



Bangladesh Cyclone



REBUILDING AFTER CYCLONE SIDR

Habitat for Humanity: The Work

TRANSITIONAL SHELTERS

480

As of December 2008

LATRINES

480

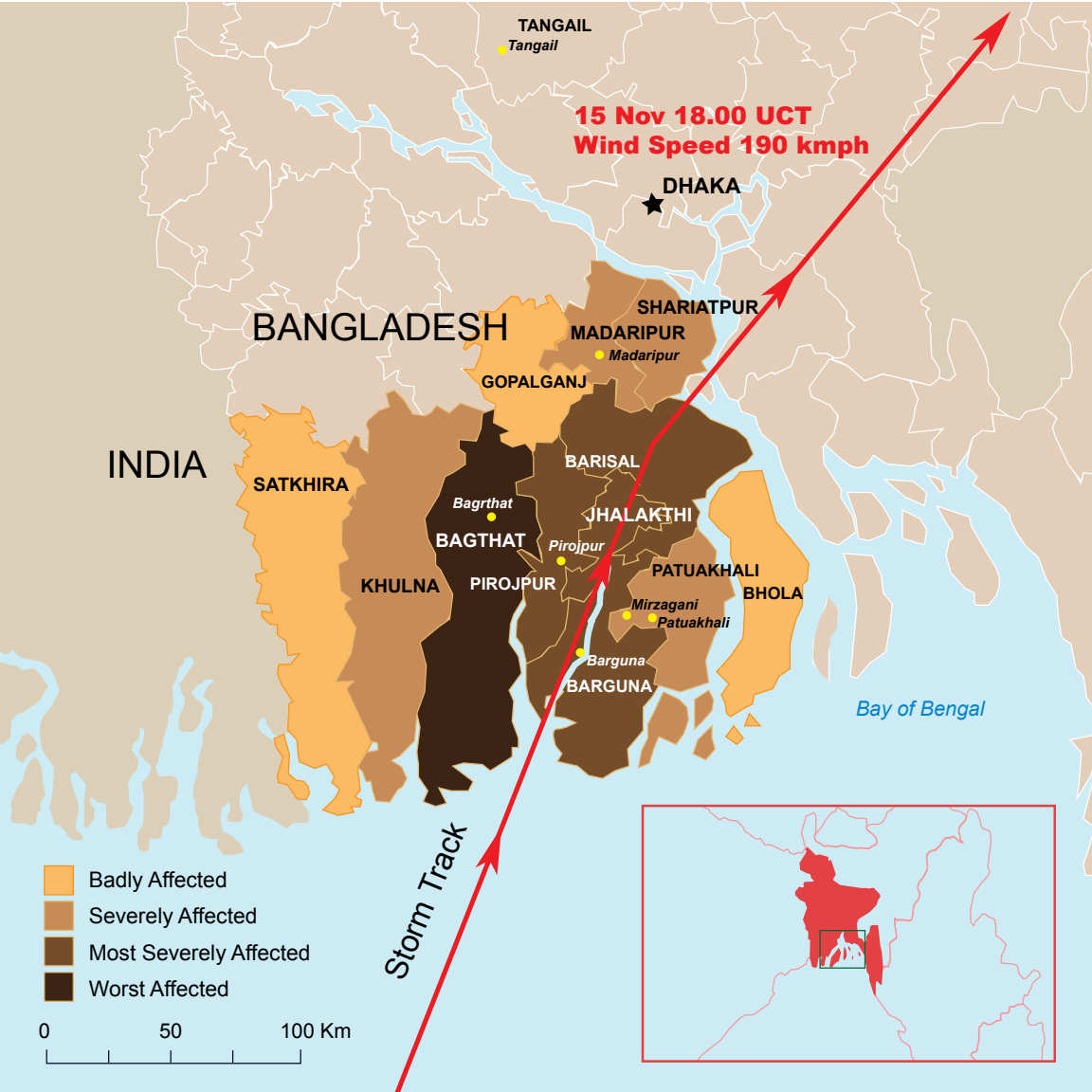
As of February 2009

A Day in November

On 15th November 2007, Cyclone Sidr bore down on southern Bangladesh, unleashing winds that peaked at 250 km. per hour and six-meter high tidal surges that washed away entire villages. Cyclone Sidr killed over 3,000 people, a fraction of the more destructive cyclones that struck in 1970 and 1991 which claimed more than 600,000 lives. But that was still too many. According to reports from the worst hit areas, many of the dead and injured were crushed when trees fell onto poorly constructed houses made of thatch, bamboo or tin. Others drowned when they, together with their houses, were swept away by the torrents of water.







TANGAIL
● Tangail

15 Nov 18.00 UCT
Wind Speed 190 kmph

