Projects library of the specialized group of construction **SHELTER**

Project **Reconstruction**

Project name **Cyclone SIDR rehabilitation project in Bangladesh**

Country	**Bangladesh**
Region/town	**Bagherat / Mongla**
GIS data (WGS 84)	
Project type	**New construction**
Typology	**Individual housing**
Approach	**Contractor-built houses**
Beneficiaries	**Most vulnerable cyclone victims**
Climate	**Sub tropical /coastal**
Special constraint	**Flood / cyclone / land ownership issues**
start / end of project	**2008 / 2009**
Country GNP	**430 USD/cap (2007)**

Partners

Organization (donor)	Swiss Red Cross (Swiss Solidarity)
IO/NGO partners	Bangladesh Red Crescent Society (BDRCS)
GO partners	Upazila (sub-district) and Union Parishad (municipality) authorities

Context to project

Initial Situation

Tropical storm Sidr lashed Bangladesh's south and south western regions on the evening of 15th November 2007 hitting the world's largest mangrove forest, the Sundarbans, with speeds of up to 220 kmph. A seven foot high tidal surge crossed through the country's southern Barisal-Khulna belt from the Bay of Bengal, killing thousands of people, flattening tens of thousands of houses, uprooting trees, snapping telephone and power lines.

Tropical Cyclone Sidr tore apart villages, severely disrupted power lines and forced more than a million coastal villagers to evacuate to government shelters. The official death toll reached 3'451 by 2nd December 2007. This was the deadliest storm to hit Bangladesh in a decade. The damage to livelihood, housing and crops was severe. The cyclone affected some 2.8 million people. An estimated 242'000 livestock were killed; 18'122 acres of crops and some 273'000 houses were destroyed.

Following an assessment SRC/BDRCS selected Sundarban Union in Bagerhat District for its reconstruction/rehabilitation effort. In this location an estimated 40% households been adversely affected.

Goals, Beneficiaries

1. Construction of 455 cyclone resistant housing units including sanitary latrines for 2,220 persons.
2. Reconstruction of 12 sustainable drinking water supply systems.
3. Conduction of hygiene promotion activities, parallel to latrine construction and improvement of water supply.
4. Improvement of Union wide disaster preparedness and response capacity.

Beneficiaries: 19 villages in Sundarban Union, Bagerhat district ; population 18,331 in 3,659 households.

Implementations / Results	• 455 core houses with individual sanitary latrines constructed • 6 drinking water ponds fully rehabilitated • Hygiene promotion on household and school level conducted • Disaster preparedness trainings held at union authorities and village level and 266 fishing boats equipped with life-saving equipment

Reference data (comparative)

Land plot (per house unit)	Various sizes	Garden	-
Ground floor (incl. walls)	18 m2	Floor (incl. walls)	1 floor
Occupants max.	4 persons	Occupants min.	1 person
Total house area	27 m2	Surface / occupant	6 m2/cap
House volume (outside dimension)	56 m3	Volume / occupant	14 m3/cap
Number of rooms	1-2 rooms	Occupant / room	2-4 cap/room
Heated area	-	Heated area/occupant	-
cost /unit	1200 USD	cost/occupant	300 USD/cap
cost/m2	45 USD/m2	cost/m3	21 USD/m3
Total housing cost	1200 USD	Self help (beneficiaries)	Plinth construction
community development projects cost	40'000 USD	Comm. Dev. cost/occupant	20 USD

Approach to results

Initial Situation

In the project area, the traditional housing model is mainly a one level family timber structure house covered by bamboo mats and roofed by CI-sheets. The house is always set on a 60 to 90 cm mud-plinth (killa) above the ground to protect the house from the floods. In general, the timber houses did resist to the wind force and did not suffer from the flood. The houses destroyed by the Cyclone SIDR were mainly huts made of bamboo mats without a proper structure and belonging to vulnerable families living below the local average living standard.

The project was designed to provide new safer houses to this vulnerable group.

Approach

Strategy: Build back better focusing on most vulnerable beneficiaries.

House design: The house design and minimum standards have been developed by a shelter coordination group without the participation of the beneficiaries.

Implementation: Due to the context of the area (see below: problem / constraints), the implementation of the project was given to a general contractor from the capital. The self-help or "cash" approach was not foreseen as a possible option due to the lack of local building resources in the area.

Problems/Constraints

Local construction resources vs. contractor: no suitable contractors and very few masons could be found in the district. Among three preselected contractors based in the capital only one fulfilled the selection criteria.

