Government of the People's Republic of Bangladesh
Department of Disaster Management
Ministry of Disaster Management and Relief

TECHNICAL SHELTER WORKSHOP BANGLADESH
Draft Report – extended version
Kaat Boon – 170115

Prepared by:

Supported by:

The Ministry of Foreign Affairs of the Grand-Duchy of Luxembourg, Friendship Luxembourg and the Luxembourg Red Cross

CONTENT

# PART 1: CONTEXT AND OBJECTIVES OF THE WORKSHOP

1.1 Context of the Workshop

CAPACITY AND VULNERABILITY IN BANGLADESH

Over the last decades, multiple disasters in Bangladesh have created a need for humanitarian support in the area of sheltering. According to the IFRC, Cyclone Sidr in November 2007 for example caused damage to 1.5 million houses, leaving hundred thousands of families in precarious living conditions. These conditions impact on the health of the family members, their capacity to earn a living, continue education and generally recover from the disaster.

Although concerted efforts by the Government of Bangladesh, local and international NGO's and other support agencies have at each disaster occurrence alleviated the suffering of the affected population, Bangladesh's communities remain vulnerable to hazards including flooding, tropical storms and cyclones, earthquakes, landslides, river erosion, a rising sea water level and fires.

Pressure on the land due to a very high population density and wide spread poverty make finding durable solutions quite challenging. Lastly, specific vulnerabilities of individuals and groups within communities need to be mentioned, such as the particular issues the disabled face, or the ill or elderly.
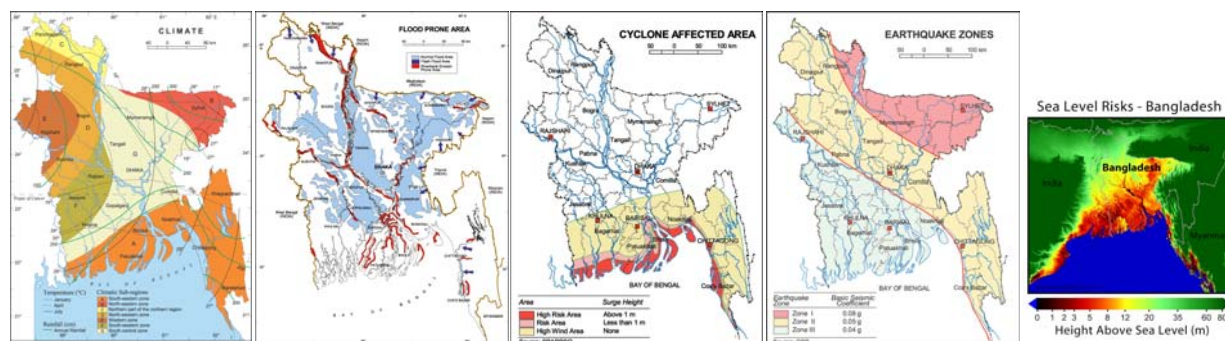
Above: maps from left to right: the climate, the flood prone areas, the cyclone prone areas, the earthquake prone areas and the rising sea level.

Factors challenging shelter in Bangladesh:

Climate change   **Complexity out of the geography**   **Pressure on the land**

Prone to multiple disasters

Fragmentation of the sector   **Large scale of the issues**

Specific vulnerabilities such as disability

Limited resources   **Poverty of the population**   **Margin for capacity building**

Bangladesh has built up massive experience in disaster response and development. The shelter sector can count on the institutional support of the Government and the academic

input of Bangladesh's National University. A large network of local NGO's is active throughout the country, and substantial support comes in the country through international NGO's and other aid agencies. For decades, highly qualified architects and engineers have worked on appropriate solutions for sheltering and Low Cost Housing. Communities around Bangladesh have been sensitized about the impact of disasters and how they themselves can help to reduce it. The Humanitarian Reform has resulted in the Shelter Cluster opening up more opportunities for shelter coordination and capacity building, also in Bangladesh.

A lot of groundwork, such as response and program reviews, manuals for local building techniques, trainings and CBDRR and CMDRR (Community based/managed disaster risk reduction) materials developed and tested, has thus already been done. It is felt that the time is ripe to complete stocktaking and consolidation of knowledge and experience so that it can comprehensively inform future responses.

Shelter enabling factors in Bangladesh:

Impressive grass-roots development expertise

Extensive network of local NGO's

Supported by academic knowledge

Renowned Architects and trained Engineers

Awareness and willingness of the population

Substantial support from international NGO's

Department of Disaster Management (SOD, National Plan ea)

Low cost housing experience

Humanitarian Reform, shelter cluster

Previous disaster response experiences

INSTITUTIONAL CONTEXT OF THE WORKSHOP

IFRC SRU conducted research on technical aspects of implemented shelter solutions in Bangladesh, between 2011 and 2013, based on prior research done in Bangladesh by IFRC after Cyclone Sidr and in the frame of the 'Shelter Solutions' approach developed within the IFRC SRU with as one of the first cases Bangladesh. For some time, the IFRC SRU was looking for an opportunity to share the results of the research in-country, with the principal shelter actors. The workshop would be a step towards rendering the conclusions of the research work operational; towards local capacity building and subsequent improvement of shelter responses in Bangladesh.

Such opportunity was finally found with Friendship Luxembourg and Friendship Bangladesh, whom formed a partnership with the Luxembourg Red Cross and the IFRC Shelter Research Unit to organize this workshop. The Luxemburg Ministry of Foreign Affairs offered funding, which was topped up with co-funding from Luxemburg Red Cross and Friendship.

The in-country knowledge, team and network of Friendship Bangladesh was mobilized to expand IFRC SRU's research to other regions in Bangladesh, organize and host the workshop, invite regional, national and international shelter actors in the country, and liaise with the Government.

Above: pictures from preparatory fieldwork done by Friendship, showing typical housing construction in the regions addressed in the workshop.

Upon a meeting between Friendship Bangladesh and the Government of Bangladesh, in particular the Department of Disaster Management under the Ministry of Disaster Management, it was decided that this workshop would be co-hosted and endorsed by the Government as a step towards the development of a more comprehensive national approach to sheltering. During a pre-workshop meeting the Director General, as co-organizer of the workshop, guided the outline of the workshop as well as repeated the Honorable Secretary's consent on this endeavor.

IFRC SRU laid contacts with the Shelter Cluster that is quite performing in Bangladesh and fairly active even in between disasters. Through the IFRC Zone office and the IFRC Bangladesh Delegation, it was learned that the cluster had undertaken efforts to develop encompassing shelter guidelines based on prior experiences. Also, a shelter cluster coordination meeting was in the pipeline with the target to bring all shelter actors together in preparation of future response needs.

All these opportunities together led to the final formulation of the workshop: it was to become a consultation of the complete spectrum of shelter actors in the country (technically focused shelter members of Government, INGO's and NGO's, RCRC Movement members, UN Agencies) around a preliminary consolidation of shelter knowledge in Bangladesh prepared by IFRC SRU and Friendship.

1.2 Objectives of the Workshop

PRINCIPLE OBJECTIVE
Together with the prime shelter actors in the country, and with the support of the Government, expand and consolidate technical shelter knowledge in Bangladesh – towards national shelter strategies

SPECIFIC OBJECTIVES
1. Collect, share and discuss technical best practices and lessons learned by Government, local, regional, national and international NGO's, UN Agencies and RCRC Movement members.

2. Develop, collectively, technical key-messages on key-topics such as emergency sheltering, recovery sheltering, site organization, structures, cladding, training and capacity building.

3. Conclude, collectively, on the current state of technical sheltering knowledge in Bangladesh, gaps that need to be addressed, and the way forward in terms of developing national shelter strategies.

1.3 Outcomes of the workshop

The workshop was a success. Not only were all types of shelter actors well-represented in the workshop, they also shaped the discussions and knowledge creation in the workshop together with the organizers. This means that the outcomes now in hand are of exceptional value: a preliminary consensus was built around a range of issues crucial to sheltering, ranging from limitations on emergency sheltering response modes, over acceptable foundations and structures to capacity building needs on decision making, shelter management, regional and community levels.

It was thus decided to conclude the workshop with a recommendation to the Government informed by the consensuses reached during the workshop. The recommendation is two-fold:
- technical recommendations: preferred policies for different aspects for shelter
- follow-up recommendations: how to continue and consolidate the efforts of the workshop into national shelter strategies

Besides that, the body of knowledge unlocked in the workshop is briefly captured in this report and will be shared broadly among shelter actors in Bangladesh. The database of reference resources built up in preparation to and during the workshop will be made available on the cluster website.

Above: Group picture of the workshop, inauguration

The ultimate goal is that every shelter response in the future is informed by the key-messages developed in this workshop, or through subsequently developed shelter strategies. This should present a leap forward in shelter support delivery for the entire nation.

PART 2: ROLL-OUT OF THE WORKSHOP

2.1 Preparation to the Workshop

The following materials / activities underpin the content of the workshop:

Preliminary research was conducted by IFRC Bangladesh and IFRC SRU:
- IFRC's Cyclone Sidr Response Barisal sub-base's shelter team: documentation effort on ongoing cyclone Sidr operations (2008)
- IFRC SRU's 'Shelter Solutions' research and report (finalized autumn 2013)
- IFRC SRU's desk preparatory research for the workshop (Oct - Nov 2014)

Preliminary scoping was done to expand the research to other regions of Bangladesh by Friendship in Cox's Bazar, Rangamati, Chittagong, Kalapara, Kuakata, Sunamgonj, Sylhet and Gaibandha regions (Oct - Nov 2014)

Before the workshop, group fieldwork was conducted by Friendship and IFRC SRU in the same regions (Nov 2014).

External resources consulted:
- Shelter evaluations, research and publications by other agencies active in shelter in Bangladesh, such as UNDP's cyclone Sidr response evaluation, ADPC's and German Red Cross's research, Caritas's work on learning from local building ea.
- Shelter Cluster and Shelter Centre databases, for example to identify best practices in other countries, establish a link between the 'product' and the process of sheltering ea.

Furthermore, participants were asked to bring their own work on sheltering: pictures, presentations, guidelines ea to the workshop. This was very well followed-up on and most participants contributed a lot of supplementary reference resources and examples. A 'knowledge bazaar' was organized in which participants briefly explained their experience in shelter, and other participants were offered an opportunity to discuss.

For the workshop, all of the above was used to come to a preliminary stocktaking and consolidation of technical shelter knowledge and capacity in Bangladesh. This formed the starting point for the discussions in the workshop. Those then led to the formulation of recommendations and a follow-up plan towards the development of national shelter strategies.

2.2 Agenda and Participants

AGENDA

The workshop focused primarily on technical aspects of sheltering. Aspects related to the disaster context (location, type of disaster, number etc) and program aspects (available funding, policies of individual agencies, program planning and management, coordination etc) were touched upon only in function of developing technical key-messages.

The workshop addressed roughly the following themes across the different presentations, plenary discussions and working groups: Emergency sheltering, Recovery sheltering, Site organization, Structure of the shelter, Cladding, Capacity building, Local construction and Cyclone shelters, Best practices.

Please find the final agenda below.

DAY 1: 21/11/14

Registration	Welcome of participants and registration to the workshop	Organized by Friendship
Introduction to the workshop	Introduction to the workshop	DDM Deputy Director DS Md. Harun-or-Rashid Khan, Founder and Executive Director of Friendship Runa Khan and IFRC SRU Coordinator Cecilia Braedt
Preparation of knowledge bazaar	All participants prepare flipcharts explaining briefly their experience in sheltering	All participants

DAY 2: 22/11/14

INAUGURATION	Key-note speeches	xxx
Coordinating shelter response, shelter cluster	Introduction to current shelter cluster role and activities	Hasibul Razib Bari, IFRC
Emergency sheltering	Presentation and plenary discussion	Kaat Boon, IFRC SRU
Recovery sheltering	Presentation and plenary discussion	Kaat Boon, IFRC SRU
Housing solutions for Bangladesh	Presentation and plenary discussion	Shohrab Hossain, Deputy Director Planning DDM
Site organization	Presentation and plenary discussion	Kaat Boon, IFRC SRU
Raised communal plinth	Presentation and plenary discussion	xxx. Friendship
Introduction to structure	Introductory presentation, group work on foundations, load bearing structures, connections and roof structures	Cecilia Braedt, IFRC SRU
Cultural program	Traditional Bangladesh songs performed live	Organized by Friendship

DAY 3: 23/11/14

FIELD VISIT	Visit to char and to Friendship's raised plinth project	Organized and hosted by Friendship
Plenary discussion on structure	Presentation of group work and discussion	Moderated by Friendship and IFRC SRU
Housing solutions for Bangladesh	Presentation and plenary discussion	Nafizur Rahman, HBRI
Introduction to cladding	Presentation and plenary discussion	Cecilia Braedt, IFRC SRU
Local Cost Housing Innovation: Pilot Project	Presentation and plenary discussion	Ratan Kumar Podder, Caritas
Part 1 of the knowledge bazaar	Introduction to own shelter experience by participants	Islamic Relief, DDM, CDD, Action Aid, Caritas, Friendship, IFRC, Habitat for Humanity

DAY 4: 24/11/14

Awareness raising and training needs	Introductory presentation, group work on decision makers, shelter managers, (Upa)zilla level, communities	Kaat Boon, IFRC SRU
Part 2 of the knowledge bazaar	Introduction to own shelter experience by participants	World Vision, Pulse, Shining Hill, Avas, Mukti, ERA, Save the Children, Muslim Aid, UNDP

Overall conclusions and recommendations	Presentation and plenary discussion	Kaat Boon, IFRC SRU
Uncertain land occupancy	Presentation	Runa Khan, Friendship
Cyclone shelters and raised communal plinth	Presentation	Arch. Kashef Mahboob Chowdhury, Urbana
CLOSING	key-note speeches	xxx

A field visit to understand the condition of the chars in Gaibandha was conducted as part of the workshop. One group focused on Friendship's multi-disciplinary approaches in community resilience creation on the chars, another group visited the raised communal plinth project implemented on one of the chars by Friendship.