★ DHAKA

BANGLADESH

SHARIATPUR

MADARIPUR
● Madaripur

GOPALGANJ

INDIA

SATKHIRA

BARISAL

● Bagrthat

BAGTHAT

JHALAKTHI

● Pirojpur

PIROJPUR

PATUAKHALI

BHOLA

KHULNA

Mirzagani
Patuakhali

● Barguna

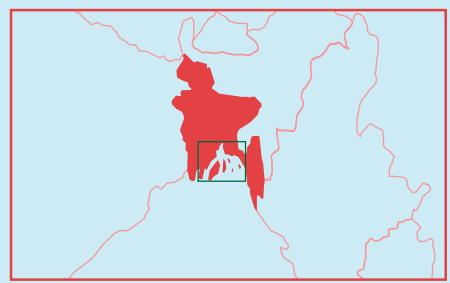
BARGUNA

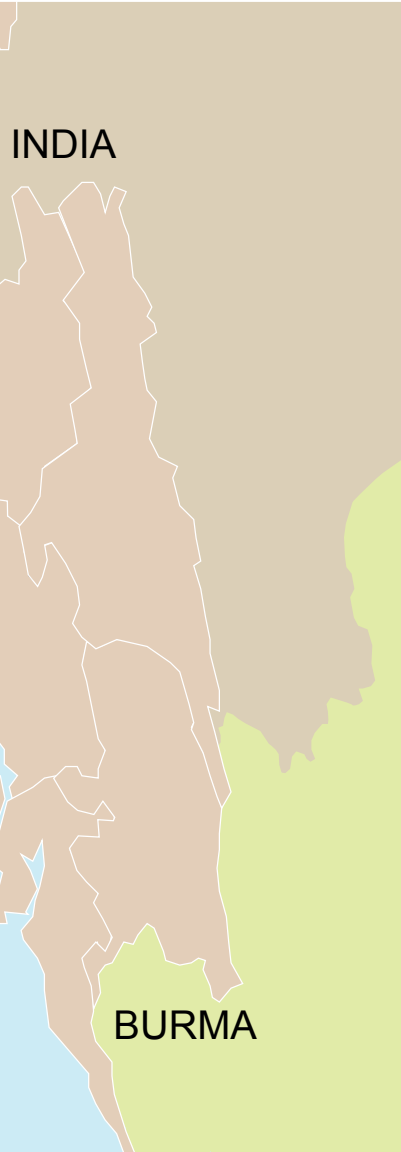
Bay of Bengal

- Badly Affected
- Severely Affected
- Most Severely Affected
- Worst Affected

0 50 100 Km

Storm Track





Extent of the Damage

More than eight million people in 31 districts were reportedly affected by Cyclone Sidr. More than 9,000 schools were flattened or swept away, with extensive damage reported to roads, bridges and embankments. Some two million acres of crops were damaged and over 1.25 million livestock killed.

The brunt of the disaster was felt in Patuakhali, Barguna, Bagerhat, Bhola, Satkhira, Barisal, Khulna, Shariatpur, Pirojpur, Madaripur, Jhalakathi and Gopalganj.





