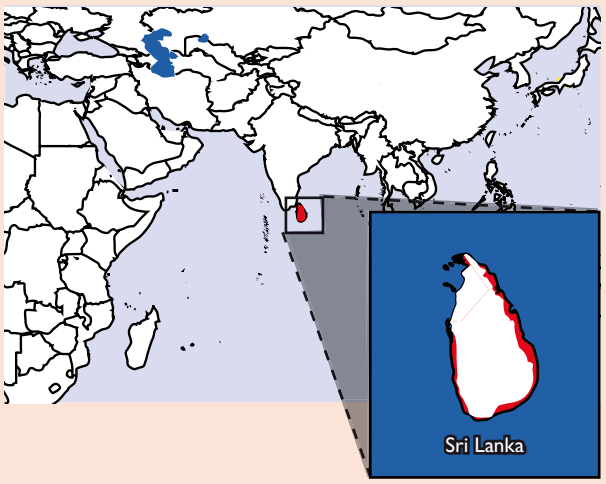
B.13 Sri Lanka - 2004 - Tsunami

Overview of the tsunami response

The tsunami of 26 December 2004 hit Sri Lanka two hours after the initial earthquake and killed over 35,000 people along the eastern and southern coasts. It destroyed approximately 100,000 houses and damaged or destroyed much of the infrastructure and public buildings in the affected areas.

The shelter strategy developed for much of Sri Lanka focused on the construction of transitional shelters to bridge the gap until permanent shelters could be built. This case study is of one such transitional shelter project, where an international organisation provided metal-framed shelters that people could erect on their own plots of land.



Shelter Strategy

In the areas of Sri Lanka controlled by the national government, a national transitional shelter strategy was adopted.

The general principles of the shelter strategy were founded on Sphere standards, but were expanded to describe a transitional process looking beyond emergency needs, and taking into account the need to support livelihoods.

The international scale of the disaster and the intense media attention it received meant that there were large amounts of funding available and a great number of organisations wishing to become involved. This was recognised when the strategy was formed.

The technical design aspects of the strategy gave a per shelter budget and a series of spatial guidelines (minimum indoor space, minimum height, etc.). Within those guidelines, humanitarian organisations and communities were free to make their own specific shelter designs. In most cases, the shelters were single-family huts, built with varying levels of input from beneficiary groups, using a mixture of wood, metal frame, roofing sheet and concrete-block materials.

Coastal buffer zone

The national government insisted upon having a coastal buffer zone. Construction was excluded from within 100m of the high-tide mark in the south and west and within 200m in other areas. This created major challenges in finding land to rebuild on, leading many families to live far from their livelihoods and forcing the creation of many camps.

Coordination

Coordination within the shelter sector was generally good, with full participation from the government at both the national and local level. However, in many areas up to 60% of the shelter support was provided by small organisations. Many of these had little previous disaster experience and were often involved for only short periods of time.

Photo: Joseph Ashmore

One of many transitional shelter designs adapted by its occupants

Different levels of support

Different levels of support were given to those who had been affected by the tsunami and those who had been affected by the armed conflict in the north and the east. This led to tensions and difficulties for many ongoing development projects.

Emergency shelter needs

Immediately following the tsunami many families found temporary shelter in public buildings, such as temples, or with host families. In the weeks that followed, many were able to make some basic repairs to their houses, while others lived in tents until the transitional shelters were constructed.

After the first year

Government numbers showed that all affected families had been provided with transitional shelter by mid-2005. However, permanent housing would take significantly longer.

Many humanitarian organisations were only funded for the initial six- to nine-month emergency and transitional periods, and there were often gaps in the handover to other organisations that could support permanent reconstruction.

Despite the incentives of government grants, many families rebuilt houses that were not resistant to the common hazards of cyclones and floods. Remittances from relatives living abroad and grants from smaller charities made it more difficult to ensure construction quality.

Due to the length of time required to build permanent shelters, the UN and other organisations advocated for the upgrading and maintenance of a large number of the transitional shelters. They were aware that some families would be living in them for some years to come.

There was no construction allowed within 200m of the high-tide mark in some areas and within 100m in other areas.

In some cases, small groups of transitional shelters were built on small plots of land that were negotiated on a temporary basis.

New settlements or camps had to be built for many of the displaced. Many of the allocated sites were prone to flooding and away from livelihoods.

Photos: Jo Da Silva and others.

The shelter strategy allowed for many different shelter designs. Over 70,000 transitional shelters were built.