Above left: fieldwork group1, above right: fieldwork group 2, Gaibandha region, chars

The knowledge bazaar consisted of a 5 minutes time slot for each participant to introduce its experience in sheltering, with pictures, prints, presentations and flipcharts. The other participants were given the opportunity to ask questions and discuss.

Spread over the four days, a mix of presentations, group work and plenary sessions provided the opportunity to debate best practices and build upon the technical shelter knowledge already acquired. Key-messages were developed for each of the 9 themes addressed.

PARTICIPANTS

Because of the technical focus, the participating shelter actors were requested to delegate their more technical shelter staff to the workshop; be it the ones responsible for shelter projects or technical staff supporting them.

A large representation from the Government was present, both from Gaibandha as from the national level: the Ministry of Disaster Management and Relief (Joint Secretary Dr. Atiqur Rahman), the Department of Disaster Management (Deputy Director DS Md. Harun-or-Rashid Khan, and Deputy Director Planning Shohrab Hossain), the Housing and Building Research Institute (Senior Research Architect Md. Nafizur Rahman and Research Fellow Architect Shafinaz Sameen) and the Ministry of Public Administration (Upazilla Nirbahi Officer Phulchari Md. Mustafizur Rahman and Upazilla Nirbahi Officer Gaibandha Sadar Md. Ashraful Monim Khan).

From the sector of implementing partners, the following organizations were present: Habitat for Humanity, IFRC, UNDP, Action Aid, Islamic Relief, Mukti, Shining Hill, Caritas, Efforts for Rural Advancement, PULSE, AVAS, Save the Children, Muslim Aid, Practical Action, CDD and World Vision. Most of these organizations have experience with implementing shelter.

The participating NGO's and INGO's have a strong basis in country, be it on the national or regional level. Participants from the following regions were present: Dhaka, Gaibandha, Cox's Bazar, Rangamati, Sunamganj, Barisal, Netrokona, Kurigram, Bogra, Sirajganj and Savar.

The Shelter Cluster was represented by the Government, IFRC Bangladesh Delegation and UNDP. Quite some of the other participants to the workshop are part of the Shelter Cluster as well.

Please find the Participant Contact List in annex.

INAUGURATION AND CLOSING

Above: opening speech by Ms. Runa Khan, Founder and Executive Director of Friendship

Special guests were invited for the inauguration and closing of the workshop, including Dr. Atiqur Rahman, Joint Secretary, Co-Chair Shelter Cluster Ministry of Disaster Management and Relief, Government of Bangladesh; Dilder Ahmed, Acting Director General, Department of Disaster Management, Government of Bangladesh; Eng. Mohammad Abu Sadeque, Director Housing and Building Research Institute (HBRI), Government of Bangladesh; Md. Ehsan-A-Elahi, Deputy Commissioner, Gaibandha, Government of Bangladesh; Md. Mustafizur Rahman, Upazila Nirbahi Officer, Phulchari, Ministry of Public Administration, Government of Bangladesh; Md. Ashraful Momin Khan, Upazila Nirbahi Officer, Gaibandha Sadar, Ministry of Public Administration, Government of Bangladesh, Ms Runa Khan, Founder and Executive Director of Friendship and Arch. Kashef Mahboob Chowdhury, URBANA.

INTRODUCTION OF THEMES AND MODERATION

Friendship Bangladesh and IFRC SRU (Kazi Amdadul Hoque, Cecilia Braedt and Kaat Boon) introduced most of the themes discussed and acted as main moderators of the workshop.

The following participants were invited to introduce their work in plenary:
- The IFRC Bangladesh Delegation was asked to introduce the current work of the Shelter Cluster.
- The HBRI (Housing and Building Research Institute) of the Government of Bangladesh was invited to present its work on shelter typologies and innovative techniques.
- The Department of Disaster Management, Planning, was invited to give an update about their work related to sheltering

- Because of the large research aspect of their recent work, Caritas was invited to present its 'Low Cost Housing – Pilot Projects' project.
- Finally, Arch. Chowdhury from URBANA was invited to present the work it has done in collaboration with Friendship, on the raised communal plinth, cyclone shelters and the Friendship Centre, venue of the workshop.

Above: pictures of the knowledge bazaar

All the participants were asked to present their work briefly in the knowledge bazaar. Time was provided for comments and discussion.

# PART 3: FOCUS OF THE WORKSHOP AND RELATED ISSUES

Of course it was not possible to address all aspects of sheltering in equal depth; a choice was made to focus on technical aspects. That means that, keeping the ambition in mind of developing national shelter strategies, some aspects will need more attention in a later stage. These aspects were highlighted by the participants of the workshop, across and in between the different technically focused discussions.

This part first discusses what technical aspects of sheltering are and some particular areas for improvement in the Bangladesh context. Secondly it briefly introduces other issues and aspects that are crucial to qualitative sheltering but were only indirectly and partially addressed in the workshop.

3.1 Technical Aspects of Sheltering

'Sheltering is a process' is the current international consensus. This means that humanitarian actors should aim to support the affected population in their disaster response, in different phases according to a growing recovery capacity, step by step supporting them to recover an acceptable housing condition. Capacity building of communities, discussing designs with families, distribution of cash and vouchers or supporting host families can be effective alternatives to actual construction of housing. Sheltering is not about delivering a 'product', a built house, but supporting the process of shelter recovery of the affected population, whether this is more effectively done by construction or not.

Three major aspects impact on, or are part of, the definition of an appropriate shelter response: the disaster context, the response process and the product.

PRODUCT ⟷ **DISASTER CONTEXT** ⟷ **RESPONSE PROCESS** ⟷ **PRODUCT**
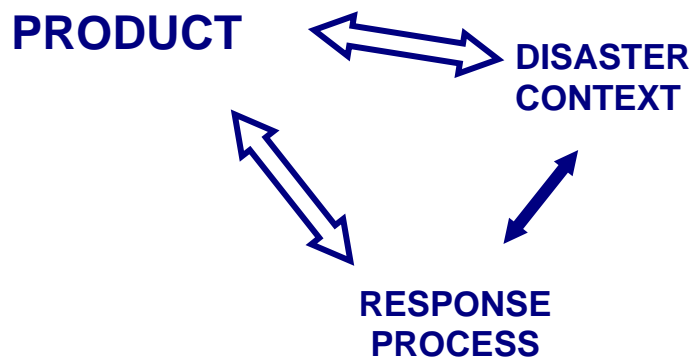
DISASTER CONTEXT: where the disaster happens and what disaster occurred:
- Local specificities, both in terms of pre-disaster situation as in terms of what is locally available (skills, materials, people etc) to formulate an appropriate shelter response
- Disaster scale and impact: what disaster hit, what type of damages it caused, relationship to local vulnerability level etc

RESPONSE PROCESS: what the institutional means are to respond to the disaster:
- Type of actors involved in the response and their policies/ capacities: a local NGO has a very different capacity to support the affected population than for example the National Government, or an international NGO setting first foot in the country.
- Financial capacity of the response actors

PRODUCT: what is actually built, in what 'construct' do people find shelter:
- Technical considerations regarding available materials and skills, and up to the standard construction techniques applicable in the area
- Sociological considerations regarding how people live, how they organize their house to fit their family life

Shelter relief and recovery is a process in which working with the affected communities is complemented with quite some technical expertise in the area of building such as selecting good quality building materials, building proper foundations, ensuring cross-bracing and tie down, technical awareness and training etc. The focus of the workshop is on 'product', the technical aspects of sheltering.

Technical shelter aspects are an area in which it is possible to make a leap forward, building upon that extensive experience and groundwork that is already accomplished. By bundling capacities, sharing experiences and consolidate commonly agreed upon good practices, it is possible to increase the technical standards of sheltering, both to reduce the impact of future disasters by improving disaster preparedness measures as to respond to disasters as efficiently and effectively as possible with limited resources.

SOME PARTICULAR AREAS FOR IMPROVEMENT

Certainly after cyclone Sidr, there was a great difference in quality between shelter responses of different agencies: some families received a good house that will last for decades, others received a temporary shelter that perished within a few months. The possible solutions for this are multiple: more coordination, less fragmentation of the sector, deal better with the pressure by donors, the urgency of disaster and the expectation to respond quickly and more readiness in terms of shelter policy. Lying open the actual built in previous disaster responses in between disasters, allows us to compare and discuss tried and tested options, and formulate policies that can inform future responses.

Above: documentation IFRC after Cyclone Sidr: examples of the variety of shelter reconstruction interventions

The poverty and population density in Bangladesh have as consequence that we need to make an optimal use of resources (importance of knowledge, people, skills, networks on top of budgets). All interventions need to be as effective and efficient as possible. This also means that technically we need to develop optimal solutions that offer as much durability as possible with limited funds.

Because of the poverty level and lack of land and resources in Bangladesh, often families aren't able to build to local traditions anymore. Also the landscape in Bangladesh is changing, traditionally by shifting river beds, but also due to climate change (rising sea level, saline crop land ea). This causes that some traditional building techniques aren't applicable anymore, or

people seek refuge in landscapes and areas that are uncommon to them, for which they do not know the appropriate building techniques. It is also for these changes in the landscape that we need to develop intelligent technical solutions.

Above left: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Cox's Bazar hills: people unaccustomed to building on slopes // Above right 2x: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Rangamati hills: traditional construction in hilly areas

Still, there is a lot of valid local building practice that we can draw inspiration from. It has been proven across the world that adapting shelter solutions to local contexts and building practices can lead to much more durable housing solutions.

One last issue to mention is that, in a context of recurrent disaster, where already a lot of shelter capacity has been built up, new responses should be informed by this shelter capacity. Though this may happen within individual response agencies, there are still organizations that come in after disaster and re-invent the wheel. This is not only inefficient; it also increases the risk of sub-standard sheltering responses.

Above: IFRC SRU Shelter Solutions Bangladesh: 17 technically documented shelters implemented from 2006 to 2011, to inform future shelter responses

3.2 Sheltering as a Process

The fact that this workshop solely focuses on technical aspects, the 'product', means that the outcomes should be matched with current best practices in shelter process management in order to come to a coherent and complete approach to shelter.

Taking the technical viewpoint as a start however, informs the shelter process in an alternative manner. A discussion is built up from the practical, tangible level, from the actual shelter that people find themselves in after disaster. Looking at what was done in the past, and can still be found in the field, triggers a profound thinking about the sheltering process humanitarian actors set up.

International guidelines on sheltering as a process exist. Starting from an agreement on the actual built shelters can help bringing these guidelines back to the context of Bangladesh. Nevertheless, this work, the workshop, needs to be complemented with an adaptation and reconfiguration of the sheltering process to fit the context as well.

3.3 The Affected Communities

The affected communities themselves are the most important stakeholders in the sheltering process. Because the technical focus of this workshop, this has not been addressed sufficiently. The actually inhabited shelter was taken as a starting point for many of the sessions, which does put the actual families affected by disaster in the centre of our work. But, experts in vulnerability for example, cultural aspects, social dynamics etc should be invited to look into the outcomes of this workshop and complete findings where necessary.

3.4 Specific Vulnerabilities

Affected communities are not homogenous wholes, and neither are individual households. Within communities, there are groups that are particularly vulnerable in relation to sheltering because of their socio-economic position as for example extreme poverty, social marginalization, ethnicity ea. Different members of households have a different relation to the house: some spend most of their day inside or around the house, whereas other members may attend to day-time activities outside of the house. Women with young children, the elderly, ill and disabled may be more dependent on the quality of the house for the quality of their life than for example youth attending school or men employed outside of the house.

3.5 Urban and Sub-Urban Issues

Because of the extensive experience in disaster response in rural areas, the workshop focuses primarily on rural areas. The impact of disasters on urban areas, and what the appropriate processes are to respond, is however also very relevant to address in the Bangladesh context seen the increasing urban population. Lessons can be learned from slum-upgrading projects, and from some disaster responses that did focus on urban areas.

The increased internal migration for socio-economic reasons often related to climate change is stimulating development on the edges of cities and urban areas. Not only does this represent a physically different living environment, also the socio-economic functioning of sub-urban populations is different than that of rural or urban populations. Households find themselves at the edges of cities for the closeness to services and economies of the city, but can't afford to settle in the city itself. Though they may generate livelihoods primarily from participating in the urban economy, they may combine this with small scale crop growing for

example. Also socially they can find themselves in between. It can be expected that this type of environments will house a larger share of the population in the future and is thus certainly relevant to consider in national shelter strategies.

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Cox's Bazar beach: new settlement of climate change and other refugees on the edge of the city, almost absent of infrastructure

3.6 Wash

During the discussions in the workshop the importance of proper water and sanitation was recognized by the participants. In fact, many of the participating agencies have substantial experience in wash. The technical details however fell outside of the scope of this workshop due to time constraints. It was nevertheless concluded by participants that an acceptable living environment must include access to safe water and sanitation.