Habitat for Humanity and Bangladesh

Cyclone Sidr was the second occasion Habitat for Humanity* responded to a natural disaster in Bangladesh. The cyclone struck as Habitat was providing transitional housing for families affected by summer floods that had inundated about 40 percent of the country a few months earlier. Until then, Habitat's activities in Bangladesh had concentrated on assisting the poor who had drifted into slum settlements in towns and cities in search of a better life in one of the world's poorest and least developed countries. Habitat's Save & Build housing microfinance scheme had enabled thousands of families to slowly save what they could afford to build small basic homes or rehabilitate existing dwellings.

** Habitat for Humanity International operates as a branch in Bangladesh, Habitat for Humanity International – Bangladesh (HFH Bangladesh).*





But the aftermath of flooding in July and then Cyclone Sidr could not be ignored. Habitat for Humanity had to respond to needs of families who had lost their homes. Habitat worked with local authorities and communities, mobilized resources and building expertise and rolled out a program to build 122 transitional houses after the summer floods in central Tangail district. This scheme was supported by Japan Platform, an emergency humanitarian aid organization that brings together Japanese government, corporate and non-governmental organizations to provide emergency humanitarian assistance after disasters. This work was still under way when Cyclone Sidr struck. Habitat for Humanity Bangladesh quickly applied experience from the first scheme in its response after Cyclone Sidr.

First Response

Habitat for Humanity International responded to the cyclone with a commitment of US\$25,000 to provide technical assistance and to build HFH Bangladesh's disaster-response capacity. In addition, the local arm of Chevron Corporation, an existing supporter of HFH Bangladesh, offered to sponsor the building of 30 houses in the Bakerganj area, north of Patuakhali city. A seven-member assessment team from Habitat for Humanity International and HFH Bangladesh visited affected communities in the south of the country in late November 2007, within two weeks of the disaster.

In the worst-affected districts, such as Barguna and Patuakhali, the immediate need was for food, water and medicine. There was also a need for shelter from the elements. Experienced local and international non-governmental organizations and the Bangladesh authorities were able to handle many of these requirements. But it was also clear from the outset that consideration should be given to the provision of strong, cyclone-resistant and sustainable housing solutions.

The deputy commissioner of Patuakhali district suggested that Habitat focus its response on Mirzaganj, one of the worst-hit *upazilas*, or sub-districts, where no other NGOs were working on housing rehabilitation projects. Mirzaganj became the operational centre of Habitat's post-cyclone response program.





A Strategy for Reconstruction

After Cyclone Sidr, the scale of the need for safe, permanent housing was enormous. Habitat for Humanity created a strategy that was both rapid and scalable. The project design was predicated on the need to efficiently deliver shelter assistance and to optimally use resources. It involved Habitat bringing to bear its expertise and experience in construction, project management and volunteer mobilization. It also sought to increase Habitat's reach by leveraging on the strengths of partner organizations. In particular, the US-based Christian Aid Ministries entered into a partnership with HFH Bangladesh to provide both funding and volunteers for construction.

The target was to build strong permanent homes. However, communities were – and are – so poor that a more beneficial approach was to create transitional shelter solutions involving low-cost, easy-to-assemble, cyclone-resistant structures. HFH Bangladesh was already using a similar transitional shelter approach in its work in Tangail district following the summer floods. The model had also been used successfully in Habitat post-disaster reconstruction projects in Pakistan and elsewhere.





Transitional shelters are designed to be more effective and last longer than the tents and plastic sheeting traditionally offered by relief organizations. They are designed to be safe and durable. Based on a strong core structure, the design also incorporates a longer-term development component as there is the potential to expand the structures later or to reuse the materials in building permanent houses. Unlike money spent on temporary housing, resources used to construct transitional shelters can be considered an investment in long-term, permanent housing.