B.14 Sri Lanka - 2004 - Tsunami

Case study: Transitional shelter construction

Project type:
Transitional shelter construction

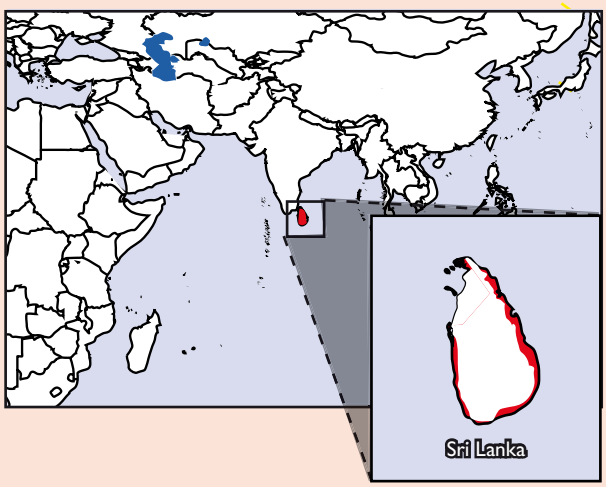
Disaster:
Indian Ocean tsunami, 26 December 2004

No. of houses damaged:
100,000 nationally; 5,500 in the area where the NGO was working

Project target population:
1,500 families (January 2005), then reduced to 1,000 families (March 2005)
Final total of approximately 850 families

Occupancy rate on handover:
Estimated at 90%

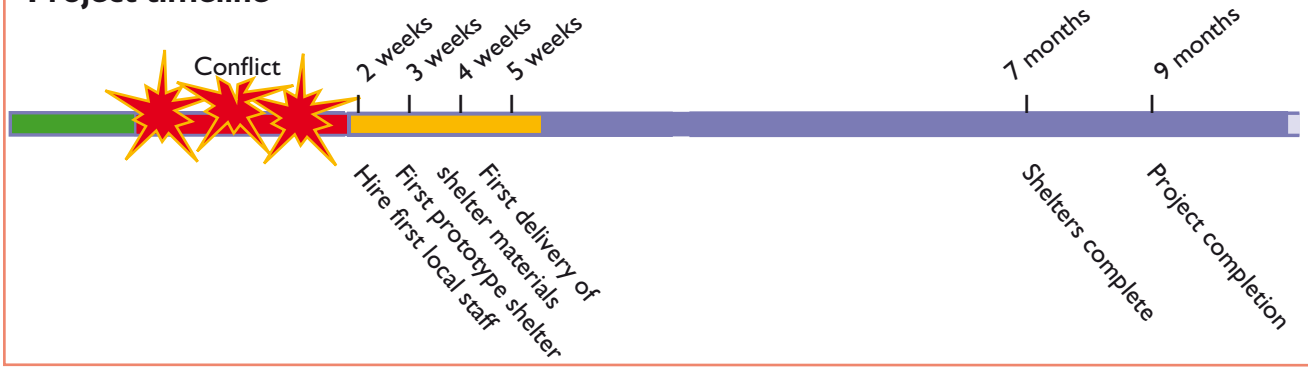
Shelter size
18.6m^2 (200 ft^2), later upgraded to approximately 20.5m^2 with enclosable veranda space



Summary

Using easy-to-construct and easy-to-carry metal frame shelters adapted from previous Sri Lanka programmes, the NGO was able to support affected families in 27 different villages along the coastline. The project avoided the creation of large camps, focusing instead on helping people to build on customary plots of land that belonged to them or were negotiated from land owners.

Project timeline



Strengths and weaknesses

X A high level of choice was given to beneficiaries in terms of location, adaptability of design, transferability and potential for reuse.
X Apprenticeship training in basic carpentry and electrician skills was provided for local tsunami-affected youth.
X Support was given to families to build on customary plots of land and not to build new camps.
X The project was augmented by rainwater harvesters and community-based micro-irrigation projects.
- Beneficiary labour was used, with trained support for vulnerable beneficiaries.
W The project perpetuated unplanned coastal settlements, preventing upgrading of sanitation or better environmental husbandry.
W There was no clear link to permanent reconstruction.

Before the tsunami

Many families had built houses on customary plots in ribbon settlements along the coast road. This was a response to the economic development of the region over the previous decade and was spurred on by government-backed housing programmes. However, consideration was not given to the consequences of cyclone and flooding risks to individual houses or to the consequences of drying out coastal marshes and naturally flooding areas. The haphazard layout of the housing also limited the possibility of community-wide or municipal sanitation and drainage solutions in many cases.

In-country experiences

This project was implemented by an NGO that had previously worked on transitional shelter programmes for those displaced by the conflict in the north of Sri Lanka. Much of the shelter design and the methods for interacting with the communities and the local government were adapted from this previous programme.

Minor changes were made in the design of the shelter from the previous project, giving the shelters greater height.

In the previous programme in the north, many of the beneficiaries were living in IDP camps and had limited access to livelihoods. This meant that they could spend more time on shelter construction, and were more inclined to work on each other's shelters. In contrast, the tsunami-affected populations in the south had a culture of working independently, with more diverse livelihoods. This led to the project running more slowly than anticipated.

Selection of beneficiaries

The NGO approached local village officers and coordinated with them to receive a full list of those in need of shelter. This was then cross-checked by door-to-door visits conducted by NGO staff. The cross-checking process was also used to identify vulnerable households eligible for support from NGO technical teams in the construction of their shelter. All the beneficiaries from a community were asked to nominate a small committee to store the shelter materials and help with their distribution.

Shelters were arranged in small groups on plots of land, often negotiated with the help of the NGO.