Above: Friendship fieldwork conducted in Fall 2015, Cox's Bazar

3.7 Ecology

Construction is typically a sector that can weigh heavily on ecology. The Bangladesh Government for example has regulations for brick factories such as the height of the exhaust chimney and the type of fuel used for heating. The Forestry Department has regulations regarding the harvest of wood for example. These ecological measures form an integral part of the construction industry and should be informative for ecologically acceptable shelter responses.

PART 4: TECHNICAL ASPECTS OF SHELTERING

4.1 International Framework Shelter Terminology

Quite intense discussion were held during the workshop to get clarity on 'what is what' in terms of sheltering options, and what options we prefer in which contexts. Though these discussions weren't concluded, it is important to write up a 'current state' of the discussion, so that discussions can continue on the basis of that.

Underpinning any effective strategy is a clear vision. Defining the correct terminology is ultimately about that: what vision do we have for shelter after disaster in Bangladesh? What vision underpins the material options we choose for after disaster? We need to set a conceptual framework adapted to Bangladesh.

Since the Humanitarian Reform in 2005 and the subsequent set-up of the Shelter Cluster in 2006, capacity in shelter has rapidly increased globally. The leading paradigm at this moment in time is 'Transitional Shelter'.

The publication:
> TRANSITIONAL SHELTER GUIDELINES, Shelter Centre, 2011, Geneva, Switzerland
> http://www.sheltercentre.org/node/25121

includes a definition of transitional shelter:

> *"Transitional shelter is an incremental process which supports the shelter of families affected by conflicts and disasters, as they seek to maintain alternative options for their recovery. Through its five characteristics, transitional shelter can be:*
> > *(1) upgraded into part of a permanent house;*
> > *(2) reused for another purpose;*
> > *(3) relocated from a temporary site to a permanent location;*
> > *(4) resold, to generate income to aid with recovery; and*
> > *(5) recycled for reconstruction.*
> *The process starts with the first support offered to families and extends over the period of securing land rights and reconstruction, which may take several years…. "*

In the 'Historical Introduction' of the following publication, by Ian Davis:
> SHELTER PROJECTS 2009, UNHABITAT and IFRC, 2010
> http://www.sheltercasestudies.org/shelterprojects2009/ref/204800-Sheltercatalogue2009-EN.pdf

the following recommendation is made:

> *"Avoid the waste of Stage 2 Transition Housing*
> *… By extending the life of emergency sheltering and rapidly embarking on reconstruction, as happened in Guatemala it is possible to have a simple '1-3' reconstruction strategy. But if authorities adopt a '1-2-3' strategy of emergency sheltering, transition, permanent reconstruction these three stages can delay recovery and waste valuable resources on double reconstruction."*

What these references clarify is that the term 'transitional' is interpreted as a positive as well as a negative. What however speaks out of the work of both is the need for an **optimal sheltering process, with optimal shelter solutions for each stage of the response**. Such a process or solutions:
- are tailored to the specific disaster context

- make optimal use of resources in the different phases of the response
- strive towards durable solutions for affected populations

What that is however, in material terms, is quite complicated and highly debatable, as became clear during the workshop. About an entire hour of plenary discussion was dedicated to this subject, without final conclusion. Moreover, the current terminology needs to be adapted to the Bangladesh context, and the variety of contexts within Bangladesh.

4.2 Proposed concepts and definitions for shelter in Bangladesh

Below is a first attempt to formulate definitions and name desirable shelter solutions for different disaster contexts in Bangladesh. It is an attempt to translate international best practice into practicable solutions for Bangladesh.

1. EMERGENCY SHELTER

Purpose
People are protected from the open sky; temporarily housed on a safe site and protected from the elements (cold, rain, heat).
Target group
1. non-displaced people with fully or partially damaged houses
2. people temporarily displaced by disaster
Proposed material support
1. for non-displaced: 'top-up approach': all the materials and knowledge that people can not provide for themselves immediately after disaster to adequately protect themselves from the open sky: cash/voucher support, tarpaulins and plastic sheeting, toolkits, elementary training etc.
2. for displaced: a temporary housing solutions that is quick to set up and cost-effective, a locally appropriate alternative to a tent: to be developed.
Estimate time frame
Needs to be implemented and completed within the first weeks after a disaster. This solution should be reduced in time as much as possible, as it is not a long-term solution. The preferred option is to move to more long-term solutions as quickly as possible.

Why and how is this an optimal shelter solution?
Emergency shelter serves to protect people's health and safety in the first weeks and months after a disaster.
Emergency shelter is however not considered a desirable solution: it is a solution for in cases of extreme need. Funding going to emergency sheltering should be limited to what is minimally needed to protect people from the open sky. As soon as possible the response should move from emergency shelter support to longer term solutions for the affected population, and funding should be targeted for that. In small scale disasters, this can even happen immediately.

Examples
- In a village, the embankment breaks during a high tide and about 20 houses are seriously damaged. Upon assessment, it appears that the roofs of the houses are still largely intact and can be re-used. The affected families can then best be supported with poles to support their roofs, and temporary walling materials for example. This will protect them from the elements until they can focus on complete repair of their houses and longer term recovery.

- Part of Dhaka is destroyed by an earthquake and has left 100.000 people homeless. Some of them can be temporarily housed in communal facilities in a part of the city that wasn't destroyed, or stay with host families. Many of them however need to be offered protection from the open sky elsewhere, for example in temporary housing solutions just outside of the city or on large empty terrains in the city. These temporary housing solutions need to be immediately available so should not be complicated. They should however also allow for improvement and up-grading, if the estimated displacement time exceeds 6 months.

2. CORE SHELTER

Purpose
Support people with secure land to recover long-term from disaster, and increase their resilience to future disasters.
Target group
People that have secure land tenure, capacity to complete the shelter, live in areas of great exposure that can't be solved by communal infrastructure.
Proposed material support
Only the structure of a resistant one or two room space is built. The core shelter needs to be completed into a house by the families themselves. For completion of the shelter, supplementary cash/ voucher, material and/or technical support can be considered.
A core shelter is to be designed and built up to the standards of regular construction, respecting the Bangladesh National Building Codes (BNBC). The level of exposure on the particular building location needs to be taken into account.
Estimate time frame
Depending on the scale of the disaster, and the level of preparedness, core shelter construction could start as soon as 3 months after disaster. It is supposed to offer a resistant core for at least 20 years.

Why and how is this an optimal shelter solution?
This is considered a highly desirable solution, mainly for two reasons:
- The investment that is made is durable: the core is designed to last for 20 years minimum and withstand a reasonable level of impact from wind, water etc.
- It is an investment that often can't be done by people themselves as they do not have the resources for it. Building core shelter after disaster thus solves more than just the problem of recovery, it is a 'build back better' strategy that provides quality for the future. The recovery process becomes an opportunity to create longer term resilience.
Some specific situations need to be mentioned though:
- Core shelter can not be done for people who do not own land, or for areas where land 'moves' such as on chars. In this case, one should look at 'shelter for uncertain sites'.
- Core shelter is not suitable for people who do not have the funds, manpower or time to complete the core house by themselves. An option is to look into supplementary livelihoods support for these families. But, for families with extreme vulnerability or special needs (disability, illness ea) a core shelter is not a suitable option, as also livelihood support is likely to be difficult. Permanent shelter could be more advisable.
- Core shelter may give people a false sense of security: though the core shelter is designed to withstand great impacts, it can't protect as well as cyclone shelters or evacuation.
- In cases where the vulnerability of the site can be solved by community infrastructure (strong embankment etc) or the exposure to elements is limited, there is no need to

replace qualitative local architecture with core shelter. This would be cost-ineffective and counter-productive to the self-help capacity of the population.
- Care must be taken that core shelter is a solutions that can be accepted by the target population. Since a core shelter is in principle not a finished house, some beneficiaries may feel uncomfortable with this solution in terms of social and cultural aspects.

Examples
- the most known example is reconstruction in the planes in the south of Bangladesh that are very exposed to impact from cyclones
- rebuilding in hilly areas to resist landslides better could be an example as well

3. PERMANENT SHELTER

Purpose
Support people to recover a complete house after disaster. Permanent shelter is intended as a long term solution similar to the level of good quality houses in the affected area.
Target group
People that have secure land tenure, extremely vulnerable people, and areas that have a good quality local architecture that can be adopted at low cost.
Proposed material support
Construction of complete houses, according to the local architecture, but improved to be more disaster resistant. Again, BNBC is the quality standard to upkeep.
Care needs to be taken to interpret local architecture well: what are the elements that ensure its durability? Not necessarily these can be copied identically in a response, and there may be interventions that can improve local construction practices. Innovation and local architecture can be combined.
Estimate time frame
Depending on the scale of the disaster, and the level of preparedness, permanent shelter construction, just as core shelter, could start as soon as 3 months after disaster. It is supposed to offer a qualitative living environment for at least 20 years.

Why and how is this an optimal shelter solution?
Permanent shelter is sometimes regarded as a non-optimal solution in comparison with core sheltering, or because of the suspected higher cost. This isn't correct in all cases:
- Where the local architecture is qualitative, reconstruction according to local architecture may be more durable than replacing local knowledge with imported core shelter models causing risk of bad maintenance and repair.
- Permanent shelter according to local building techniques is in some areas much cheaper and faster than 'imported' core shelter solutions.
- For extremely vulnerable people that have no means at all to contribute to the construction of their own shelter, it is more advisable to construct permanent shelter
Permanent sheltering should also aim to attain a greater level of resistance and durability than the housing situation prior to disaster: it should also be a 'build back better' strategy.

Examples
- A small organization is supporting 100 affected families with the reconstruction and repair of their house after flooding. The original house was built in earth, but the plinths weren't very high. The organization offers support to increase the height of the plinth, and the reconstruction of the earthen house with some technical improvements such

as protection of the lower parts of the wall or adding bracing. That earthen house will be more protected from future flooding.
- A group of extremely vulnerable families is unable to put up a safe house after disaster. The area in which they live is vulnerable to wind impact, but not extremely: it is quite inland and surrounded completely by protective vegetation. An organization can support them with the construction of a structurally improved bamboo frame, for example, that can withstand stronger winds: two rooms including a veranda. Because the families are extremely vulnerable, also treated bamboo walls panels and well-fixed tin sheets for the roof and the bottom part of the walls are provided. This type of house would give them a safe living space for about 20 years, that is more on par with construction techniques they may be able to upkeep.

4. SHELTER FOR UNCERTAIN SITES

Purpose
Offer a solution for affected families that have no secure access to land, because of property rights or shifting landscapes. This solution should be better than an emergency solution, because it will be the only solution for the mid-term of 2 to 5 years. Because of the land insecurity however, it can't be a core or permanent shelter.
Target group
Families that don't have secure land and are thus obliged to move every couple of years:
- People that live on chars, and see their char reconfigured by erosion every couple of years.
- People that are landless and can't be accommodated on khas land or other relocation sites within a reasonable time span of below 2 years.
Proposed material support
Offer qualitative building elements that can be easily disassembled and reassembled on new sites. Qualitative 'kaatla' foundations are an example of this, or durable tin sheets for roofing.
Estimate time frame
For the two different target groups this is different.
- For the char inhabitants, for which moving site is part of the way of living, this is a 'permanent' solution in the sense that the ultimate aim is not to obtain a fixed house on a fixed site.
- For landless people, this is only a temporary solution. In time, they should be offered more long term solutions with greater security, such as land titles, housing in relocation sites or qualitative housing in urbanizing areas ea.
Depending on the scale of the disaster, and the level of preparedness, shelter for uncertain sites could also start as soon as 3 months after disaster. It is supposed to offer a qualitative living environment for at least 2 to 5 years in one location, and about 10 to 15 years in several locations.

Why and how is this an optimal shelter solution?
As long as a substantial section of the population has no secure access to land, this shelter for uncertain sites solution is necessary. It is not necessarily a desirable solution, but it responds to a real need.
Since these people are not expected to claim secure sites in a short time span, we should accommodate solutions that can offer a secure environment for at least a couple of years.

Examples
- A char is regularly affected by flooding. Reconstruction of a fixed house is not an option as people will have to move in any case, following how the char changes shape due to erosion.
- A group of landless people will be permanently resettled after 4 to 5 years, but the exact location is not known yet. Part of the group will be targeted with livelihoods activities so that they will be able to acquire land. In the mean time, they need to stay in a safe house. That safe house can be built in such a manner that, once the group acquires land, they can move that house to that land, in parts or in its entirety.

The above concepts and definitions are proposals based on some of the main issues that were discussed during the workshop. Further discussing disaster scenario's and possible suitable solutions can help to conclude on these.

4.3 Emergency Shelter

The first theme addressed in the workshop was emergency sheltering. An introductory presentation was followed by a group discussion. Please find below the key-messages that were formulated:

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Kutubdia Island: emergency repair of houses after breach of embankment has severely damaged them

KEY-MESSAGES 🔑

Key-message 1: Emergency shelter support is not a preferred option, but is sometimes necessary to keep people safe immediately after disaster
Please consult 4.1 for a preliminary definition of emergency shelter.

Emergency shelter is not a preferred disaster response option. After a disaster, the available funding should go to long term solutions, 'building back better', that reduce the vulnerability of families to future disasters.

But, to keep people safe and healthy immediately after disaster, in the first weeks, it may be necessary to support them with an emergency shelter response.