In post-disaster reconstruction programs, there are advantages to rebuilding homes on site where the land is physically accessible and safe. Families can maintain community relationships and people are often able to return to school or work. This strategy was followed after Cyclone Sidr. HFH Bangladesh worked with families to rebuild their homes providing there was clarity on land tenure. Families were also encouraged to work on the rebuilding – contributing “sweat equity” as with regular Habitat programs.

Four Phases

The initial phase – capacity building – entailed the establishment, in early 2008, of a Habitat Resource Center. The center was a base for Habitat technical staff to plan, coordinate and manage the entire project. It was also a center to manufacture and store construction materials and prefabricated transitional shelter units. These were distributed to site locations for erection. Staff trained beneficiary families and representatives of local communities and partner organizations on how to build the structures, and how to defend themselves and property from future flooding and other disasters.

In Phase II, the construction process began, starting in March 2008. A total of 280 transitional houses were built in 12 communities in two stages. Between March and August, the core structures were erected. From August to December, sidewalls were installed. Phase III, running from October to December, involved building and completing an additional 200 houses.

In the final phase, each of the 480 houses was provided with proper sanitation using contributions from UNICEF Bangladesh and HFH Great Britain.







Cyclone SIDR Rehabilitation Project
সাইক্লোন সিডর পুনর্বাসন প্রকল্প
Muriganyi, Patuakhali

Habitat Resource Center in Action

The Habitat Resource Center was located in Mirzaganj village. It was opened in the last week of February 2008. The production part of the facility manufactured pre-cast cement columns, welded metal roof braces and trusses, and prepared other materials. The facility could produce five shelter kits a day and up to 100 a month. Raw aggregate, steel rebars and other materials were brought in from neighboring Patuakhali town. The Habitat Resource Center was near a river, allowing supplies, equipment and volunteers to be transported from the capital city, Dhaka. As most roads were in a poor condition and home partner families tended to live near the water, waterways were a reliable and more practical means to transport the fabricated shelter components to the project sites for assembly.

The development of the center was boosted by a visit from a dozen volunteers from Arup Group, an international design, engineering, planning and business consultancy. Facilitated by HFH Great Britain, the multi-disciplinary team arrived in March 2008 to study and advise on house design and the production facilities so that the work could be completed on schedule. Their report proposed ways to deliver stronger, appropriately reinforced cyclone-resilient houses. The Arup team leader, an architect, had previously spent six months as a volunteer working on Habitat's reconstruction program following the 2004 Indian Ocean tsunami, and had joined the Habitat assessment team after the 2005 earthquake in Pakistan.

At the same time as the Habitat Resource Centre was established, HFH Bangladesh staff sought out affected communities and discussed their needs with local government officials and community leaders. Together they identified homeowners who had been most severely affected by the cyclone, particularly those who had lost their entire homes. These same home partners, in turn, helped identify others who they considered highly vulnerable such as the elderly and disabled who may not have been accounted for in earlier government assessments.

HFH Bangladesh encouraged families to contribute sweat equity and many helped build up, secure and expand raised earth and clay plinths traditionally used as foundations on which to build in order to keep houses above water in times of flooding. That completed, families dug holes into which the reinforced concrete columns were recessed to create strong, stable structures. However, many families survived on a subsistence basis so they could not afford the time to contribute more directly: family members needed to work growing rice and vegetables, fishing or taking itinerant employment in order to feed their dependents. The pre-fabricated components were therefore assembled on site either by skilled volunteers or, if necessary, skilled and unskilled day laborers.

As the months progressed, HFH Bangladesh worked in a total of 12 communities. Transitional structures were built in Ghotoker Andua, Andua, Kalagachiya, Pipra Khali and Mirzaganj villages in Mirzaganj Union, to the west of Patuakhali city. They were also built in Uttar Amragachia, Dakkhin Amragachia, Shoilabunia, Kismat Shoilabunia and Amragachi villages, all part of Amragachia Union, the next area to the west of Mirzaganj. In Barisal district, half way between Barisal and Patuakhali cities, Habitat built transitional houses in Ramnagar and Bakerganj villages, Niyamoty Union.