Land rights / ownership

Many of the families living beyond the 100m coastal buffer zone had lived on traditional plots, although many did not have clear ownership titles. Almost all of these families chose to remain on their traditional plots of land.

For those who had lived within the buffer zone, the NGO worked with the communities to find host families on whose plots shelters could be built. In three cases, small planned settlements of 15-30 families were constructed, as close to sea-based livelihoods as possible.

Local government officials were usually willing to allow families to construct shelters on their previous spots. This deferred ownership issues until the time when permanent reconstruction would start.

Technical solutions

Shelters needed to be easy to construct so that beneficiary participation could be maximised. They also needed to be movable, to help people as they moved out from living with host families or were disassembled to make way for permanent reconstruction.

The basic shelters were made from box-bar metal frames, which could be rapidly assembled into the basic skeleton of the shelter so that even those with little physical strength or prior construction knowledge could assemble them.

The metal frames also meant that the shelters could be relocated and reused if necessary, unlike shelters made from wood. The roofs were made from galvanised metal (a material specifically insisted upon by the beneficiaries to reflect their perceived social status), with open eaves under the roofs to provide for ventilation.

The beneficiaries were asked to provide the rubble for the raised foundation and the sand for the cement mix. A half-wall of concrete blocks was built along the edge of the foundation. Each household was given a small grant to do the masonry or to find local craftsmen. The sides of the shelters were then initially covered with plastic sheeting, which was reinforced by plywood. The work was done by 'shelter crews' of local tsunami-affected youth from the communities involved.

A detached veranda was later added as an upgrade. This could be positioned on any side of the basic shelter and could be used either as additional living space or as a kitchen area. Later, guttering and rainwater harvesters, as well as roofing insulation and basic electrical wiring, were added.

As part of a parallel programme, families without latrines were provided with materials and technical advice for latrine construction.

Implementation

Shelter materials were delivered upon completion of each stage of the building. The frame and roofing were delivered first, then the concrete blocks for the half-wall, followed by the siding materials. However, the timing of the delivery of second- and third-stage materials was complicated by families building at different speeds.

The frames and roofing sheets were prepared in the NGO's warehouse, while the plastic sheeting was cut to measure in a small workshop set up by tsunami-affected families in one community.

Site with poor drainage. Not all available shelter sites were ideal.

Shelters built with tanks for rainwater harvesting

In each community, the first one or two shelters were constructed by NGO staff for the most vulnerable people, as a way of demonstrating the assembly method to the rest of the community.

The longer times taken by many families to complete their shelters meant that the amount of time needed for support and supervision by the NGO staff also increased. This in turn meant that the NGO was not able to extend its support into more communities and caused the initial forecasts for completed units to be reduced twice across the programme.

Logistics and materials

There was an effort to ensure that the procurement process would support the national economy, while trying to avoid creating scarcity or putting inflationary pressures on the materials needed for permanent reconstruction. Most materials were supplied from the south and west of Sri Lanka, with the exception of the roofing sheets and the plastic sheeting, which both came from abroad.

There were concerns that the concrete blocks would conflict with demand due to permanent reconstruction. Many of the concrete blocks supplied for the transitional shelters were not of sufficient quality for hazard-proof permanent housing.

The supply of sand (for mortar and for constructing the foundations) also posed difficulties. Initially the NGO had encouraged the communities to take sand from the beaches, but this was counter to government bans and also had a potentially negative impact on the environment. In some cases, communities were given small grants to buy sand from local suppliers.

Materials list

Material	Quantity
Steel column - 40mm x 40mm x 1.85m	8
Steel bracing - 20 mm x 20 mm x 2.13m box bar	4
Steel purlin - 20mm x 20mm x 5.7m box bar	4
Steel trusses - 25mm x 25mm box bar	4
Steel rear side bar - 20 mm x 20mm x 3.48m box bar	3
Steel side bar - 20mm x 20mm x 5.18m box bar	2
Steel front side bar - 20mm x 20mm x 230mm	1
Pop rivet - 3mm x 16mm	
G.I. bolt & nut - 75mm x 6mm and 64mm x 6mm	32
Door (fully completed)	1
Door stopper - 25mm x 25mm x 45mm	1
Hinges -100mm x 75mm	2
Cement (50Kg)	1
Roofing Sheet - 190mm	8
Ridge sheet - 470mm x 45mm	1
Hook bolt nut	32
Concrete block - 380mm x 180mm x 100mm	210
Concrete feet for columns	8
Sand (provided by beneficiaries)	

After June 2005, an upgrade veranda extension was made using the following materials:

Material	Quantity
Pillar plate - 100mm x 50mm x 250mm	4
Rafters - 50mm x 50mm x 200mm	6
Tie bars - 50mm x 50mm x 125mm	8
Wire nails 50mm & 75mm	1.5kg
Roof sheet	4
Umbrella nails	0.2kg
G.I. ridge sheet - 0.9m x 2.4m	1

In July and August 2005, basic electrical wiring (one plug socket and one light socket) and roofing insulation were added.

The construction of the shelters was not a difficult process.

Photos: Jim Kennedy