B.5 Indonesia, Jogyakarta - 2006 - Earthquake

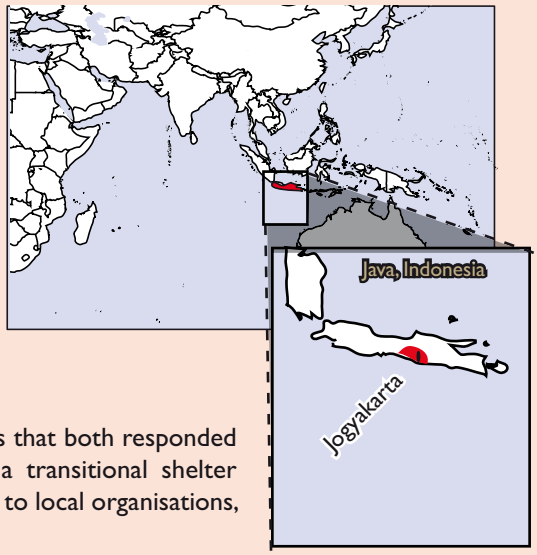
Overview of the response

Summary

At 6:30 a.m. on a Saturday morning an earthquake measuring 6.0 on the Richter scale struck the south-eastern corner of the province of Jogyakarta in Central Java. The 53 seconds of violent activity killed 5,000 people and decimated over 8,000 rural and peri-urban sub-villages, leaving over 2 million people homeless.

The largest response was a national response from a diversity of private actors and organisations. This was backed up by an international response, which was accelerated by the preparedness activities that were already ongoing in anticipation of the eruption of nearby Mount Merapi. The international response was coordinated through the Emergency Shelter Cluster that was activated locally.

The case studies included in this section involve two organisations that both responded in phases: an initial distribution of emergency items, followed by a transitional shelter response. Both organisations used cash grants, either to individuals or to local organisations, to implement the transitional shelter programmes.



Before the earthquake

As there had been no major earthquake in the area in living memory, the quality of general construction in the province of Jogyakarta had slipped. When the 2006 earthquake struck, the level of housing damage was disproportionately high.

Immediately prior to the earthquake, the imminent threat of eruption from nearby Mount Merapi meant that several agencies in Jogyakarta were pre-positioned to respond to a disaster. For example, one international NGO's disaster response unit had over 10,000 tarpaulins warehoused in Jogyakarta and a fully functioning office. This organisation was in an ideal position to respond very rapidly in the emergency phase of the shelter response.

The earthquake

The proportionally low levels of death and injury, when compared to the damage to physical infrastructure, resulted in comparatively low levels of damage to the social infrastructure. This, combined with the disaster's proximity to the relatively unscathed major city of Jogyakarta (a major hub of university learning and NGO activity), provided a massive national capacity for the INGO movement to draw upon and work with.

In the early stages of the disaster response, international funds and resources appeared extremely limited for such a vast affected area.

Few other sectors were as badly affected as the shelter sector. Most families used private wells and septic tanks, which remained largely functional. This, along with high general hygiene levels, greatly reduced the need for water, sanitation or hygiene assistance.

The Jogyakarta earthquake response became primarily a shelter disaster, and over 50% of the over 200 agencies on the scene became involved in the Shelter Cluster that was set up to coordinate the response.

The semi-rural nature of most of the affected areas meant that there was space for temporary shelters in the rubble. The combination of people's desire to stay close to their remaining possessions and (mainly) agricultural workplaces, meant that the need for IDP camps was largely avoided.

Transitional shelter

Soon after the earthquake, the government of Indonesia committed to providing permanent housing to every affected family, announcing the 'one step' policy to move people directly from emergency to permanent housing.

With over 300,000 houses destroyed, initial government reluctance to support transitional shelter gave way to a cluster-wide strategic approach to address the upcoming rainy season and the gap between emergency and transitional shelter.

With limited apparent funding, and therefore little conflict over operating areas (compared to the tsunami response in Aceh), the member organisations in the Shelter Cluster worked closely together to develop guidelines for locally appropriate transitional bamboo shelter. These were then taken on board across the cluster.

Resource management

A total of about 25 million sticks of bamboo were used in the response. Some 5 million sticks were used by the Shelter Cluster, about 3 million by the Indonesian government and 10-15 million by other communities.

