A.22 Philippines – 2012 – Typhoon Bopha

Case study

Keywords: Household items; Transitional shelter / T-shelter; Training.

Emergency: Typhoon Bopha (Pablo), Philippines.

Date: December 4 2012.

Damage: 216,817 houses damaged (89,666 destroyed and 127,151 partially damaged), of which 58% in the target provinces.

People affected: 6.2 million affected, 973,207 displaced.

Project location: Compostela Valley and Davao Oriental provinces, Mindanao.

Beneficiaries: 20,000 people.

Outputs: 4,139 transitional shelters. 18,193 households received NFIs and 10,233 received emergency shelter materials.

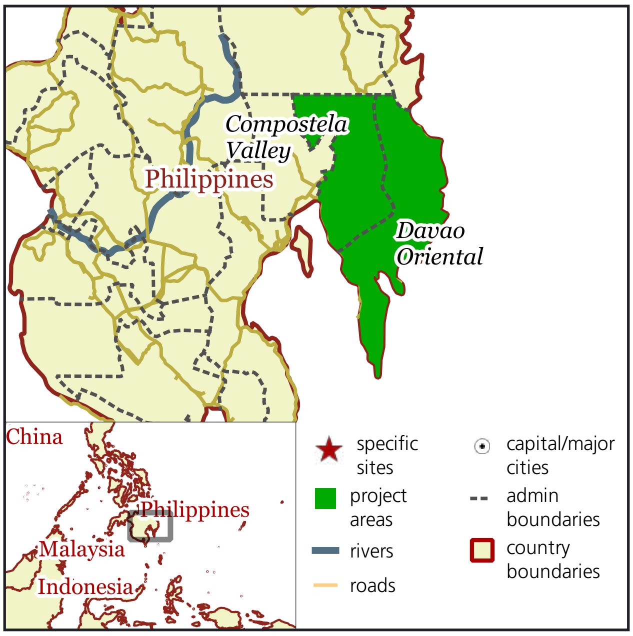
Ocupancy rate: 100%.

Shelter size: $18m^2$ for up to six people, $24m^2$ for seven or more people.

Cost per shelter: Materials: US$ 380. Project costs: US$ 580.

Project description:

Families were supported to rebuild shelters with materials they salvaged (mostly coco lumber) and materials provided by the organisation (roofing materials and strapping). The organisation paid carpenters to build the main structures after receiving training in safe construction techniques. A focus on community participation and low-cost materials maximised the project outputs.



Emergency timeline:

[a] December 4 2012: Typhoon Bopha hits.

Project timeline (number of months):

[1-3] Emergency response (NFIs, WASH and debris clearance). [2] Household interviews and assessments.
[4] Construction begins in Davao Oriental province.
[5] Construction begins in Compostela Valley province.
[9-10] Peak construction rate of 800 shelters per month.
[13] Handover completed.

Emergency		a
Years	2012	2013 2014
Project (months)		1 2 3 4 5 6 7 8 9 10 11 12 13

Strengths

- ✓ The percentage of community members aware of DRR construction techniques rose from 9% to 98%.
- ✓ Model shelters were built to facilitate the training of carpenters and feedback from beneficiaries, resulting in a 99% satisfaction rating for the final design.
- ✓ A strong emphasis was placed on community involvement and local-level planning and execution.
- ✓ Effective feedback process during beneficiary selection and a resolution mechanism for complaints through Project Implementation Committees.
- ✓ Relatively low costs per shelter meant that a larger number of beneficiaries could be assisted.

Weaknesses

- × Availability of fallen coco lumber was based on an assessment in Davao Oriental, but no assessment was made in Compestela Valley, where salvageable materials were less available, causing delays.
- × Financial coping capacity was not included in selection criteria, meaning that some households who could not afford to rebuild were not assisted.
- × Tensions between beneficiaries and non-beneficiaries were reported in the early part of the project. Improved methods of communicating selection criteria might have helped to avoid this.
- × Combining different project activities (NFI distribution, WASH etc.) would have streamlined community mobilisation and project monitoring.
- × Humanitarian organiastions were unable to coordinate when it came to competing for the scarce number of skilled carpenters and chainsaw operators.

Left: Beneficiaries are introduced to the shelter design which was developed after studying local techniques. Improvements such as bracing (right) were included in the new design.
Photos: Seki Hirano/CRS.

Situation before the disaster

After a long period of time without severe weather events, southern Mindanao was hit by Tropical Storm Washi (Sendong) in late 2011 and Typhoon Bopha (Pablo) at the end of 2012.

The lack of previous experience of such powerful storms meant that most houses were not built to withstand them.