Access: The houses are scattered around a large and remote area, and are of a difficult access. The roads are often only mud paths not practicable by motorized vehicle.

Water: during dry season, the scarcity of sweet water can be so acute that it can even not be used for construction purposes (mixing cement).

Local economy: Apart from fisheries, economical activity is very low in the area, and the private construction sector is practically inexistent.

Security: the area is prone to banditism, smuggling (near India border) and other crime; several qualified SRC employees either refused to go work there or left prematurely.

	Landless poor without land-titles on government owned lands One of the important issues during the entire project was the securing of permanent rights to settlement and land-titles for 51 very poor beneficiary households who had lost everything in the disaster. These beneficiaries were living on so-called Kash land or government owned properties within the Sundarban forest protection areas. These marginalized people had occupied these plots out of a lack of other survival options and usually do not have any legal land titles. They belong to the poorest of the poor people in this area. In order to render its negotiations fact-based and legally sound, the SRC had employed a local lawyer to clarify legal issues. After a prolonged procedure the office of the District Commissioner provided official clearance for the constructions to begin and issued land-titles to the concerned families. In the midst of project implementation the same area was affected by cyclone Aila
Lessons learned	Contractor: The general contractor did not have the real organizational and financial capacity to build more then 10-20 houses at the same time. Therefore, the project was regularly stuck because of either technical or financial issues. Serious quality issues regarding cement pillars led to repeated and time consuming replacement thereof, at the cost of the contractor. The contractor had to bear a penalty payment at project end. Relationships were difficult but works could be completed thanks to intensive negotiation and supervision effort. When possible, it would be advisable to split the work in batches of max. 20 houses and to work with several small contractors. Such strategy was already successfully applied with good results in other SRC projects (i.e. SRC housing project in Trincomalee, Sri Lanka, 2006-2008). The additional administrative and organizational workload resulting from working with several parties is far less problematic than to have to struggle during all the implementation period with one inefficient contractor. This way of implementation has also the advantage to create stimulation between local sub-contractors and to be more flexible in case of a problem occurring with one contractor who can be treated separately without hampering the all construction progress. Monitoring: A close monitoring was essential to ensure quality work. The help of Red Cross Youth (volunteers), trained by the SRC team leader was very valuable for all monitoring tasks.
Evaluation	A construction-quality assessment carried out by the back-stopping expert who accompanied the project revealed a number of quality issues that required repairs. These repairs were carried out under the supervision of the SRC.

Legal framework

Politically attached to	Sundarban Union in Bagerhat District
Type of ownership	Private house owner. Land-ownership was conditional for receiving project support, except in the case of landless living on public land (see above).

Construction information

Construction		
Structure	Foundations	The structure of the house is a skeleton of 9 RCC pillars embedded 60 cm below the ground and stabilized with a 90 cm high traditional compacted mud plinth above the ground. After floods, damaged mud plinths can be easily rebuilt by the beneficiary. Due to the nature of the soil, muddy and saturated, a brick layer was laid on the bottom of the foundation to improve the soil resistance. The complete description of the foundation is as follows: - Brick layer on the bottom of the pit - Cement bed - Pre-casted RCC pillar - Sand filling - Mud plinth 90 cm above ground
	Walls or columns	Pre-casted (on site) RCC pillars
	Facade	Bamboo mash mate cladding
	Roof	MS steel trusses painted anti-corrosive
	Earthquake protection	-
materials	Floor surface	Compacted mud plinth (traditional)
	Walls	Bamboo (traditional)
	Doors	Bamboo (traditional)
	Windows	Bamboo (traditional)
	Ceiling	-
	Thermo insulation	-
	Roofing	CI sheet
watsan	Water	Community pond
	Toilets	Individual pit latrine with water seal
	Waste water	Open pit (no drinking ground water available)
	Rain water	Community pond
equipment	Heating system	-
	Electricity connection	-
	Telephone connection	-
	Cooking facilities	-
Total		**100%**

Urban planning

Distance to	Health center	5-10 km
	Education facilities	2-5 km
	Income activities	Fisheries
	Public transport	5-10 km (main public transport)