However, management of the growing clumps of bamboo was not integrated into the transitional shelter programmes. In response to demand, much bamboo was clearcut or harvested using unsustainable techniques. Depending on the type of bamboo and how it was harvested, some areas will take three to five years to return to their original stock. Other areas may take ten years and some will not grow back.

The resultant environmental impact was significant. Although formal studies have not been carried out, it is likely that vast areas of bamboo forests were decimated, including entire valleys.

There is a strong tradition of bamboo-based construction in Jogyakarta.

A transitional shelter strategy was adopted by the Shelter Cluster members.

Bamboo jointing details

Bamboo being bound with string

Electric power drills used to drill holes in the bamboo so that it can be pegged

Prefabrication of a wall panel

Connecting a vertical post to the foundation

Foundation pads cast with bamboo to connect them to the frame

Photos: IFRC

Public information messages distributed as part of the response

B6 Jogyakarta - 2006 - Earthquake

Case study: Cash and transitional shelter

Project type:
Community-built transitional shelter
Self-build, cash grants for materials
Skills transfer through volunteers living in communities

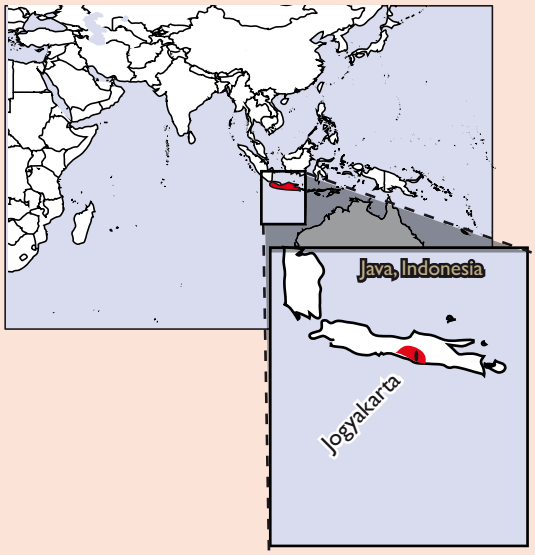
Disaster:
Jogyakarta/Central Java earthquake, 24 May 2006

No. of houses damaged:
303,000 destroyed or seriously affected

Project target population:
12,250. 22.5% of UN/OCHA-recorded shelters

Occupancy rate on handover:
100% (according to an independent student survey)

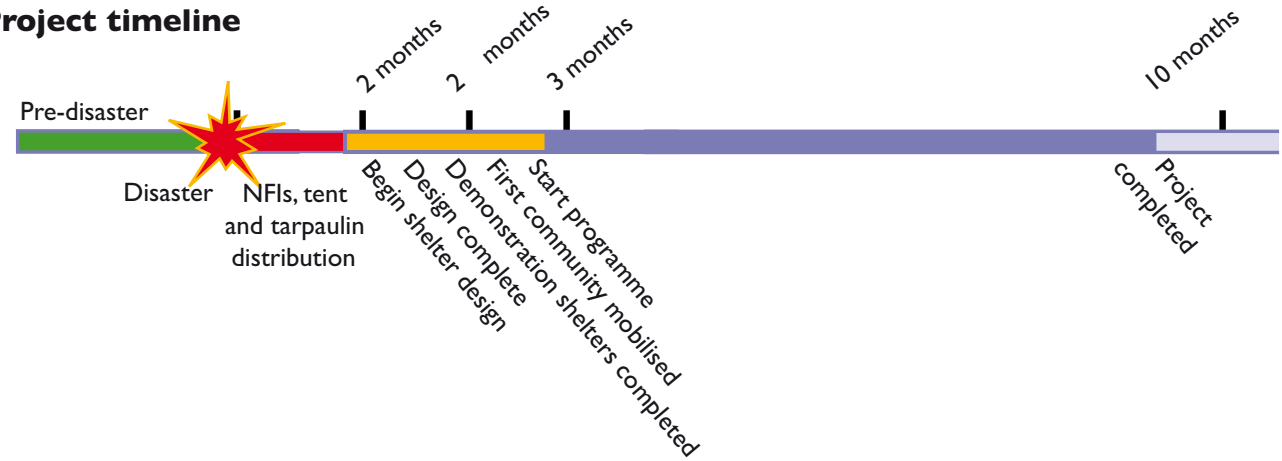
Shelter size
4 x 6m^2 (minimum 2m height)



Summary

This organisation developed a locally appropriate shelter design based on traditional building materials and construction techniques. It delivered cash with support to affected families to build their shelters. It set up a community-built transitional shelter programme supported by hundreds of volunteers and extensive instructional and promotional materials, including short training manuals, video compact discs, posters and radio advertisements.

