer programming - 2007
Available from: www.ifrc.org/
Provides information on when and how to distribute cash in disaster response.

IFRC, Guidelines for assessment in emergencies - 2008.
Available from: www.ifrc.org
Practical information and guidance on how to conduct assessments in emergencies.

IFRC Owner Driven Housing Reconstruction Guidelines (ODHR), 2010
Available from: www.ifrc.org
Guidance on the planning and implementation of assisted self help reconstruction projects.

IFRC, Oxfam GB, Plastic sheeting, 2007
Available from: www.plastic-sheeting.org
A guide to the use and specification of plastic sheeting in humanitarian relief, 2007. An illustrated booklet on when and how to use plastic sheeting most effectively in emergencies.

IFRC, The IFRC shelter kit, 2010
Available from: www.shelterlibrary.org
A guide on the IFRC shelter kit and how to use it.

IFRC, Transitional Shelter: Eight Designs, 2011
A review of risks in shelter construction and detailed structural analysis of eight different transitional shelters designs that have been used in the field in large scale projects.

Mike Albu, The Emergency Market Mapping and Analysis Toolkit,
Available from: http://emma-toolkit.org
A toolkit designed for generalists, as well as specialist staff on how to conduct an emergency market mapping analysis.

NRC, Shelter Centre, Urban Shelter Guidelines
Available from: www.shelterlibrary.org
general guidance for urban humanitarian response.

Shelter Centre, UN, DfID, Shelter after disaster - Strategies for transitional settlement and reconstruction, 2010
Available from: www.shelterlibrary.org
A book containing information and guidance on how to agree strategies for reconstruction after natural disasters. contains description of the types of shelter programmes that organisations can implement.

Sphere Project, Sphere - Humanitarian charter and minimum standards in humanitarian response, 2011
Available from: www.sphereproject.org
Contains consensus standards agreed among major humanitarian organisations for key sectors including shelter and settlement. It also contains actions, indicators and guidance notes as to whether standards have been achieved.

Sultan Barakat, HPN Network paper 043, Housing reconstruction after conflict and disaster, ODI, 2003
Available from: www.odihpn.org/documents/networkpaper043.pdf
Review of housing reconstruction experiences and approaches.

UNDRO, (now UNOCHA), Davis, I., Shelter After Disaster, Guidelines for Assistance, 1982
Available from: www.shelterlibrary.org
Guidelines and description of shelter provision in all aspects of natural disasters (from preparedness to reconstruction).

UNHABITAT, IFRC, Shelter Projects 2009
Available from: www.ShelterCaseStudies.org
Case studies of shelter projects implemented between 1945 and 2009. Includes many different types of response.

UNHABITAT, IFRC, UNHCR, Shelter Projects 2008
Available from: www.ShelterCaseStudies.org
More case studies. Stee also UNHABITAT, IFRC, Shelter Projects 2009.

UNHABITAT, Land and Natural Disasters - Guidance for Practitioners, 2010
Available from: www.disasterassessment.org or from unhabitat.org
A book containing guidance on land issues following natural disasters.

UNHCR, Handbook for Emergencies, Third Edition, 2007
Available from: http://www.unhcr.org
A book containing guidance on the management and all the key sectors in refugeee emergencies.

UNICEF, Compendium of Temporary Learning Spaces (TLS): Design and practice in emergencies 2011
Designs and guidance on the construction of temporary learning spaces.

UN/OCHA, Tents - A guide to the use and logistics of tents in humanitarian relief, 2004
Available from: www.shelterlibrary.org
A booklet describing when and how to use tents as well how to support those living in them to best adapt them to meet their needs.

UN/OCHA / IFRC / CARE International, Timber as a construction material in humanitarian operations, 2009
Available from: www.humanitariantimber.org
An illustrated booklet on how to source and use timber for the construction of basic structures.

General statistics and case study related information

CRED, EM-DAT disaster database.
www.emdat.be.

Construir com os ventos: guião de construcäo para zonas de risco de ciclone, Government of Mozambique UN Habitat.
Available from www.sheltercentre.org

IFRC, World Disasters Report, 2011 - Focus on hunger and malnutrition
IFRC, World Disasters Report, 2010 - Urban Risk
Available from www.ifrc.org

IDMC/ NRC, Internal Displacement Global Overview of Trends and Developments in 2010
Available from www.internal-displacement.org

Rick Bauer & Jonathan Brass, Oxfam GB, Brick Markets in West Sumatra after the 30 September 2009 Earthquake, an inter-agency assessment of issues in brick supply & demand 16 –19 October 2009 Pariaman & Padang Districts - West Sumatra.
Available from www.cashlearning.org

Sacca David, Abri Transitionnel (T-shelter), Cahier des Charges, Handicap International, Département Action d'Urgence, Haïti 2010-11.
Available from www.sheltercentre.org

Scott DiPretoro, American Red Cross, RED Card Program (Repair and Development) Chile Earthquake 2010 Beneficiary Satisfaction & Program Evaluation, 2011
Available from www.cashlearning.org

UNHCR, Global Trends 2010
Available from www.unhcr.org