Transitional Housing

The transitional shelters were designed to be erected by volunteers and unskilled workers in about eight hours on ground that had been prepared by the families. Each measured 5.5 m. by 3.7 m. (18 ft. by 12 ft.), or 20 sq. m. (216 sq. ft.), in compliance with internationally accepted SPHERE standards for post-disaster housing*. The structures were built upon a raised clay and mud-hardened foundation (plinth) with reinforced concrete columns with a T-shaped foot to strengthen and stabilize the foundation. The roofing support used mainly welded steel roof trusses overlaid with corrugated galvanized iron sheets. The walls were also made of corrugated galvanized iron sheets.

A transitional shelter provides a strong and cyclone-resistant core structure to protect against severe weather. It can be expanded into a permanent home by adding lean-to walling onto an extension of the roof or by re-using materials which the families may already have on hand.

As part of the rebuilding program, HFH Bangladesh conducted a series of training and orientation sessions about the advantages of transitional housing especially in providing protection from cyclones and bad weather. Between March and December 2008, 16 sessions attracted beneficiary families, representatives of community groups, government officials and people from the community.

* See www.sphereproject.org

Key Materials

Reinforced concrete columns: six, each 11' x 5" x 5"

Corrugated 18 mm thick galvanized iron sheets for walls: 36, each 8' x 2' 2"

Corrugated 36 mm thick galvanized iron sheets for the roof: 18, each 8' x 2' 6"

Steel mm roof trusses: three, 12' x 2'

Steel 4 mm roof tie beams: two, 14' x 2" x 2"

Steel 4 mm roof purlins: six, 20' x 1.5" x 1.5"

J hooks: 130, each 3.5"

Cross bracing wire: 5 kg.

Wooden battens: 16, eight 12' 2" x 1.5" x 2.5" and eight 18' x 1.5" x 2.5"

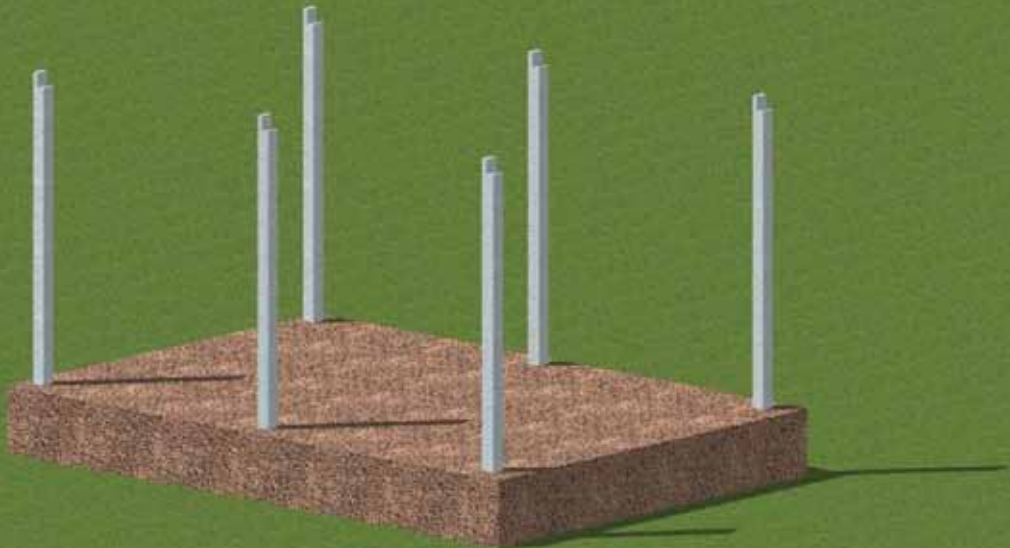
Wooden columns (from homeowners): six, each 11' x 4" x 4"