Project timeline



Strengths and weaknesses

X Emphasis on community participation empowered communities in their reconstruction process and resulted in community engagement and ownership of the programme.

X The project was able to build on the Javanese self-help culture of 'gotong royong' ('working bee').

X The project sucessfully used materials that kept funds in the local economy.

X Maintaining volunteers to live within the communities was essential for effective knowledge transferral.

X Cash grants gave communities responsibility and engagement with the programme.

X Once new permanent houses were inhabitable, transitional shelters were used as kitchens, sheds, small shops, workshops, storehouses, etc.

W Environmental groups expressed concerns about the widespread impact on Java's bamboo forests. This could perhaps have been alleviated or averted by altered procurement mechanisms.

W A supply of treated bamboo would have greatly extended the usable lifespan of these structures (from two years to 25 years) and enhanced community recovery.

W Faster implementation, scale-up and scale-down of the shelter programme would have reduced the problems of overlapping with permanent reconstruction.

W Without the incentive of further funding, minor issues of accountability and transparency occurred with the final installment of funding. Clearer contracts, penalty clauses, training or incentives may have alleviated this.

A completed transitional shelter built through cash grants

A transitional shelter built on the site of a destroyed house

Beneficiary selection

Small cash grants were given out via traditional mutual support mechanisms to neighbourhood groups to buy tools and basic materials to build temporary shelters.

Meetings were held with each group to discuss the project and to sign a contract with the community. In order to participate, each neighbourhood (20-50 houses) had to form a shelter committee that had to include a head of the group, a treasurer (who had to be a woman) and a secretary. The positions could not be held by local officials or their family members.

The committee was responsible for the selection of beneficiaries, who could be anyone currently living in a tent or under a tarpaulin, with a house unsuitable for habitation. Priority was given to vulnerable people such as widows, orphans, disabled people, pregnant women, the sick and the elderly. Funds were delivered through group bank accounts in three to four instalments. The community contributed labour and materials recovered from the rubble.

Design process

This project aimed to empower community members to rebuild their lives, starting with the construction of a transitional shelter. The transitional shelter design was developed through an understanding of locally available materials, community needs and the capacity and objectives of the organisation.

It took one month for the design process, one month for community preparation and demonstration shelters, and one week to build 740 'model' houses through a public competition.

The competition involved three categories and offered prize money that went to the neighbourhood for:

- the most number of houses;
- the most beautiful houses; and
- the involvement of women.

The programme was rolled out over seven months, with 12,250 shelters built in 761 communities. Shelters cost under US$ 200 per unit.

Community-built shelter

Beneficiaries were strongly encouraged to follow the design, but not compelled to. In some cases people ignored or modified the design, such as in Delingo, a remote community with widespread construction skills and local construction resources.

The volunteers/supervisors were essential to guide and support good construction. The more the volunteers were confident and engaged in the process, the more the construction followed the design and was of sufficient quality. Variations were not problematic as long as the general principles were followed and the essential points (such as building size, safe connections, etc.) were satisfied.

Delay in project startup

The organisation was initially hesitant to give cash directly to beneficiaries. If there had been quicker institutional support for the project, it could have been scaled up faster and reached more people.

Community knowledge

Community levels of knowledge about the use of bamboo varied. The more urbanised the environment, the lower the level of traditional knowledge in the community, which led to a lower quality of bamboo construction.

The rural mountainous communities recovered relatively quickly, despite higher levels of damage from the earthquake and higher levels of general poverty. One of the reasons for this was that many locals had worked in the construction industry prior to the earthquake.