Key-message 2: priorities for emergency sheltering
In emergency sheltering, the priorities could lay with:
- Providing people with a safe location
- Keeping them warm
- Keeping them dry
- Ensure water and sanitation services

	Function		Emergency sheltering - Priorities?
stuff	to use inside the house		blankets, in case of cold
space plan	organise different functions inside the house		
services	equip the house with kitchen, water, electricity etc	What do we spend the most money on? what durability do we aim for for each layer?	water, sanitation and food outside of the house
skin	to protect from the outside; rain, cold, privacy		keep people dry
structure	to keep the house standing		
site	to organise relation with surrounding		find a temporary location for displaced persons

Above: Stuart Brandt 'shearing layers': adopted for technical shelter analysis by the IFRC SRU, in the 'Shelter Solutions' project also piloted in Bangladesh. Here, used to set per layer priorities for sheltering in the emergency phase.

Key-message 3: Emergency support should complement the self-help of the affected populations

The first responders to disaster are the affected families themselves. Any external support should be designed to complement the actions of these 'first responders'. They are in fact the leaders of the response, and aid agencies should support them in their response process; fill the gaps and complement what they cannot do themselves.

Key-message 4: Need to develop an assessment tool to identify the actual self-help capacity of the affected population

Any support should be tailored to complement people's self-help capacities, but good assessment is crucial in this: what capacities do the affected families have to help themselves and what is lacking?

Above: documentation IFRC after Cyclone Sidr: self-built emergency shelter in the weeks and months after Cyclone Sidr

An assessment tool is to be developed that clarifies what additional support needs to be offered to the affected population. The following list is not complete:

- Do people have a relatively safe site to stay on?
- Can they salvage materials from their damaged house, and in what condition are these materials?
- What materials do people miss to keep them dry and give their temporary shelters a minimal strength (could be plastic sheeting, toolkits, a minimum of structural elements such as bamboo poles, tie wire, nails, bolts, corner connections…)?
- What is the percentage of people that do not have anything, no site and no salvaged materials at all?

- Are construction materials available on the local market?
- How is the access to skills and labor, what is the percentage of people that need help to put up a temporary shelter?
- How many people can not support themselves at all, because of extreme poverty, special needs, illnesses, disabilities etc?
- How much support can be mobilized from the community to help the construction of emergency shelters for the most vulnerable?
- Etc.

Key-message 5: Need to make a difference between small and large scale disasters
Small scale disasters may be handled in a different manner, in more close collaboration with the communities and more locally appropriate. It may be easier in small scale disaster to limit the emergency shelter response and move more quickly to long term solutions. Large scale disasters may require a more uniform response to be able to help more people faster.

Key-message 6: Emergency solutions should be adapted to the local conditions
The support offered in the emergency phase should be adapted to the locally available construction techniques, skills, materials and exposure level of sites. That way the local economy is stimulated. Also, commonly used materials are more likely to be re-used in more long-term solutions.

Key-message 7: Need for an emergency model that is better than a tent
In case of longer term displacement (more than a month) of a substantial amount of people, international agencies could be inclined to send tents. Since tents don't offer a qualitative living environment in the Bangladesh context, a locally appropriate emergency sheltering model should be developed that is easily produced and placed, in large numbers, locally.

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Cox's Bazar beach area: Local practices that can inspire the design of a standard emergency shelter for longer term displaced populations

Key-message 8: People receiving emergency shelter support should not be excluded from longer-term response
This problem occurs when the emergency response that is offered at first sight looks like a long-term solution but it actually is not. Sometimes organizations build emergency shelters that will not withstand minimal flood or wind impact, with an estimated life span of below 2 years. Immediately after that they have been constructed however, these shelters may be interpreted as a complete house and therefore these families are excluded from further recovery support.

This situation needs to be avoided. No sub-standard emergency shelters should be built that jeopardize long term support for families. It is a non-optimal use of resources. It increases the unevenness of the response.

Above: documentation IFRC after Cyclone Sidr: example of sub-standard reconstruction in the emergency response

Key-message 9: Options to pre-position materials should be looked into
Availability and transport of materials immediately after a disaster can pose a problem that delays the emergency response. Pre-positioning could prove to be a solution for this. It should be studied where and how this needs to be organized: locally, regionally and/or nationally, by government and/or aid organizations.

It was mentioned that this could be also done in collaboration with private partners. Then a type of agreement would be written up in which the private partner assures a certain amount of stock to be available at al times, that can be immediately redirected to disaster response if need be.

Key-message 10: Most commonly used emergency response materials are considered valuable
Distribution of tarpaulins, plastic sheeting, toolkits, some basic structural materials and connection elements were considered, by the participants, as valid emergency shelter support options.

Above: documentation IFRC after Cylone Sidr: tarpaulin and bamboo pole distribution, content of the toolkit

Key-message 11: Need for a guideline for recuperation of materials
Recuperation of materials is good in principle, but not all materials are suitable for re-use. Also, use of recuperated materials may require different building techniques. It would be good if a guideline exists to ensure that recuperated materials are selected and used well.

Key-message 12: Technical support can also be possible and valuable immediately after disaster, in an emergency response
Subjects to address in technical support immediately after disaster are:
- how to fix plastic sheeting so that it is more durable

- how to fix tin sheets properly. It may be advisable to always distribute fixing materials and structural materials together with tin sheets, to ensure that they are fixed properly
- how to repair shelters that are partially damaged
- reinforce corner connections
- provide minimal cross-bracing and tie down

There may be more subjects to address. This is particularly important if the affected areas remain vulnerable in the first weeks after, for example if the rainy season is not over yet, or more tropical storms are expected.

Above: documentation IFRC after Cyclone Sidr: tin sheet distribution: better to be matched with some structural materials such as bamboo poles, and technical support to fix the tin sheets properly

Key-message 13: Some technical training should be given to communities prior to disaster
Reinforcement of houses before a disaster can greatly increase their resistance during disaster, see later. Training could also include emergency sheltering aspects, to improve the quality of emergency shelters that people build themselves immediately after disaster.

Key-message 14: Need for the development of a decision tree that can help decision making regarding shelter immediately after disaster
A decision tree helps to make decisions after a particular disaster has happened. The decision tree is built on questions with a Yes or No answer, that each lead to a different decision or further action. A simple example is shown below:

Do people have sufficient materials to build a temporary shelter?

Yes: no need for emergency shelter support   **No:** conduct assessment to discover what is missing

People cannot keep the rain out

All materials are washed away with the floods

Some people have all materials, others nothing

Distribute plastic sheeting

Look into options to mobilize new building materials

Continue assessment: identify the most vulnerable

In reality, the options are far more complicated. This is why it was suggested to develop this decision tree in between disasters, in 'peace' time. It would then be discussed and agreed upon by all stakeholders in shelter. It was then suggested that, immediately after disaster, the shelter cluster would use this decision tree to define the appropriate response.

4.4 Recovery Shelter

In the workshop, a lot of time was spent on defining what the preferred strategy for shelter recovery is, after the emergency has passed. In section 4.1 an attempt is made to define the three types of responses that were withheld from the discussion:
- core shelter
- permanent shelter
- shelter for uncertain sites

These three were put forward as the desirable options for recovery shelter, depending on the specific situation.

Some of the general principles agreed upon for emergency shelter also apply to recovery, specifically in relation to training and capacity building:
- develop guidelines for assessment of self-help capacity of affected communities
- prior to disaster support recovery shelter knowledge at community level
- develop technical support tools adapted to the recovery response

It was also repeated that support efforts should focus on complementing what people can do to recover by themselves.

KEY-MESSAGES

Key-message 1: Optimization of resources: balance COST and QUALITY
Because of the large need in Bangladesh, and the limited resources, it was felt that every shelter response should strive to a good balance between cost and quality. On the one hand, every family receiving support should receive a qualitative support that increases their resilience to future disasters. On the other hand, available funds have to be used in an efficient manner so that a maximum number of affected families can be supported. This requires intelligent recovery approaches.
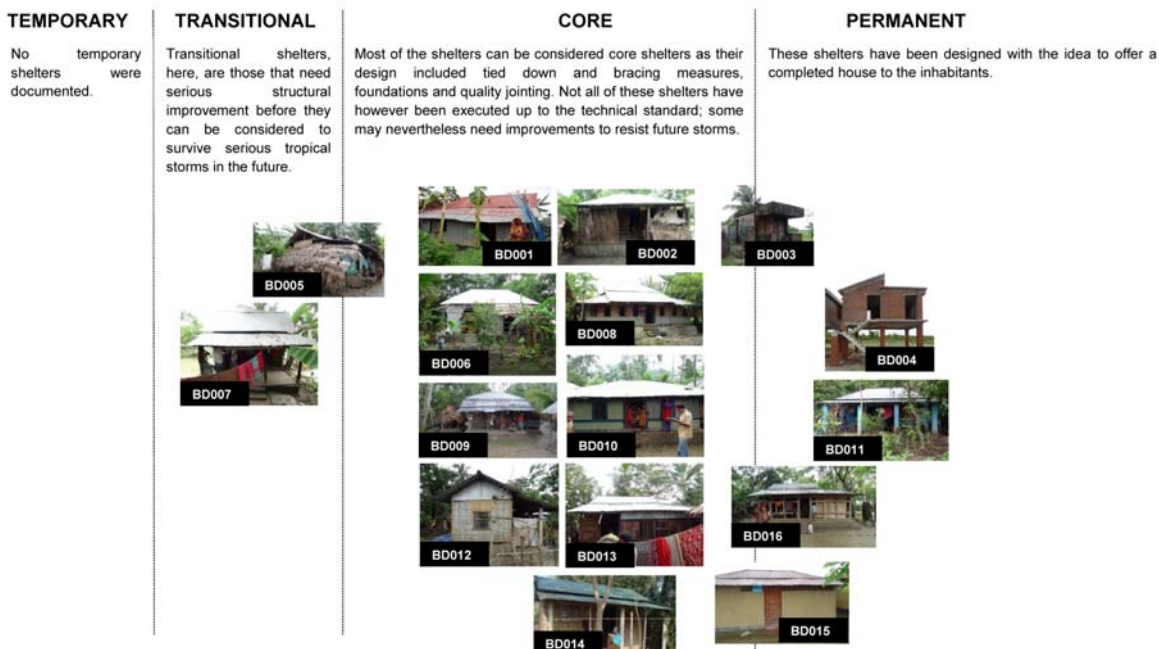

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, 2 left of Cox's Bazar hill area, far right Kutubdia island: earth construction can be built and repaired by the inhabitants themselves, making it a cost-effective solution

Key-message 2: Towards a more even and equal response
The uneven response after cyclone Sidr, with some families receiving a permanent house with an expected life span of 20 years plus, and others a 'transitional' shelter that requires serious

repairs after 2 years, was considered problematic. It was felt that increased preparedness and coordination should, in the future, reduce this problem.

Above: IFRC SRU Shelter Solutions Bangladesh: simplified cross-analysis of shelter types

The above classification was somewhat contested by the participants. Between the different shelters included in the core shelter section there are still many differences, and not all can be considered core shelters. This further proves that participants are looking to sort out the different options and set more clear standards. If labeled or planned as core shelter, the shelter should deliver the therewith expected resistance to future disasters.

Key-message 3: Need for a guideline for repair & retro-fitting of buildings
More attention should be given to repair of damaged houses in the recovery response. If these houses aren't repaired well they may not withstand future disasters. With some simple guidelines recommendations could be given regarding proper repair, and even reinforcement, of damaged houses.

Key-message 4: Adapt shelter solutions to the local context

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015: examples of local construction techniques, from left to right: Kalapara panel housing, Sylhet wattle and daub, Rangamati tribal housing

This local context has different aspects:
- The local construction practices, materials and skills available: bamboo is quite common everywhere, except for in the flood planes in the south, bricks are produced everywhere, earth construction is traditional in certain regions but unknown in other ea.
- Cultural differences in housing practices and inhabitation
- Different hazard profiles: the south is very prone to cyclones for example, whereas landslides only occur in the hilly areas ea.

Key-message 5: Introduce new techniques in changed environments
It was pointed out that, in certain circumstances, traditional building practices need to be altered or improved:
- Some earth construction is done in areas that are highly prone to flooding. Earth construction doesn't resist flooding well, so adaptations or alternatives may need to be considered: higher plinths, concrete or brick base of the walls etc.
- Though building on stilts is not common in the southern flood planes, some projects have been implemented successfully
- Smaller plot sizes, migration and limited resources cause that many people live in bad adaptations, poor versions, of local building techniques. These don't hold the positive elements anymore of local building techniques.

Learning from local building techniques should be adopted in an intelligent manner, in combination with new techniques. An example is replacing the cross-bracing capacity of a paneled façade with a simple diagonal element.

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Sylhet: introduction of cross-bracing into traditional wattle and daub construction

Key-message 6: Need for better monitoring and evaluation tools and practices
A more systematic and qualitative monitoring and evaluation of shelter projects should be done, during and after implementation. Site supervision for example was mentioned as an aspect that can be improved.

Key-message 7: Attention to specific vulnerabilities
We need to pay attention to families with members with specific needs. The elderly for example may spend most of their time inside the house, or people with disabilities need an adapted environment. These members of the family are not necessarily the heads of the families; attention should be paid to their housing needs in particular.