The organisation conducted household surveys immediately after the typhoon. Families reported that, prior to the typhoon, they lived in houses constructed mainly with light materials: roofing was mainly CGI sheeting (90%); walls were constructed with plywood or amakan (weaved palm leaves or bamboo) (50%); a combination of wood and cement (30%); or cement only (20%). The damage was reported to be highest among homes with plywood or amakan walls

In focus groups, families indicated that they were not familiar with simple resilient construction techniques.

Situation after the disaster

Shelter damage was concentrated in Compostela Valley (95,054 damaged houses, 40% of them totally damaged) and Davao Oriental (30,245 damaged, 75% totally damaged).

The majority of those made homeless returned to the site of their original home and built makeshift shelters or slept in tents. Others stayed with host families.

These makeshift shelters were extremely vulnerable to further hazards and most people did not have the resources to rebuild basic shelters to *Sphere* standards.

Shelter strategy

The Philippines Department of Social Welfare and Development released 160 million pesos (US$ 3.65 million) in assistance. Half the money was for repairs (approximately US$ 232 per household) and the other half intended for building new houses on original plots or on resettlement sites.

"[The time after the typhoon] was very difficult. It was just one day at a time trying to meet your daily need. But now there is a feeling of confidence because we have proved to ourselves that we can overcome." Beneficiary, Compostela Valley province.

In order to complement the government response, Shelter Cluster members provided shelter recovery assistance to two broad groups of beneficiaries. Communities in designated safe areas were assisted to rebuild on their original plots, whilst families who had to move from high-risk areas to relocation sites were assisted to build new houses.

The shelter strategy promoted "building back better" construction techniques and was part of a wider integrated approach, including livelihoods and WASH assistance.

Beneficiary selection

Once the geographical selection had been made, beneficiaries were selected based on three types of criteria:

1) Inclusion criteria

Beneficiaries had to be residents of the target barangay, have a totally damaged house, and not be a beneficiary of any other significant shelter project.

2) Vulnerability criteria

This was used for prioritising beneficiaries, and was based on whether one or more family members were pregnant or lactating, disabled, under five years of age, or elderly. Single-parent families and families with more than five members were also prioritised. Families with unstable or

Two finished shelters. Three pilot models were built to elicit beneficiary feedback. Left photo: CRS. Right photo: Seki Hirano/CRS.

very limited income were included on a case-by-case basis, but others that did not meet vulnerability criteria, but were still too poor to rebuild, were not reached by the response.

3) Beneficiary requirements

Before construction could begin, beneficiaries needed to prove land ownership, which could include written consent from a land-owner, and the land had to be classified as "safe". Families living in evacuation centres had to be willing to return to their original place of residence. Each family had to provide three volunteers to assist in construction and a household could not consist of multiple beneficiary families.

Project Implementation Committees (PICs), comprised of local political leaders and health workers, were formed and briefed as to their role in assisting with the resolution of beneficiary concerns and in ensuring project implementation.

The community mobilisation team conducted meetings at purok (sub-village) level, providing information about the organisation, the project and beneficiary selection criteria. During the meetings, the community nominated households that met the selection criteria.

The organisation then registered potential beneficiaries using a screening form, to validate the criteria. The beneficiary lists were validated by the PICs and then displayed publicly in the community. A hotline for feedback or disputes was open for three days, and beneficiaries could also direct their feedback directly to staff members present in the community.

Feedback was resolved with the involvement of the PIC, to ensure a locally acceptable list of beneficiaries.

Project implementation

NFI distribution and debris clearance

In the immediate aftermath of the typhoon, 18,193 households received water-storage materials, hygiene kits, and household items, and 10,233 households received emergency shelter materials.

Nearly 1,000 people were paid for clearing debris from public spaces, providing a temporary source of income for workers.

WASH activities included water infrastructure repairs benefitting 4,472 families, and the construction of latrines. Other activities included livelihoods support for 500 farmers.

Recovery

The shelter recovery project, which ultimately reached 4,139 households, was implemented through two complementary teams: a community mobilisation team and a construction team.

Once beneficiaries had been selected, land ownership established, and sites approved by organisation engineers, each family began to collect coco lumber logs to begin construction.

If a family could not prove ownership, or if the plot was on an unsafe site, they could seek permission from another landowner or approach barangay officials for a new plot.

Construction began once beneficiary households had cleared the construction site and provided the lumber needed for the walls. Organisation engineers and foremen oversaw construction by local carpenters, who received payment after an engineer or foreman had completed a technical checklist which included disaster resilient techniques.

In cases where families were unable to provide voluntary labour, the carpenters agreed to complete the work themselves.

The hotline was active throughout the entire project. Calls were received by staff not directly involved in project implementation, and the nature of the calls as well as the resulting actions were logged. In cases of dispute, the PICs were asked to assist in resolving the issue.

The organisation carried out multiple types of assistance at the same time (NFI distribution, WASH infrastructure, livelihoods assistance and shelter) but each activity was implemented separately with its own selection criteria. Combining them may have improved the efficiency of the project.