Wooden windows: four, each 32" x 32"

Wooden door: one, 7' x 3'

Step 1: The plinth and columns

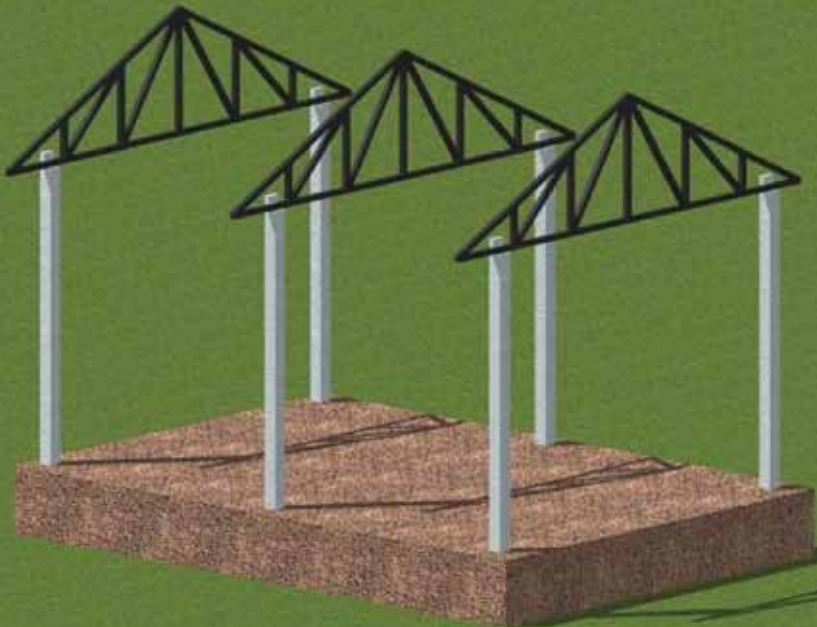
- Lay out and check squares and diagonals to set columns.
- Dig foundations on the plinth.
- Level and fill the reinforced concrete columns.





Step 2: Erect the trusses

- Erect corners.
- Set end trusses, then middle trusses.
- Set metal battens into the trusses.





Step 3: Install the roof

- Fit galvanized iron sheets from one end with overlaps.





Step 4: The walls

- Install wooden horizontal battens into pre-made holes in columns.
- Insert wooden window frames.
- Fit vertical galvanized iron sheets from the corner with an overlap.





Hygienic latrines

In the final phase of the program, a hygienic latrine was built for each of the 480 transitional houses. The sanitary pit latrines were built away from the houses in stand-alone structures. Southern Socio-economic Development Program, a local non-governmental organization, built the structures while staff from HFH Bangladesh provided technical expertise, supervision and quality control. Another local group, Society Development Agency, provided training for the 480 families as well as other families in basic health and sanitation using adapted UNICEF Bangladesh materials.









Partners

Christian Aid Ministries, a non-profit organization based in Berlin in the U.S. state of Ohio, was Habitat's main partner in the post-Cyclone Sidr rebuilding program. It provided funding support as well as volunteers who helped to construct the transitional shelters. Funding for the transitional shelters also came from HFH Netherlands and Chevron Bangladesh, a strong HFH Bangladesh partner. With financial support from HFH Great Britain and UNICEF, Bangladesh, Habitat was able to construct latrines for the 480 beneficiary families and provide them with training in using the hygienic facilities.

Volunteers from the U.S.A.

Christian Aid Ministries fielded two teams a month throughout 2008. Volunteers came from the U.S.A., covering their own costs of their travel, food and other expenses for their two- or four- week build trips.

A total of 227 volunteers from CAM contributed their time and labor to build transitional shelters for affected families.

“One of the biggest challenges was the weather. We come from a climate that is extremely cold so when the volunteers arrived to a climate the exact opposite this took some time to get used to,” said Arnold Eby, the CAM project coordinator, who came from Bedford, Pennsylvania.