Key-message 8: Development of shelter model designs
It was agreed in the workshop that the development of standard shelter model designs per different context would be good. This could speed up and harmonize the response, and guarantee a minimal quality.
The model shelters could draw from previous experiences and projects implemented by agencies before. External experts could study these and make recommendations and propose models for discussion (more about that later, under 4.7).

Key-message 9: Infrastructure development
In some cases, it is not necessarily the shelter itself that needs to be improved, but the communal infrastructure. Examples of this are embankments that protect houses from high tides and flash flooding, retaining walls and stair cases to make living in hills safer, communal plinths that are raised rather than individual plinths etc.

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Gaibandha: Local construction practices of housing can be combined with heightened communal plinths

Key-message 10: Attention to ventilation and internal climate
Areas for which not much standards are developed yet are the ventilation and internal climate of a shelter. Certainly for those members, often also more vulnerable, of the household that spend a large part of their day inside the house, these two aspects need to be considered. Problematic situations that were mentioned are heat build up in complete tin sheet housing, inside cooking without proper ventilation, lack of light inside.

Key-message 11: Train teams of masons and carpenters on issues of specific disaster prone areas
It was mentioned in the workshop that it would be good to have masons and carpenters specifically trained in construction to reduce impact from future disasters. Depending on the particular disasters an area is prone to, these trainings need to be adapted.

4.5 Site Organization

The workshop introduction to this theme and the subsequent discussion was focused on different levels of exposure of sites and the importance of protection sites to make family houses less vulnerable to disaster.

KEY-MESSAGES 🔑

Key-message 1: Traditional homestead

The organization of a traditional homestead in Bangladesh was mentioned as providing some hints towards better protection of houses. The main constituting elements of the traditional homestead are:
- homestead plinth raising the entire homestead above the level of the surrounding area

- a well-thought through vegetation sequence on the edges of the homestead to protect the homestead plinth
- second plinth to raise the house above the homestead plinth for supplementary flood protection
- the plinth of the house itself is protected as well: cement stabilized, with brick slates or otherwise
- deep-root trees that can brake the power of the wind but are firmly rooted in the ground

Above: left: Google earth aerial picture of a homestead, right: Friendship – IFRC SRU fieldwork conducted in Fall 2015

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Cox's Bazar inland area: views of a homestead

Some organizations (fe Friendship, who presented their raised communal plinth project that was subsequently visited during the fieldwork) have good experiences with raising communal and house plinth levels substantially higher than what is traditional practice.

The organization of a traditional homestead in Bangladesh is by far not driven solely by protection of the house. The planting provides food and construction materials, the ponds can be used for washing or growing fish ea. The homestead also has an important cultural meaning: it organizes family and social life, with areas dedicated for visitors, for women, for production ea.

It was recognized that this homestead is not achievable in all regions or areas in Bangladesh, certainly considering the high level of poverty, large population density, internal migration, urbanization and changing landscape.

Key-message 2: Infrastructure is critical for rendering sites safe
In this, the embankment is the prime example. Embankments all over Bangladesh make areas inhabitable that would be otherwise too exposed for living.

Recent migration into more hilly areas is another example: both for the quality of life as for safety, hilly areas often require infrastructure: safe stair cases, water sources close to the houses, retention walls and/or planting to protect from erosion and landslides, proper house location and construction ea.

Above: left:Google earth picture of inhabited coastal hills Cox's Bazar, right:Friendship – IFRC SRU fieldwork conducted in Fall 2015, Cox's Bazar hill area: view of the landscape with dirt road leading up the hill, and far right the type of slopes found in the backyards to houses

Key-message 3: Estimation of exposure at different levels

It would be good to have a system to define the vulnerability of areas and sites. For the purpose of the discussion, the 'mezzo' and 'micro' level were identified:
> Mezzo level: embankments, slope stabilization, communal plinth raising etc.
> Micro level: raised plinth, protective vegetation

But, these levels should be refined more, according to:
- The type of location (beach, slope, island etc.)
- The type of treat (flooding, cyclone, landslide etc.)

It was mentioned in the workshop that some land-use planning expertise may be useful to develop this.

Above: Google earth picture, south of Bangladesh, different exposure levels

Key-message 4: Adapt shelter designs to the vulnerability of sites
The exact exposure and vulnerability of a site should be taken into account when designing shelters. Also the treats prevalent in a certain area should be considered.

For particularly vulnerable sites, it may even be necessary to develop tailored alternative designs. Some projects offering housing on stilts in areas that were culturally not accustomed to stilts that nevertheless obtained beneficiary satisfaction were mentioned.

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Rangamati: a house purposely designed to be built on a slope, with a retaining wall towards the slope, and wind impact resistance measures in the roof design such as metal straps. Designed for this site particularly by a family member with an engineering education

Key-message 5: Guidelines for construction on vulnerable sites
It was suggested that we need guidelines for construction on vulnerable sites.

Key-message 6: Position of the house on the site
Though this was not developed in detail in the workshop, it was repeated that the position of the house on the site is important to increase its resistance, as for example taking into account the prevailing wind direction, or using brick walls facing slopes.

Key-message 7: Link to other DRR measures
Other community and family level DRR measures are linked to site organization, such as manners to protect stock on the site, provide places for livestock during floods, floating devices etc. Another example: putting the wells on the heightened plinth was mentioned as a good practice for flood prone areas. This is to be developed further.

4.6 Construction Guidelines

A check-list of main principles that could substantially improve the housing and shelter construction in Bangladesh should be developed further. The temporary list developed for the workshop is:

1. STRONG FOUNDATIONS
- deep enough, with spread or footing and/or undisturbed earth
- with materials and techniques that resist water and humidity
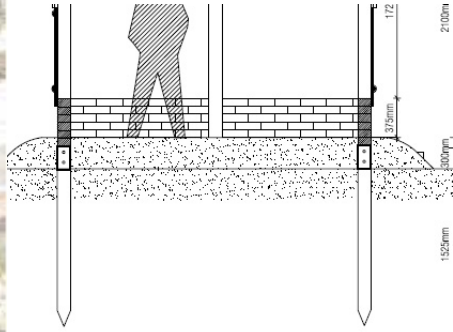
Above: IFRC SRU Shelter Solutions Bangladesh: different types of reinforced concrete foundations

2. CROSS AND HORIZONATL BRACING
- braced in all directions, in joints and/or with extra poles, of walls and roof structure
- cross bracing for wind loads
- horizontal bracing for heavy structures vulnerable to earthquake
- cross and horizontal bracing for shelters in flood-prone areas

3. TIE DOWN FROM BOTTOM TO TOP
- wall structure well-connected to foundations
- roof structure well-connected to wall structure
- roof covering well-connected to roof structure

Above: IFRC SRU Shelter Solutions Bangladesh: tie down from bottom to top

4. IMPROVED CONNECTIONS AND JOINTS
- overlapping timber or double bolting or nailing, or reinforced with metal plates
- resistant wire to bind bamboo, or reinforced with wooden elements
- clamps and enforcement bars out of RC with anti-corrosive treatment
- steel welding in protected environment, steel bolting on site

Above: IFRC SRU Shelter Solutions Bangladesh: improved connections

5. BETTER QUALITY MATERIALS AND APPROPRIATE TREATMENT
- proper reinforced concrete production
- curing and treatment of wood
- selection and anti-infestation treatment of bamboo
- Anti-corrosive treatment of steel
- Cement stabilization of earthen elements
- Maintenance

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Kalapara: tin sheets corrode due to lack substandard application

6. IMPROVED LOCAL CONSTRUCTION SKILLS FOR MORE UNCOMMON MATERIALS
- Mixing of cement for RCC, compacting and curing
- Mixing cement and masonry brick work
- Welding and bolting of steel frames
- Improved treatment techniques

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Kalapara: common problems with reinforced concrete

7. BETTER DESIGN
- Compact building volumes
- Placed in the correct direction in relation to prevailing wind direction
- Careful placement and protection of openings in walls
- Ventilation to evacuate humidity
- No saving on materials for structurally important elements

4.7 Construction Best Practices

In preparation to the workshop, the following main structural elements were identified in Bangladesh:

1. Foundation brick perimeter
2. Foundation bamboo or wood
3. Foundation and poles reinforced concrete
4. Timber frame
5. Bamboo frame
6. Steel frame
7. Load-bearing walls wattle and daub
8. Load-bearing walls earth
9. Load-bearing walls brick

Preliminary key-messages were briefly developed in preparation to the workshop: they can be found in the workshop's presentations in annex. Also the main cladding materials in Bangladesh were presented: bamboo mats, thatch roofs, tin sheets, brick infill and finishing.

The Housing & Building Research Institute (HBRI) of the Government of Bangladesh presented its ongoing work on new and improved best building practices. In the presentation, they showed type houses constructed under the concept 'eco-housing', and demonstration houses built as part of that. For the full presentation, please consult the annexes to this report.

Above: type eco-housing developed by HBRI
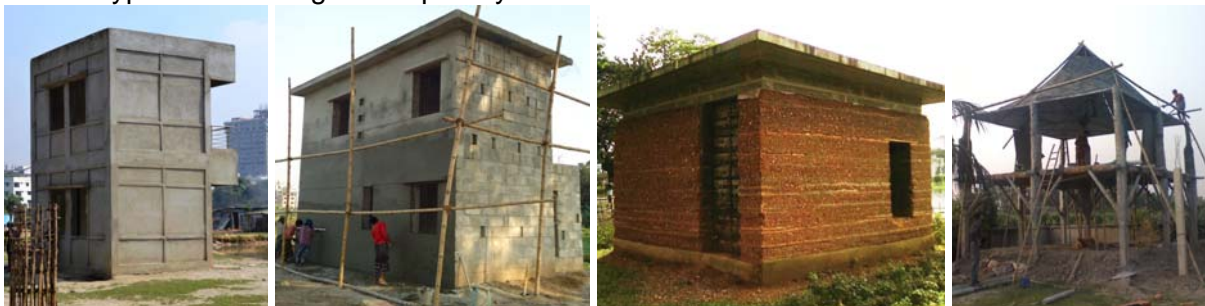
Above: demonstration houses constructed by the HBRI using different construction technologies, from left to right: ferrocement, polyconcrete block, rammed earth and a low cost roofing solution using tent technology.

This research creates options to broaden the range of construction techniques available for shelter recovery. Some of the techniques allow for multi-story construction, which, because of the high population density, is relevant even for rural housing solutions.

The <u>Department of Disaster Management Planning</u> briefly presented some of its work on cyclone resistant housing, and enforcement of infrastructures. Please consult the annexes to this report for the full presentation.
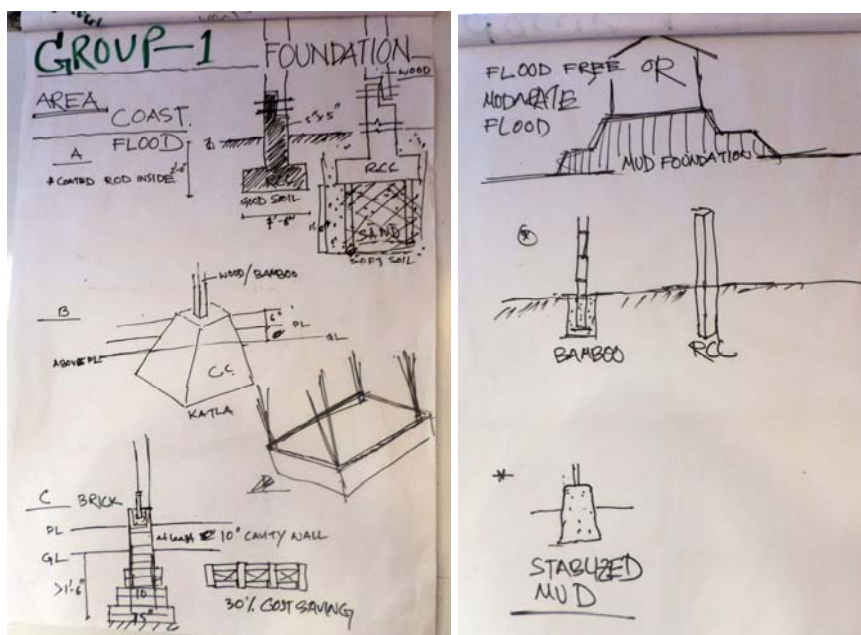

Above: 2 cyclone resistant houses developed by the DDM, Planning

Four groups subsequently worked on listing good construction practices for sheltering after disaster: for foundations, superstructures, connections and roofs.

Above: pictures of the group work on structures

1. FOUNDATIONS

Above: workshop flipcharts

The above foundations were mentioned as acceptable practices, if they fit the context. It was mentioned that we need to design the foundations to fit the local condition and risk profile.

Subsequent discussion led the participants to conclude that foundations should always adhere to BNBC-6 standards as they are crucial for the stability of a house. The only exceptions that can be made to this role are for emergency sheltering and for sheltering on uncertain sites.

Briefly, the use of anchoring elements was mentioned for emergency sheltering.