Coordination

The organisation was the first and primary provider of shelter assistance in the area, which meant that coordination was focussed on inter-sector coordination. Shelter designs were shared within the Shelter Cluster.

Technical solutions

Affected households expressed a need for a simple, standardised design for a disaster-resilient shelter that could be built in 3-5 days. The organisation promoted a standard design of 18m² for families of six, adapted to 24m² shelters for larger families.

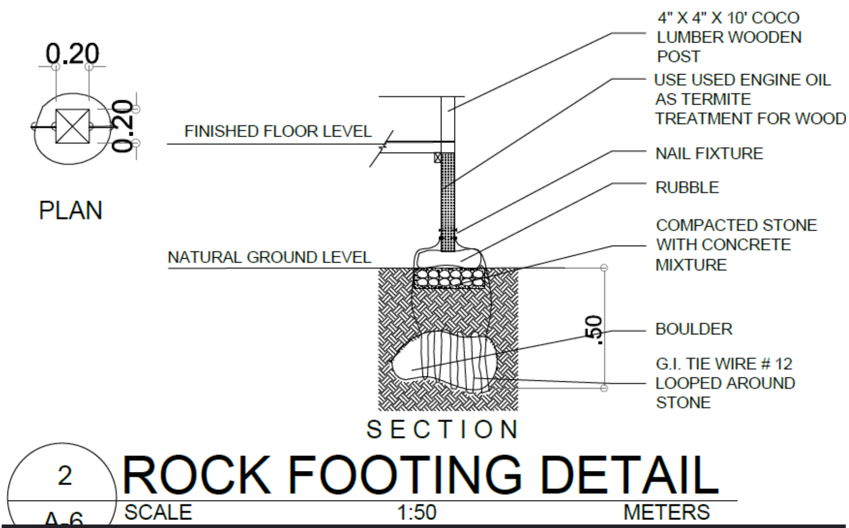
The organisation's senior technical advisor, in collaboration with engineering staff, developed three pilot models, all of which used locally available materials, and enhanced local construction knowledge. Community feedback sessions were held to select the preferred model.

Disaster Risk Reduction (DRR)

Five disaster-resilient construction techniques were incorporated in the shelter design:

- Reinforcement of key structural joints: Connections between wooden pillars, beams, trusses, roof purlins, and bracing were reinforced with metal strapping.
- Lateral bracing: Cross- or corner-bracing was applied to increase the frame's resistance to lateral forces.
- Firm anchoring of roofing sheets: Sheets were held in place using fasteners such as J-hooks or bolts.
- Raised floor: Shelters were constructed above typical flood levels.
- Foundations: Frames were built upon, and anchored to, concrete or stone foundations buried 50cm-100cm below ground, to prevent both uplift during storms and subsidence.

The organisation trained local, skilled carpenters in how to implement the techniques and paid them to apply these techniques to the shelters.



Detail of foundation from shelter design. Drawing: Arnold L. Gasta/CRS.

Although only 9% of beneficiaries reported awareness of any of these disaster-resilient techniques before the project, 98% remembered at least one technique and 83% remembered two or more techniques approximately two weeks after the construction of their home.

As some households re-built their shelters before the organisation implemented its project, it may have been more effective to have begun the DRR messaging across the whole community much earlier.

Materials

During initial assessments, it was determined that families could provide the walling using tarpaulins and other salvaged materials. Good-quality lumber was not available for the construction of shelter foundations and frames, but fallen coconut trees proved a good alternative.

Standard-size lumber was required to build the shelters according to the design, and initially the option of giving households cash to pay chainsaw operators for cut lumber was considered. However, chainsaw operators were in such high demand that the organisation decided to centralise the process and hire chainsaw operators directly.

Wider project impacts

Some non-beneficiaries applied the DRR construction techniques in the reconstruction of their own shelters. A rapid analysis suggested that these families displayed a better understanding of the causes of typhoons and the effectiveness of mitigation measures.

Non-beneficiaries who did not adopt DRR techniques perceived the labour and materials involved to be too expensive.

Bill of Quantities

Description	Qty
10ft Coco Lumber posts (2" x 4" & 4" x 4")	26 boards
12ft Coco Lumber (2" x 3" purlins)	34 boards
8ft Coco lumber (2" x 4" & 4" x 4")	28 boards
10ft Coco lumber (1" x 8" floor & 2" x 2")	50 boards
Coco log	6 pcs
Common wire nails (various sizes) and roofing nails	8kg
Roofing sheets (gauge 26 Corrugated G.I plus 2 plain)	22 sheets
Vulcaseal	1 pint
Tie-wire hooks	50 pcs
2-1/2" Roofing Nails	2kg
Tie-wire (various types)	1.75kg
Gravel	0.5m3
Cement (40kg)	2 bags
Deformed Round Bar (6m length)	6 bars