But Eby was struck by the camaraderie that developed. “All of us worked together and there were no religious barriers at all. The people were amazing and worked along with us side by side as we built their homes.”

Another team leader Jaylan Martin from Lancaster County, Pennsylvania said: “Often the roads were non-existent. With the flooding, a road that was there one day would erode away the next day. It was an ever-changing experience that has been very rewarding, knowing that we have made a difference in the hundreds of families we built homes for.”



The Impact



Farmer Aador Hawlader and his family had a narrow escape when Cyclone Sidr struck. He returned home in time to gather his wife Dulu Begum and children, Salma, Russel and Dulal, before their former house collapsed in front of them. His paddy fields were destroyed. He lost his poultry.

Aador's is one of 480 families to benefit from a Habitat for Humanity transitional shelter. "Getting the new home was like getting back my old one," said Aador. There is a key difference though. "The core shelter is very strong and has a higher plinth. This will keep us safe from future floods and storms."

The construction of a latrine adjacent to the shelter is welcomed by Dulu Begum. "It was quite shameful for me and my daughter to go to the toilet in the open."

The latrine helps protect the family from diseases that cause diarrhea. There are fewer bad odors so fewer flies and insects to bother the children, and the ducks and chickens the family raises.

Looking to the future, Aador hopes HFH Bangladesh can maintain its presence in the neighborhood. "I would feel equally pleased if my neighbor had a home such as mine," he said.





Grandmother Bhanu Bibi was used to harsh weather, but the cyclone was something different. “When the water came in so quickly one of my neighbors rushed over to help me and my grandson to higher ground. We all watched as our house disappeared into the water,” she said.

With what she and grandson Billal could find, they built a temporary shelter made mainly of bamboo with metal sheets for the roof in their village near Mirzaganj. “I always worried that if a flood or heavy rains came the house would wash away again.”

Nearly a year after losing her house, she and her grandson could sleep in peace after a team of Christian Aid Ministries volunteers built a transitional house for them within one day. The volunteers dug holes for the cement columns, bolted on roof supports, secured galvanized iron roofing sheets and added more galvanized sheets to wooden beams for the walls.

“I felt happy and amazed to see how quickly they built this. We are very grateful to have a better home and will feel much safer living here when the heavy rains come again,” said Bhanu Bibi.



THE RESULT

By March 2008 when HFH Bangladesh began building the first transitional shelters for Cyclone Sidr-hit families, it was also near completing a disaster response program to help 122 families displaced by the July 2007 floods in central Tangail district. Funded by the multi-agency Japan Platform, Habitat's flood response program was commended by Tangail's deputy commissioner Mohammad Akther Ali Sarker at the dedication ceremony. "The technology and design that HFH Bangladesh has used in building the houses will definitely keep these families much safer during the normal flooding season," he said.

By late December 2008, HFH Bangladesh and its main partner Christian Aid Ministries had completed building transitional shelters for 480 families. The Cyclone Sidr response project was carried out over several phases in 12 of the worst affected communities in Patuakhali and Barisal districts. With funding from UNICEF Bangladesh and HFH Great Britain, the families were also provided with latrines and trained how best to use them. The sanitation project was completed at the end of February 2009.







THE FUTURE

The hope is that HFH Bangladesh can introduce a regular house building, rehabilitation and repair programs in due course. These programs engage home partners with sweat equity and encourage a habit of saving through Habitat's Save & Build housing microfinance programs. The aim is to break the cycle of poverty and losses that comes with poor construction and frequent adverse weather. However the challenge remains that many of those who lose the most in these calamities are the poorest, the most marginalized, and the most vulnerable.



Acknowledgements



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- › ARUP GROUP
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Habitat for Humanity's Disaster Response Program

Habitat for Humanity International's disaster response program develops innovative housing and shelter models that generate sustainable interventions for people vulnerable to or affected by natural disasters, conflicts and other calamities.

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