2. SUPERSTRUCTURE

When discussing the superstructure, the importance of cross- and horizontal bracing was highlighted. This bracing is not only crucial to resist impact from wind, it is also important under other treats, such as earthquakes and floods, to increase the overall structural stability of a house.
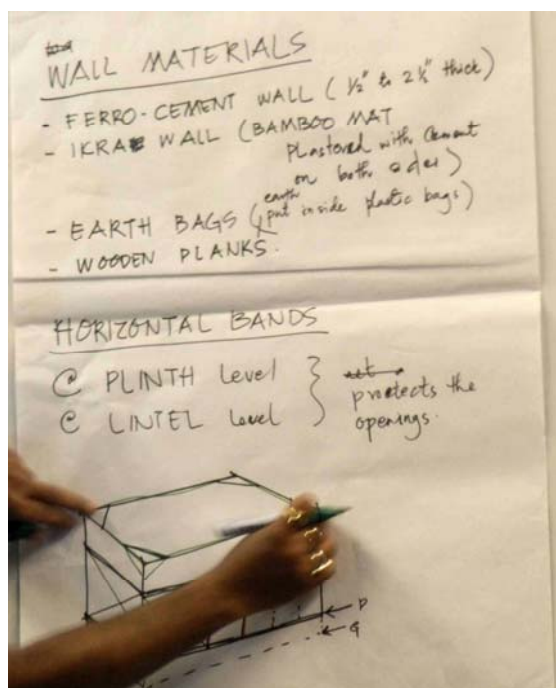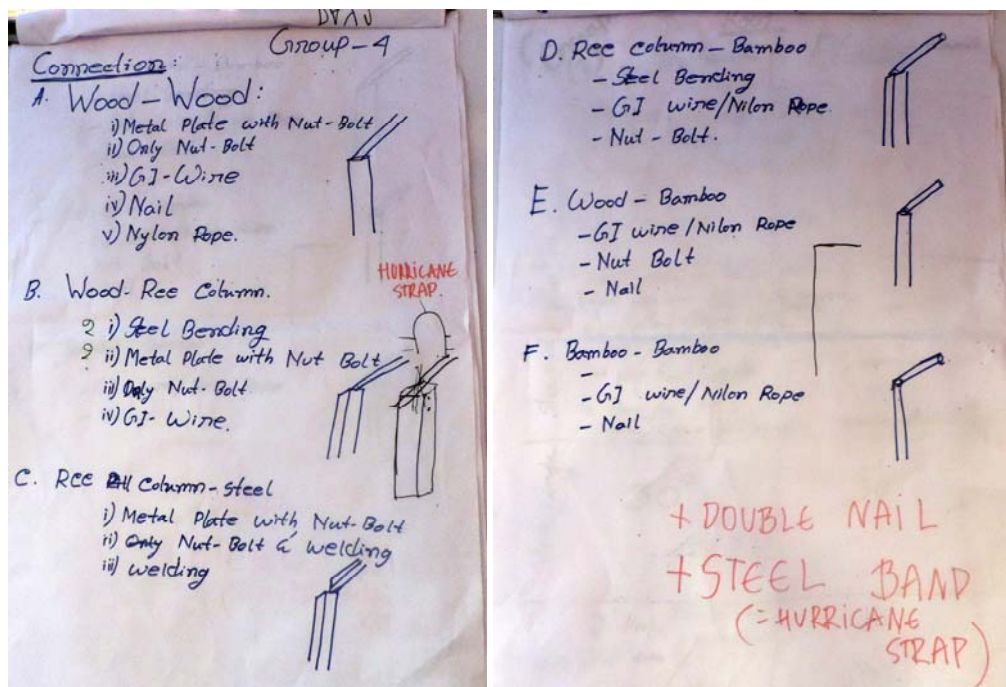

Above: workshop flipcharts

3. CONNECTIONS

We need to look at the different possible materials that need to be connected to each other. 6 categories were identified:

- wood to wood
- wood to RC column
- RC column to steel
- bamboo to RC column
- wood to bamboo:
- bamboo to bamboo

Above: workshop flipcharts

The types of connections that were discussed are:

- metal plate with nut-bolt was considered a strong connection
- only nut & bolt was also considered a good option
- nailing, preference of double nailing
- GI wire was mentioned, but, unless very well executed, not considered preferable
- nylon rope was also mentioned. The quality of the rope and the execution of the strapping is very important. Both GI wire and nylon rope are considered appropriate for bamboo connections.
- bended steel straps, the so-called 'hurricane straps' were considered crucial
- it was pointed out that welding of steel elements is a less secure option: no electricity in many areas, insufficient coverage/ welding material used

4. ROOF

A difference was made between areas vulnerable to cyclones and to flooding. The treat of a cyclone puts the highest demands on the structural design and construction of a roof. Different aspects impacting on the structural resistance of a roof were mentioned:

- the materials used for the roof cladding
- the materials and design of the roof frame
- the roof shape: hipped, gable or other
- the roof slope angle, which is said to be best at 30°
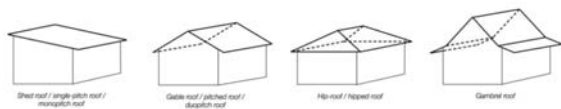- fixings: the cladding to the frame, the frame elements to each other and the frame to the supporting structure
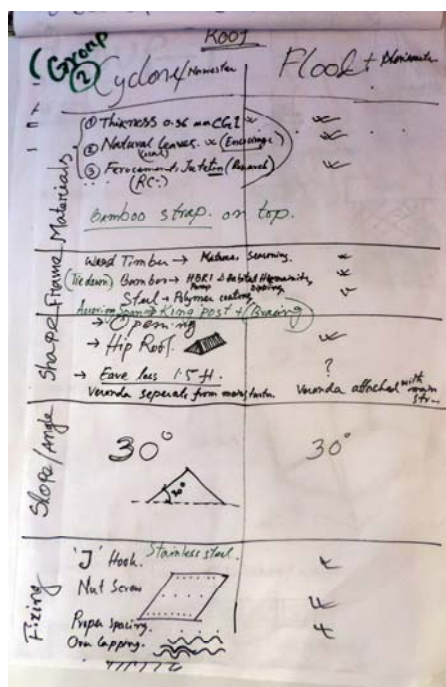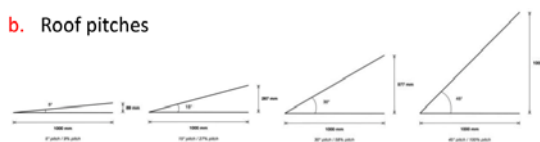
Above: workshop flipcharts

5. CLADDING

Before embarking on cladding materials, the importance of the roof design adapted to the exposure level was repeated. Please consult the presentation in annex to see further cladding aspects that were discussed.

Above: IFRC SRU ongoing research on fixing of tin sheets, and the importance of the roof design in that

4.8 Model Designs

The need to develop model designs for different regions in Bangladesh was discussed. Across the various discussions, a series of requirements that these model designs need to adhere to were mentioned:
- adapted to the local treat/ hazard profile
- adapted to the local living practices / culture
- adapted to the local construction practices
- but, innovative techniques necessary to adapt to changing circumstances
- sensitive to particular vulnerabilities such as disability
- inclusive design
- model designs need to be discussed with the target groups and adapted accordingly
- adapted to the local exposure level
- can start from already tried and tested shelter solutions
- optimal cost – quality ratio

- reduce future vulnerability to disasters
- durability and sustainability in general

<u>Caritas Bangladesh</u> presented its work on the development of model housing for permanent sheltering done in collaboration with Caritas France and Luxembourg, and CRAterre. A series of pilot houses has been constructed in different regions of Bangladesh, and training has been given to communities on simple techniques to improve the overall quality of their houses. For the full presentation, please consult the annexes to this report.

Above: pilot houses constructed by Caritas

Moving towards more evident based sheltering was suggested: adopting designs that have proven resistance in the field and have been calculated to resist certain forces.

Whether these model designs should become absolute standards for implementing agencies was not discussed in detail. It could be that these model designs are a starting point, a guideline, to which only limited variation is allowed. It could also be considered that respecting the construction guidelines discussed under 4.5 becomes the standard to adhere to. A combination is possible too: variations to model shelter designs are acceptable if these do not jeopardize the prescriptions in the construction guidelines.

4.9 Cyclone Shelters

The cyclone shelter design developed by Arch. Chowdhury for Friendship was presented briefly. Furthermore, no session was dedicated to this subject due to time constraints.

Above: Friendship – IFRC SRU fieldwork conducted in Fall 2015, Kutubdia Island: an example of a cyclone shelter that is quite essential as the island inhabitants are completely isolated during storm surges and cyclones

It came up out of the discussions though that cyclone shelters remain crucial for the safety of people in many areas in Bangladesh. The exposure level in some areas is so high that it

would be irresponsible not to evacuate households even if they live in a fairly strong house or a core shelter. Another point raised is that people would hope to save livestock and goods as well, and that provisions for that in cyclone shelters, or alternative solutions, should be thought about. Cyclone shelters with uses outside of disaster, or smaller scale cyclone shelters, were briefly suggested as well.

Similar to what was done for sheltering in preparation to this workshop, documenting and analyzing different types of cyclone shelters to come to general recommendations for cyclone shelters could be done.

The 'cyclone shelter policy' was mentioned as a potential source for further inspiration for the development of shelter policy, particularly by the Department of Disaster Management under the Ministry of Disaster Management and Relief.
link: http://www.ddm.gov.bd/cyclonesheltermanagementpolicy.php

4.10 Training and Awareness Raising, Capacity Building

One session in the workshop dealt with the importance of training, awareness raising and capacity building in general.

Training, awareness raising and capacity building are necessary to ensure that we are as ready as possible when a disaster hits. We need to be able to make an educated and informed choice after disaster, and that is only possible if we have sufficient prior knowledge about sheltering.
To obtain this, we need:
- All the available knowledge and previous experiences need to be accessible, and lessons need to be learned
- Appropriate shelter knowledge is necessary at each level: community, union, upazilla, zilla, national // local, regional, national and international aid agencies // donors
- And that knowledge needs to be adapted to each level

A couple of tools that have been used in capacity building efforts in Bangladesh were briefly shown in the introductory presentation. Some examples:
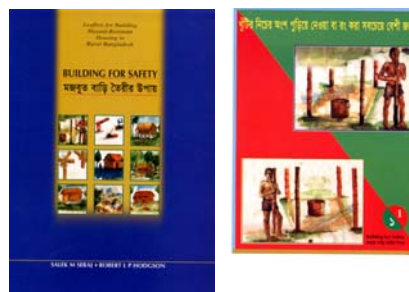
Example : Booklet

Source:	Seraj, Hodgson, BUET, DFIF, Exeter Univ, British Council
Subject:	Improvement of bamboo structures
Description:	Drawings and text in English and Bengal
Target phase:	After the immediate emergency
Target audience:	Individual households, for repair and rebuilding

Example: Training of Volunteer Trainers

Source:	IFRC
Subject:	Basic principles to improve stability of houses

Description: Training of volunteers to raise
                   awareness in communities

Target phase: After the immediate
                   emergency
Target audience: Volunteers community
                   awareness raising

Example: PASSA: Participative approach to safe shelter awareness
Source: BRC, IFRC
Subject: Participatory approach to safe
                   shelter awareness

Description: Participative process to tackle
                   all shelter vulnerabilities in a
                   community, set-up an action
                   plan
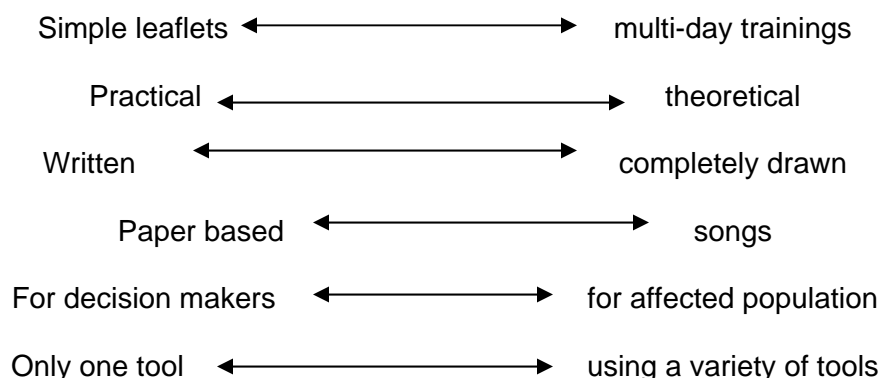

Target phase: After the immediate
                   emergency, before the
                   disaster season

Target audience: Villages

Above: documentation IFRC after Cyclone Sidr

Most important is to use the appropriate tools for the appropriate occasion: the messages you want to bring across need to be clear, adapted to the target audience, and brought in a manner that works best to reach that target audience. Some examples of the variety of options:

Simple leaflets ←——————→ multi-day trainings

Practical ←——————→ theoretical

Written ←——————→ completely drawn

Paper based ←——————→ songs

For decision makers ←——————→ for affected population

Only one tool ←——————→ using a variety of tools

It was clear that quite some tools are still missing. There is a great scope to share better what exists and complete what does not exist yet.

The introductory presentation continued to discuss the different capacities that need to exist on different levels of the disaster response. It was stressed that the shelter professional (manager or technical officer) holds a critical role: it is from this role that awareness raising starts as it is this role that holds the technical knowledge about the shelter product and the sheltering process.

The following types of knowledge are crucial for the shelter manager and shelter officer:

Technical knowledge about construction: how to make foundations, how to fix tin sheets, how to repair embankment etc.
Process knowledge: how to plan a shelter project in collaboration with the affected communities
Management knowledge: how to make optimal use of available resources: time, budget and skills (team management)
Support vision and policy development, out of the experiences in the field, and input from the beneficiaries, inform the decision makers and donors
Network knowledge: identify the correct partners to work with for every part of the project, share lessons learned, and learn from others

This was taken up into group work, in which the knowledge requirements on four levels were discussed more in detail, below the outcome.