The interior of a transitional shelter

Transporting bamboo mats to a construction site

Implementation partners

Throughout this project, the organisation worked with national volunteers, two local universities, undergraduate architecture students, a training team, NGO facilitators/trainers, an implementation team, and a bamboo expert with experience in Venezuela and Flores, and communities in Jogyakarta and Central Java.

The local universities were involved and helped to:

- develop technical inputs for shelter design and messages;
- develop posters, pamphlets, t-shirts, etc.;
- train students to deliver 'build back better' messages under staff supervision; and
- set up mobile construction clinics.

The local media also got involved, reinforcing best practice shelter and construction messages on the radio, television and in print.

'Achieving good recovery and risk reduction outcomes in shelter is not about building structures. It is about building trust with communities'.
- Recovery coordinator for the programme

Working with volunteers

The shelter programme mobilised volunteers as community trainers, with two volunteers per neighbourhood. The volunteers first went through three days and nights of hands-on training making straw models and a mock-up frame, as well as finance training and team-building exercises. They then worked with communities on selecting and buying materials, the technical aspects of working with bamboo and building the shelters.

Community training lasted up to one week. During this time the volunteers and the community built the first shelter together, with supporting media (a step-by-step guide, an informative video about using bamboo in construction, safe construction advertisements and a booklet). Volunteers lived in the communities in a tent or transitional shelter and worked with the communities every day.

Working with volunteers allowed a large-scale programme to be set up. The volunteers were often enthusiastic and very willing to help, but some had a low level of confidence or experience. This led to some challenges in ensuring adequate quality control.

Volunteers were paid a small stipend and supported with cooking equipment, sleeping gear and field support. A weekly reflective learning/training session was held.

The Shelter Cluster design guidelines included seismic resistance, lasting up to two years, using materials that could be recycled and that cost under US$ 200.

Ongoing use of shelters

In the densely populated area of Klaten, the transitional shelters were eventually demolished to make room for permanent housing.

In the rural areas, the majority of the transitional shelters were still being used after permanent shelters were built, but for purposes such as storage sheds, shelter for cattle and livestock, or for small restaurants.

As per the requirements of the cluster-wide transitional shelter design, untreated bamboo was used (which deteriorates after two years). If treated bamboo had been integrated into the programme, the shelter structures could have been safely used in communities for up to 25 years.

Resource management

The shelter programme built 12,250 transitional shelters that used more than 100 culms of bamboo per shelter, using a total of more than 1.2 million culms of bamboo.

To avoid deforestation of the bamboo stock, this project could have set up purchasing control mechanisms to manage the bulk procurement of bamboo that controlled quality, environmental impact, procurement methods and treatment of the bamboo. It would have also been possible to allocate money to reforestation programmes.

Materials	Quantity
Bamboo mats 6 walls, 3 ceiling, 1 door	10 mats
Round poles (for columns) 3' diameter, 3m long	12 poles
Round poles (for beams and roof joists) 7.5cm diameter, 3m long	11 poles
Timber for fixing the mats	7 beams
Reinforced plastic sheet	3m x 15m
Nails 5cm, 7.5cm and 10cm	2.2 kg
Wire	1 kg
Hinges	3 units
Lock	1 units

Public information was a critical component of the project.

B7 Jogyakarta - 2006 - Earthquake

Case study: Emergency and transitional shelter

Project type:

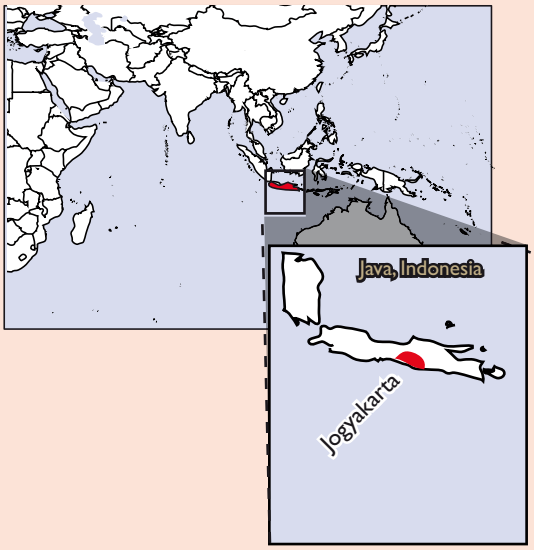
Non-food item distribution (plastic sheeting)
Emergency shelter enhancement programme
Public outreach and information programme