For further information

Involved SHA construction group consultants	Christian Ubertini, architect
Other involved SHA consultants	
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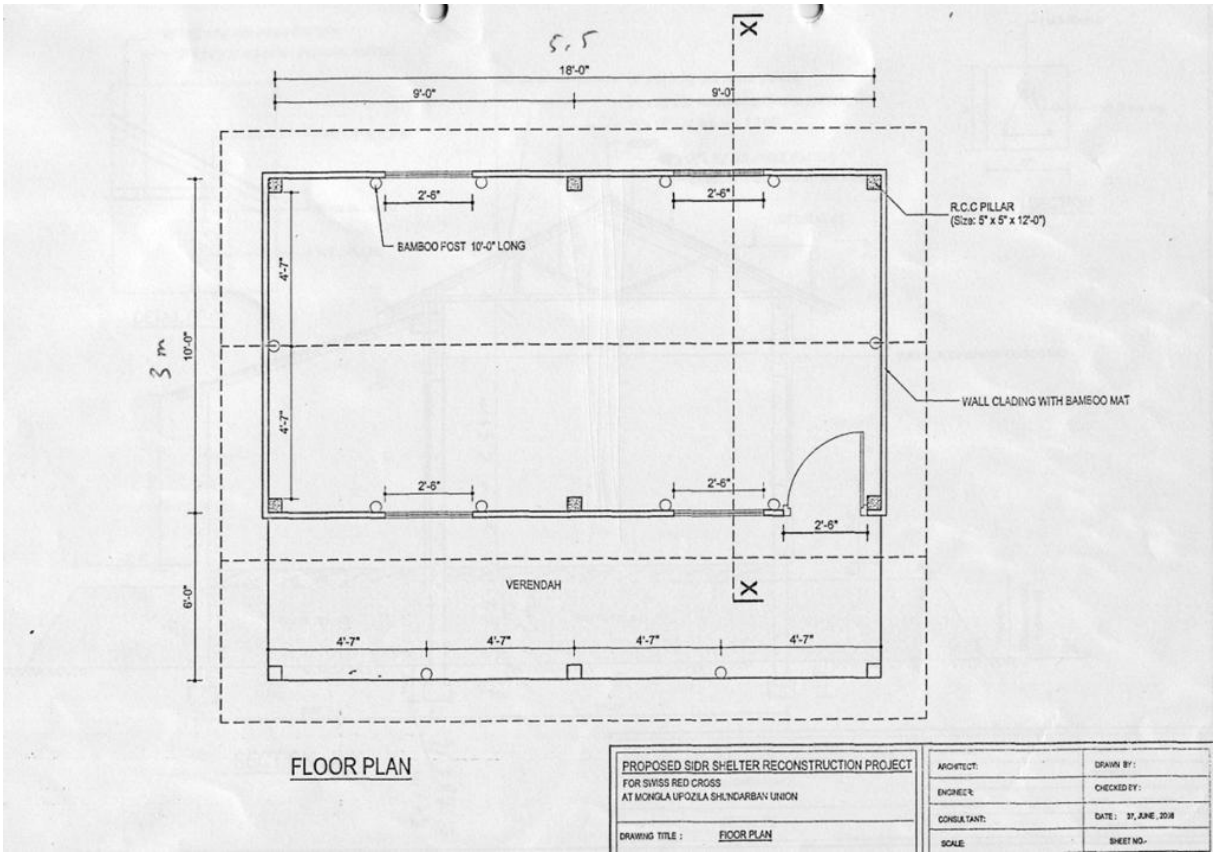
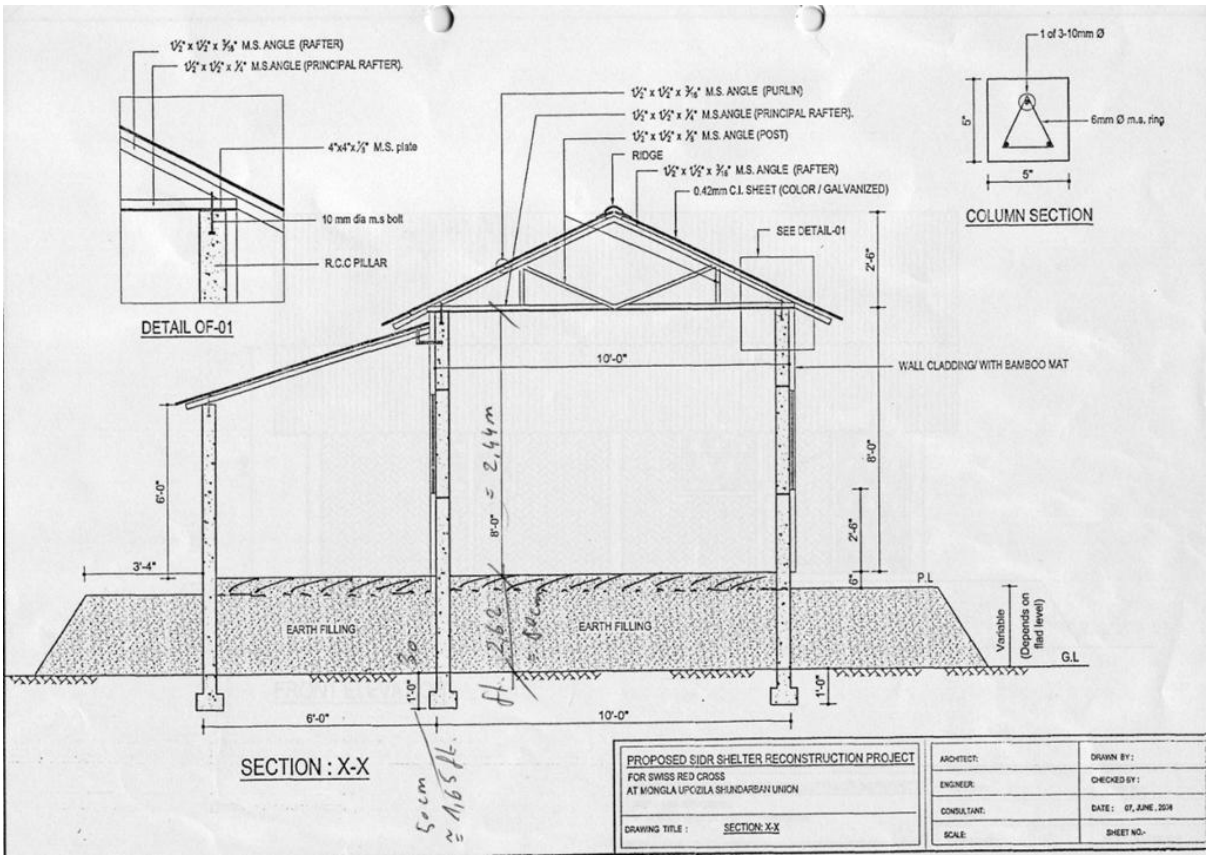
Recommended Institutions:	
Recommended partners:	
Recommended books/reports:	
Relevant other projects (links):	
Annex	