1. DECISION MAKERS

This level includes governmental decision makers, the higher up hierarchy in implementing agencies and donors. Out of the group work it was clear that capacity and awareness raising needs on this level exist. The participants of the workshop are mostly from the 'shelter manager' level. They feel that some shifts in focus and some increased understanding on the decision making level could positively impact on the quality of sheltering.
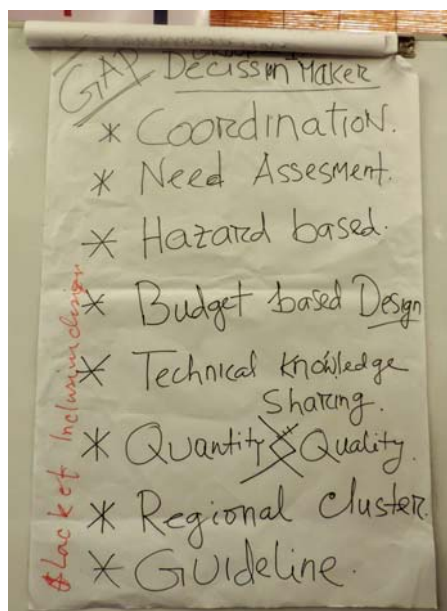
Above: workshop flipcharts

KEY-MESSAGES

Key-message 1: Improve coordination between decision makers on top of coordination between shelter professionals

Key-message 2: Needs assessment from top to bottom
Conducting needs assessments is not the responsibility of the decision makers, but it was felt that the decision making level should be better informed about the outcomes of needs assessments. All levels involved in sheltering should be thoroughly aware of what the actual needs in the field are, including the decision making level.

Key-message 3: Hazard profile based
In the decision making regarding sheltering, the hazard profile of areas should be a factor of greater influence. Sheltering in a slow onset flood prone area versus a cyclone area is quite different, and this should be well understood at the decision making level.

Key-message 4: Budget based design
Budget driven design was preferred over design driven budget. Though the government is considered aware of this, donors and agencies don't fully apply this yet.

Key-message 5: Increased technical knowledge
In relation to that, it was mentioned that the level of technical understanding regarding sheltering needs to be improved on the decision making level, so that informed decisions are taken.

Key-message 6: Raise awareness about quality versus quantity
Decision makers are still too much concerned about numbers, whereas the quality of the shelter responses we offer is at least equally important.

Key-message 7: Need for regional level cluster coordination

Key-message 8: A shelter guideline specifically for decision makers

Key-message 9: The awareness on 'inclusive design' needs to be raised
The affected communities being the most important stakeholder in shelter, they should be involved systematically in the design of any shelter emergency and recovery response. The importance of this, in terms of acceptance and durability of our responses, should be better understood at decision making level.

2. SHELTER MANAGERS AND OFFICERS

Most of the participants to the workshop belong to this level.

Firstly, the important capacity that already exists was highlighted:
- need assessments (including also site, nature, manpower and materials)
- indigenous technical knowledge
- implementation with involvement of the community
- though it is still inadequate, follow-up and M&E are being done

Missing knowledge that was mentioned:
- approaches to organize community participation regarding the design of the shelters
- inclusive design can be improved
- technical survey after disaster, that is disaster and area specific
- training of masons, and other construction manpower
- still some technical knowledge is deemed to lack
- minimum standards / guidelines are lacking
- inadequate study of the impact of shelter interventions
- insufficient knowledge sharing at this level
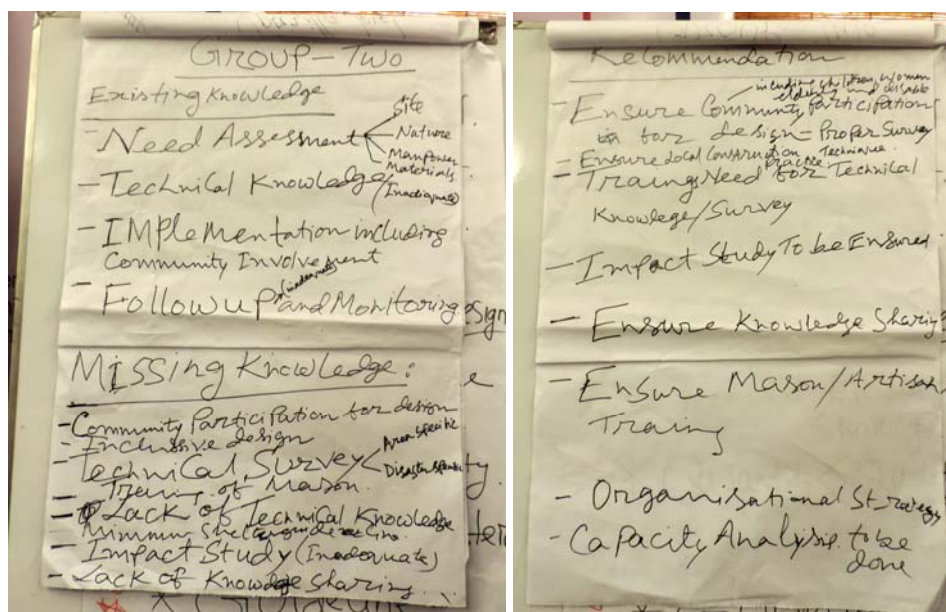
Above: workshop flipcharts

This was concluded into the following recommendations:

KEY-MESSAGES 🔑

Key-message 1: Ensure community participation
Particularly community participation in the design of shelter solutions was mentioned. Women, children, the elderly and disabled should be part of this participation.

Key-message 2: Adhere to local construction techniques
Understanding better how shelter responses can be responsive to local construction techniques was mentioned as a recommendation for future capacity building.

Key-message 3: Better technical survey
Training on technical surveys of the exact damage to houses is deemed necessary. The survey should both be disaster and area adapted.

Key-message 4: Impact studies
Improved and more systematic study of impact of shelter interventions is needed.

Key-message 5: Ensure knowledge sharing

Key-message 6: Ensure mason/ artisan training

Key-message 7: Organizational strategies for sheltering
Organizational strategies regarding sheltering would give shelter managers and officers more direction and guidance.

Key-message 8: Capacity analysis
The actual capacity that is available for shelter responses should be understood better, and remedied or completed as necessary.

Key-message 9: Monitoring
Besides follow-up after the completion of a shelter project, also the monitoring during the implementation, including site supervision, can be improved.

3. REGIONAL AND LOCAL LEVEL: UNION/ UPAZILLA /ZILLA

This group started by mentioning the various bodies on Upazilla level that are involved in disaster response. Related to sheltering a general conceptual understanding was mentioned, the D-form used for damage analysis and the presence of the Information Centre and the Union Disaster Management Committee (UDMC).

In terms of what is missing at Upazilla level, the following was mentioned:
- Technical knowledge on sheltering
- Identification of the most vulnerable groups and areas in the Upazilla
- Resource mobilization plans and strategies
- Coordination
- Prepositioning of emergency response stock
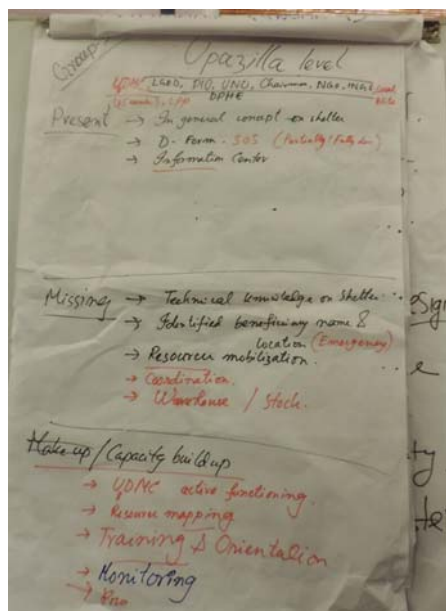
Above: workshop flipcharts

The subsequently developed recommendations are:

KEY-MESSAGES

Key-message 1: Active functioning of UDMC
Strengthening of the UDMC's was mentioned as one of the main needs. Some technical training and orientation should be provided to the correct persons within. Also in the area of monitoring, capacity can be increased.

Key-message 2: Identified beneficiaries and location
The local level is ideally placed to inform about the vulnerability of specific groups and areas in their territory. This prior knowledge should be mobilized better immediately after disaster, in order to improve the emergency response.

Key-message 3: Resource mapping
At upazilla level there should be a better understanding, related to sheltering, about the resources that are available.

Key-message 4: Technical training
Technical shelter knowledge should be included into the package of support to communities.

4. COMMUNITIES

The last group discussed the capacity building needs at community level.

As existing, the following was mentioned:
Positive are:
-   knowledge of traditional materials, technology and skills
-   people are quite capable of making shelters with local materials
-   a great motivation to learn and innovate, good capacity and resource management
Negative is:
-   technical awareness is limited
-   the poverty and the mindset sometimes makes it difficult to implement knowledge building
-   lack of awareness on inclusive approaches and shelter design
-   access to information is limited
-   confusion because of the variety of approaches by a variety of agencies
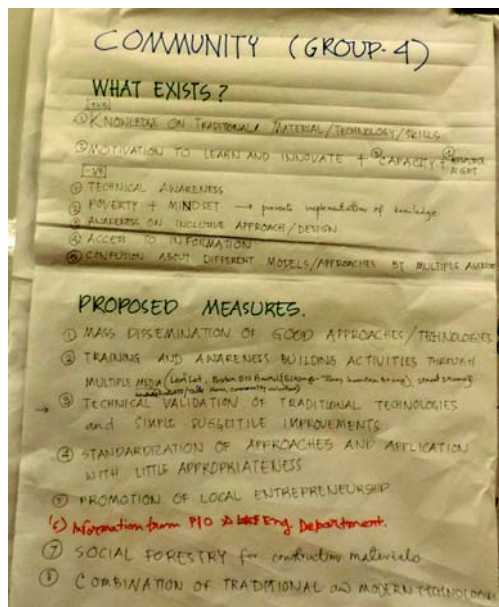
Above: workshop flipcharts

The proposed recommendations are:

KEY-MESSAGES

Key-message 1: Mass dissemination of good approaches and technologies
Communities should be made more aware of good practices in housing construction, repair and reinforcement.

Key-message 2: Training and awareness building activities through multiple media

Some media mentioned are leaflets, posters, community volunteers, songs, TV shows ea.

Key-message 3: Technical validation of traditional building techniques and simple suggestive improvements
This needs to happen at the community level, but is to be developed by shelter managers and officers. In fact, it was mentioned on that level as well.

Key-message 4: Standardization of approaches
A better standardization and adaptation to the context of approaches can reduce the confusion within communities. This is in essence a responsibility of the other three levels, but needs to be consulted on with the communities.

Key-message 5: Promotion of local entrepreneurship
Shelter projects are always opportunities to strengthen the local economy, and promote local entrepreneurship. The importance of livelihoods activities to ensure decent sheltering was mentioned.

Key-message 6: Information from engineering department
Their knowledge should be shared with communities as well.

Key-message 7: Social forestry
Social forestry should be stimulated more as it can be a good source for construction materials.

Key-message 8: Combination of traditional and innovative techniques
Though traditional construction practices are often very pertinent, innovative techniques need to be introduced to address some specific technical challenges, and deal with new typologies and lack of resources.

4.11 Roles and Responsibilities

This was not an explicit topic addressed in the workshop. Two useful key-messages were however formulated in the discussion moments.

KEY-MESSAGES

Key-message 1: Clear messages for donors
Sometimes implementing agencies are pushed towards certain responses by donors, as a condition to obtain funding. The donors are not necessarily well informed by the context and may push towards less desirable solutions. This puts implementing agencies in a difficult position, even to the extent that they offer different shelter solutions in different areas with the only reason being the conditional funding.

To counter this, stronger shared messages should be formulated regarding desirable responses. These can be used to inform the donors and sensitize them about desirable shelter responses. Both the Government and the Shelter Cluster are seen as bodies that can take this up.

Key-message 2: The voice of the affected communities needs to be heard
Similarly, it was mentioned that coordinating bodies, such as the shelter cluster, are also responsible to ensure that the concerns of the affected communities are well enough included into shelter responses.

PART 5: REFERENCE RESOURCES

Because previous experiences and already built up shelter knowledge in Bangladesh is so essential to develop good shelter approaches for the future, it is justified to dedicate a separate part of this report to reference resources.

There is a great variety in reference resources that are relevant to develop shelter strategies.

1. EVALUATIONS OF SHELTERING IN BANGLADESH AND RESEARCH

These documents have as ambition to look critically into implemented sheltering in Bangladesh; they are an excellent resource to inform future policy. Some examples:

> POST-CYCLONE SIDR FAMILY SHELTER CONSTRUCTION IN BANGLADESH, DOCUMENTATION OF PLANS AND PROCESSES, Shelter Working Group, Bangladesh, 2007-2009

> SHELTER PROGRAMMING RECOMMENDATIONS, Cyclone Sidr Shelter Cluster, Dhaka, Bangladesh, 2008

Also scientific research can inform sheltering. Some examples are the more engineering work done by BUET and Housing for Hazards, or the more applied research conducted by Caritas in collaboration with the research institute Craterre that was presented during the workshop.