Disaster:

Jogyakarta/Central Java earthquake, 24 May 2006

No. of houses damaged:

303,000 destroyed
240,000 seriously damaged
(mostly rural or peri-urban communities)



Project target population:

Distribution of plastic sheeting: 75,000 families
Emergency shelter enhancement: 26,500 families
Transitional shelter programme: 2,000 families

Occupancy rate on handover:

External evaluation shows close to 100% usage and correct targeting

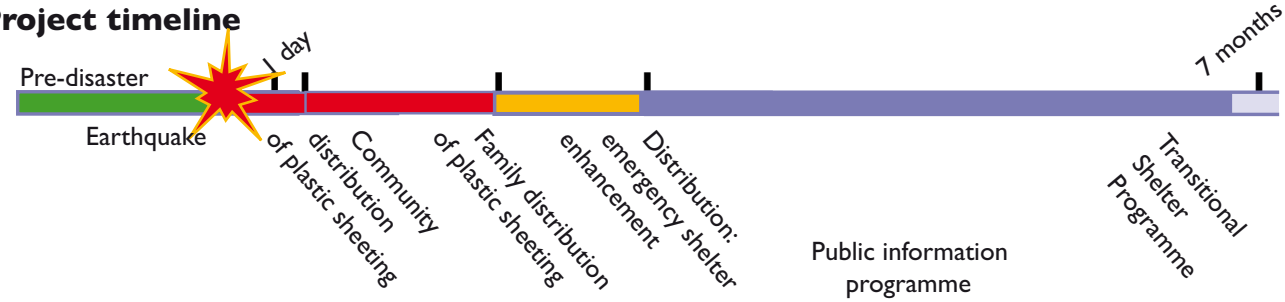
Shelter size

Plastic sheeting: Phase 1, 20-30 sheets per village. Phase 2, one 4m x 6m sheet per family
Emergency shelter enhancement programme: walling and floor mats for 4 x 6m plastic sheeting
Transitional shelter programme: 24m^2 bamboo transitional shelters

Summary

This organisation implemented a four-part emergency shelter response that included: 1) distribution of tarpaulins for emergency shelter based on a broad vulnerability assessment; 2) a 100% infill project; 3) an emergency shelter enhancement programme of tools, walling and bedding for 26,500 families, a broad public outreach and safety information programme; and 4) a small grants programme for the design and construction of transitional shelters. All programmes were designed in coordination with the Shelter Cluster, where the organisation played a lead technical advisory role.

Project timeline



Strengths and weaknesses

X As early capacity was limited, a partial distribution programme across a large affected region followed by a 100% distribution infill program worked very well.

X The delivery speed of broad-based tarpaulin distribution effectively avoided the creation of IDP camps.

X By communities' request, distributions were delivered to the community level as opposed to individuals, with communities taking responsibility for internal distribution.

X Cash grants gave communities responsibility and engagement with the programme.

X Procurement of locally manufactured woven bamboo wall sheet was far more successful than conventional tender-based procurement methods.

X Running the entire programme through local partners worked extremely well.

W The shelter enhancement programme could possibly have been improved by providing flooring and wall framing material (not just wall cladding and sleeping mats).

W Ongoing support and expansion of successful transitional shelter projects would have been desirable and useful.

W Faster bulk procurement and distribution of tarpaulins would have been desirable.

Photos: Dave Hodgkin

Plastic sheets distributed as part the first phase of the response were often used to make shared temporary shelters.

Distribution - plastic sheeting

The organisation implementing this project was one of the few agencies with full-functioning capacity at the time of the earthquake. It started its first distributions ten hours after the earthquake.

As rain was falling each night there was an urgent need for shelter, but supplies were too limited to supply one tarpaulin per family.

A broader distribution through local partners was conducted. Each village was provided with sufficient tarpaulins to ensure that the sick, the weak, the young and the elderly were adequately under cover. In the first days, villages joined tarpaulins together to form large communal shelters that housed the whole village at night (up to ten times the expected number of beneficiaries).