Relevant illustration


18'-0"
9'-0"
9'-0"
2'-6"
2'-6"
BAMBOO POST 10'-0" LONG
R.C.C PILLAR
(Size: 5" x 5" x 12'-0")
WALL CLADING WITH BAMBOO MAT
10'-0"
4'-7"
4'-7"
2'-6"
2'-6"
2'-6"
VERENDAH
6'-0"
4'-7"
4'-7"
4'-7"
4'-7"
FLOOR PLAN
PROPOSED SIDR SHELTER RECONSTRUCTION PROJECT
FOR SWISS RED CROSS
AT MONGLA UPOZILA SHUNDARBAN UNION
DRAWING TITLE : FLOOR PLAN
ARCHITECT:
ENGINEER:
CONSULTANT:
SCALE:
DRAWN BY :
CHECKED BY :
DATE : 07, JUNE, 2008
SHEET NO.-


1½" x 1½" x 3/16" M.S. ANGLE (RAFTER)
1½" x 1½" x ¼" M.S.ANGLE (PRINCIPAL RAFTER).
4"x4"x¼" M.S. plate
10 mm dia m.s bolt
R.C.C PILLAR
DETAIL OF-01
1½" x 1½" x 3/16" M.S. ANGLE (PURLIN)
1½" x 1½" x ¼" M.S.ANGLE (PRINCIPAL RAFTER).
1½" x 1½" x ¼" M.S. ANGLE (POST)
RIDGE
1½" x 1½" x 3/16" M.S. ANGLE (RAFTER)
0.42mm C.I. SHEET (COLOR / GALVANIZED)
SEE DETAIL-01
1 of 3-10mm Ø
6mm Ø m.s. ring
5"
5"
COLUMN SECTION
2'-6"
10'-0"
WALL CLADDING/ WITH BAMBOO MAT
8'-0"
6'-0"
3'-4"
2'-6"
6"
P.L
EARTH FILLING
EARTH FILLING
Variable
(Depends on flat level)
G.L
1'-0"
1'-0"
6'-0"
10'-0"
SECTION : X-X
PROPOSED SIDR SHELTER RECONSTRUCTION PROJECT
FOR SWISS RED CROSS
AT MONGLA UPOZILA SHUNDARBAN UNION
DRAWING TITLE : SECTION: X-X
ARCHITECT:
ENGINEER:
CONSULTANT:
SCALE:
DRAWN BY :
CHECKED BY :
DATE : 07, JUNE, 2008
SHEET NO.-