As funds and capacity from other organisations arrived, the project was reduced to an infill programme, returning to previously assisted villages and supplying 48m^2 of plastic sheeting per family (two 6m x 4m sheets).

At the request of local communities and in support of the local self-help tradition of 'gotong royong', all distributions occurred at the community level instead of the individual level. All needs assessments and distributions were conducted by local implementing partners. Communities were responsible for beneficiary selection.

Because local NGOs conducted all distributions and evaluations, the amount of human resources that the international NGO itself had to deploy was extremely limited. At its peak it employed only six shelter-specific staff, and focused its resources more on logistics and partnership support.

Expansion of the emergency shelter programme

Early analysis of the progress of community recovery showed:

- the use of tarpaulin for both roofing and walling, resulting in limited undercover space;
- sufficient reclaimable timber for temporary shelter framing, but insufficient material for wall cladding;
- a pressing need for tools and equipment for cleanup and reconstruction; and
- a shortage of clean sleeping mats.

The rush by affected families to reconstruct permanent houses raised a number of advocacy concerns. These included issues about the quality of construction, health and safety, treatment of the asbestos within the rubble and the construction of shelters in precarious positions.

The emergency programme was followed by an Enhanced Emergency Shelter programme, which provided:

- woven bamboo wall sheeting (gedek) to affected communities to ensure that each family had sufficient material to build walls for their emergency shelter;
- combined community toolkits for clean-up and reconstruction; and
- sleeping mats.

It also launched an advocacy and public outreach programmes to address safety and health issues.

Photos: Dave Hodgkin

A collective shelter built by beneficiaries using distributed plastic tarpaulins

The extension of the emergency programme provided additional plastic sheets so that each needy family received one sheet.

Transitional shelter grants

As a final part of the organisation's emergency shelter programme, a programme was started to support the transition into temporary housing. The transitional shelter programme was conducted in accordance with the Emergency Shelter Cluster guidelines that had been developed locally following the earthquake.

'The best we can do as shelter managers, is to be responsive and adaptive to the changing needs of the affectedcommunity;providing minimalist but strategic and incremental inputs into the communities' natural path frominadequatetoadequate permanent shelter'.

Cultural, environmental and cost concerns led to the creation of a set of common guidelines based on traditional bamboo frame construction with clay roof tiles and woven bamboo wall cladding. Flexibility in design to allow for innovations was encouraged.

This programme provided eight cash grants to local community organisations/businesses and groups, to work with communities already serviced by the emergency shelter distributions. These were based on a tender process that resulted in a cost of US$ 100-300 per shelter.

As well as housing 2,000 families and improving the capacity of a number of local partners, this programme produced a range of well-documented transitional shelter solutions as potential examples for further expansion or adoption by other agencies.

Public outreach and advocacy

The final aspect of this post-earthquake shelter response was a public outreach and advocacy programme, where the organisation provided technical advice to the Shelter Cluster. This led to the formation of technical working groups. One group working on public outreach produced posters on a range of issues including:

- safe clean-up;
- safe siting of temporary shelters;
- safe reconstruction;
- safe handling of asbestos and dust;
- building next to hazardous buildings; and
- an introduction to simple bamboo and concrete construction techniques.

The organisation led a cluster working group to design and print posters. These were then distributed by the local government and by Shelter Cluster members as a part of shelter material distributions. In total, four batches of 20,000 posters each were distributed to the disaster-affected population.

The public outreach working group went on to develop a range of public outreach and advertising materials to promote safe reconstruction.

Materials	Quantity
Emergency shelter programme	
Plastic tarpaulin 6m x 4m	20-30 per sub-village (200-300 families)
100% infill programme	
Plastic tarpaulin 6m x 4m	1 per family
Enhanced emergency shelter programme	
Woven bamboo sheeting 2m x 3m	6 sheets per family
Tikka matts	2 per family
Toolkits	
1) Clean-up	Distributed per village
2) Reconstruction	
3) Village level	
Innovative T-shelter grants	
Cash grant based on tender process	US$ 100-300 per shelter
Public outreach programme	
Public outreach posters	4 batches of 20,000 posters

Grants were provided to build transitional shelters. Many different and innovative designs were built.