2. SHELTER PROJECTS IMPLEMENTED BY VARIOUS ORGANIZATIONS

Not many organizations publish documentation of their implemented shelter projects. Still, every time an organization implements shelter is a learning moment that can inform shelter policy. In Bangladesh, over the last decades, probably more than 100.000 families have received extensive recovery sheltering support. There is thus a massive body of actually implemented shelters that can serve as a starting point to learn from.

This reasoning formed the basis to conduct the 'shelter solutions' work IFRC SRU undertook in Bangladesh. A series of inhabited shelters, as they were used and lived in at the time, were taken as starting point to develop technical shelter knowledge:

> SHELTER SOLUTIONS BANGLADESH – 17 SHELTERS, IFRC SRU, Luxembourg, 2013.
> SHELTER SOLUTIONS BANGLADESH – REPORT, IFRC SRU, Luxembourg, 2013.

3. TECHNICAL RESOURCES FOR DIFFERENT TECHNIQUES AND MATERIALS

There is a difference between sheltering and general housing construction outside the urgency of disaster. Not all construction handbooks thus are very valuable for sheltering responses. Still, there are more technically oriented manuals and guidelines available that specifically address sheltering. Also construction manuals dealing with Low Cost Housing can be useful for sheltering.

There is one publication that deserves special mention, and that is:

> HANDBOOK ON DESIGN AND CONSTRUCTION OF HOUSING FOR FLOODPRONE AREAS OF BANGLADESH, Dr. K. Iftekhar Ahmed, ADPC, Bangkok, Jan 2005

It is a very accessible and practical construction guideline specifically addressing low cost housing in flood prone areas in Bangladesh.

Out of the discussions during the workshop came up that the Bangladesh National Building Code (BNBC) could be useful for certain parts of sheltering. The main example mentioned were foundations for core and permanent housing: these could be aligned with BNBC.

4. NATIONAL GUIDELINES ON SHELTERING

These do not exist yet for Bangladesh, but various departments of the Government are working on aspects of sheltering or related to sheltering such as social housing development, introduction of new technologies, development of alternative housing models for urbanising contexts and populations ea. Some of this work was presented in the workshop.

Also, after cyclone Sidr, a guideline was published to give direction to recovery sheltering:

> CONSTRUCTION OF SIDR CORE SHELTERS, MINIMUM STANDARDS, Government of Bangladesh, Bangladesh, 2008.

Besides that, the overarching DM policies and practices developed and documented by the Government can also be informative and give direction to the development of national guidelines on sheltering.

5. INTERNATIONAL GUIDELINES ON SHELTERING

Many international NGO's, UN Agencies and other disaster response actors have published and/or supported the publication of shelter approaches and policies. These support the development of best practices within an organization or attempt to set standards for best practices and policy globally.

Many of these publications aren't tools to use immediately after disaster, as they are too complex for that. Rather, they can support capacity building, policy and strategy development prior to disaster, or in the later stages of the disaster response. Some are more hands-on, but still require some study before they can be applied:

> SELECTING NFIs FOR SHELTER, IASC, Shelter Centre, 2008. provides information on selection of appropriate NFI's, includes guidance notes and case studies

> www.sheltercasestudies.org: contains well-documented implemented shelter projects across the world

> PASSA: Participatory Approach to Safe Shelter Awareness, IFRC and BRC
> http://www.youtube.com/watch?v=ivC9Dr-FXyE

Another obstacle to make these publications immediately operational after disaster is that they are not adapted to the context. Part of that context is known to us, though the particular disaster (the impact, the exact location, the available resources etc) will remain unknown until the disaster happens.

6. PLATFORMS FOR RESOURCE SHARING

The first, most hands-on platforms for resource sharing are informal, through networks of people active in sheltering. This can be enabled by the shelter cluster meetings or this workshop for example.

The Bangladesh Disaster Knowledge Network doesn't have a section dedicated to sheltering yet. Depending on how it is managed, this is an option to look into.

The Shelter Cluster website, and the section for Bangladesh, does already contain some relevant reference resources. Its offer could be massively expanded though. The HTTC platform was mentioned as well as an important resource.

For both international and context specific resource sharing, the Shelter Centre library is probably globally the most prominent.

7. OTHER REFERENCE RESOURCES

A more complete list of reference resources used in this workshop is available in annex.

However, the total body of materials available on or useful for Bangladesh is far larger. During the workshop for example, many of the participants contributed documentation of their implemented shelter projects. Some of this documentation was not yet looked into with the aim to inform future shelter strategies.

There is also a large body of international knowledge on sheltering that could further inform shelter responses in Bangladesh. Specifically to this workshop it is worth to mention technical guidelines for certain materials and construction techniques that are also applicable to Bangladesh. For example, extensive work on earth construction has been done in certain regions of Africa. Also for construction with Bamboo, some other Asian countries can offer expertise that could be useful for Bangladesh.

PART 6: RECOMMENDATIONS: TOWARDS NATIONAL SHELTER STRATEGIES

6.1 Recommendations

1. TECHNICAL RECOMMENDATIONS

The technical recommendations are captured under Part 4 and address the following issues: concepts of sheltering (introduction of a terminology: emergency, core, permanent shelter and shelter for uncertain sites), emergency shelter, recovery shelter, site organization, construction guidelines, construction best practices, foundations, superstructure, model designs, training and awareness raising and roles and responsibilities.

These recommendations are formulated out of the collective experience from the participants to the workshop. They give a clear direction about how sheltering in Bangladesh could be done and form an excellent starting point to draft up national shelter strategies.

2. RECOMMENDATIONS FOR FURTHER DEVELOPMENT

The workshop was by all participants appreciated as a very good initiative. It was felt that this event outside of disaster times could substantially improve the readiness for future shelter responses. It was also clear to all that a massive amount of experience has already been built up in Bangladesh that should be consolidated into better approaches for the future. The sharing of experiences among participants was particularly appreciated as helpful, in the knowledge bazaar and during the group work, and is hoped to be continued.

All participants agreed that the discussion and experience sharing in the workshop should be followed up on, possibly in the development of national strategies for shelter in Bangladesh.

What is important to mention is that this initiative, of developing national shelter strategies in this manner, is quite unique. Never before, to our knowledge, has such a comprehensive shelter capacity building and consolidation process, based on already available experience and expertise, with all relevant stakeholders included, been done. It can be an exemplary approach for other countries that face recurrent disaster.

On the last day of the workshop, out of the discussions of the previous days, the following recommendations were formulated in terms of the next steps:

STEP 1: NATIONAL CONSULTATION

All relevant departments and ministries are consulted to discuss the technical recommendations formulated in the workshop and the proposed steps forward in the development of national shelter strategies.

STEP 2: VULNERABILITY MAPPING

The areas in the country most vulnerable to disasters impacting on sheltering are mapped. The hazard profile is taken into account and the vulnerability of the local construction practices. A last crucial element is the mapping of communal infrastructures that protect the living environment. At District or Upazilla level, the areas with extreme exposure and vulnerability to disasters, in terms of sheltering, are identified and documented.

This could form an explicit part of the vulnerability and capacity mapping process that is currently being embarked upon by the Government.

On top of the technical vulnerability of certain areas and housing types, the specific vulnerability to sub-standard sheltering of some groups is conceptualized and translated in a clear framework. Groups to mention are people with physical and mental disabilities, illness, the extremely poor, the socially marginalized, the elderly and young children.

STEP 3: CAPACITY MAPPING

In parallel to vulnerability, also capacity to respond to disasters with a major impact on sheltering is mapped on District or Upazilla level. This capacity includes, but is not limited to, indigenous construction knowledge, construction skills, man power, locally available materials, transportation options, storage, production of construction materials, level of awareness regarding safe building techniques, communal infrastructure building and repair capacity, organizations with shelter experience active in the area, experience in previous disaster responses ea.

Also this could form an explicit part of the vulnerability and capacity mapping process that is currently being embarked upon by the Government.

STEP 4: EXPERT REVIEW AND CONSULTATION OF BEST PRACTICES

Previously implemented shelter projects are systematically documented and reviewed by experts. Those practices that work best, and the context in which they work best, are withheld to inform policy. Purely technical aspects, process related issues and socio-economic and cultural aspects of living practices are to be included.

STEP 5: DEVELOPMENT OF MODEL DESIGNS

Matching the vulnerability and capacity mapping with the outcome of the expert review of implemented shelter projects leads to the identification of model designs for different regions in Bangladesh. These designs are elaborated in drawings and BoQ's and presented for comments to communities, regional and national levels. They are also discussed in the Shelter Cluster.

It was mentioned in the workshop that there should be a less technical version of the guidelines developed as well, to be shared broadly to increase the general awareness amongst the public.

STEP 6: CAPACITY BUILDING ACTION PLAN

Combining the outcome of the workshop regarding training and awareness needs with the vulnerability and capacity mapping, the final needs for capacity building in sheltering are identified. A multi-year action plan is developed to respond to these needs.

6.2 Outline of Action Plan

To realize these recommendations, some time and resources are of course needed. A rough indication is presented below. This was not discussed in detail in the workshop, but was developed by the organizing partners Friendship and IFRC SRU after the workshop.

1. TIMING

The bulk of the work, from national consultation to the development of a capacity building action plan, could be done in 8 months. The overall process, from preparation of the national consultation to the final publication of the end-results, would require closer to 14 months. Most time consuming is a multi-level consultation after the completion of steps 1 to 6. This is however a very important step, as it can ensure the wide acceptance and viability of the shelter strategies.

Required months

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14
preparation national consultation	■	■												
1. national consultation			■											
2. vulnerability mapping				■	■	■								
3. capacity mapping				■	■									
4. expert review of best practices					■	■	■	■						
5. development of model designs						■	■	■	■					
6. capacity building action plan								■	■	■				
consolidation of results			■	■	■	■	■	■	■	■	■			
presentation, consultation												■	■	
final publication														■

2. ROLES

A type of **'steering committee'** overseeing and guiding the entire process is to be composed out of representatives of the most important stakeholders. These include the responsible government department, other relevant departments, representation of shelter cluster members (local NGO, national NGO, international NGO, RCRC Movement and UN), representation of shelter research institutions and others as deemed necessary.

This steering committee should appoint an **'executive body'**. This executive body should be smaller and responsible for the coordination and execution of all the different steps of the process. It should have the capacity to identify, engage and guide the different resources responsible for executing parts of the process, particularly steps 1 to 6. This means that this executive body has to have:
- leadership qualities in the sense of vision development and communication
- management qualities: matching human resources with objectives, funds and project approaches
- a thorough understanding of the workings of the government of Bangladesh
- a thorough understanding of international and local sheltering
- the more 'soft' understanding, related to the socio-economic dynamics of Bangladesh's society in different regions, and household level vulnerabilities and capacities
- redaction/ work capacity to complete, translate, consolidate intermediate results

Because of the big ambition of this project, it would be best that the members of this executive body can rely on some internal support within the organization in which they are employed.

Steps 1 to 6 all require specific additional expertise. For each step alternative set-ups are possible, but a rough example for each step is given below:

Step 1: national consultation
The executive body may not require any additional capacity for this step, depending on the actual composition of the executive body.

Steps 2 and 3: vulnerability and capacity mapping
It may be necessary to include into the already identified team two supplementary areas of expertise:
- o in the area of **regional spatial planning**: knowledge of territorial development, to identify coherent spatial conditions, with a similar exposure and vulnerability profile, that can be tackled with a similar approach to sheltering.
- o In the area of **extreme, and specific, vulnerability**: develop a framework for how to indentify and deal with specific vulnerabilities (extreme poverty, disabilities etc)

Step 4: Expert review of best practices
The executive body could appoint or compose a dedicated group of experts that collects and reviews implemented shelter projects. This group should have knowledge about the technical aspects of sheltering, as well as the process of sheltering and cultural implications that are important in sheltering. **Shelter and settlements knowledge is thus needed, architect / engineer / urban planning expertise, and more anthropological knowledge about living practices**. Supplementary, a goal-oriented and practical attitude is crucial.

Step 5: Development of model designs
This could in principle be done by the same group that does step 4. But, alternative set-ups are possible.

Step 6: Capacity building action plan
Since this is very linked to existing structures of government and organizations at different levels, it is important that the executive body is very well informed about that. Supplementary **expertise in training / capacity building, or even organizational development**, may be necessary.

The executive body is thus responsible to coordinate the execution of steps 1 to 6. What is extremely important is that the executive body functions as well as a back-up, a problem-stopper. Once the process is started, there will be critical moments or aspects that are overlooked, or more complex than initially estimated. It is the responsibility of the executive body to identify such aspects in a timely manner and propose solutions.

The executive body is also responsible to bring the process to a good end. It is responsible for the final consolidation of results, the consultation process and final publication.

The steering committee is responsible to oversee the executive body. At a regular basis, the executive body should report back to the steering committee about the progress achieved. Problematic aspects are presented to the steering committee by the executive body, it is up to the steering committee to re-address the process or approve solutions following the reporting of the executive body.

3. FUNDS

The largest cost will inevitably be in human resources. As the development of shelter guidelines is the consolidation of a very vast body of experiences, and thus quite a big intellectual challenge, investment in the right skills at the right steps in the process is justified. This is also thanks to the massive experience in sheltering in Bangladesh that already exists: there is no real need to test model designs in the field anymore for example, so that type of expense is no longer necessary.

Depending on how many resources are already available and can be delegated to certain roles, the human resource cost can possibly be reduced. However, because the overall commitment in terms of ambition and involvement of stakeholders is quite large, it is worth while to invest in appropriate and dedicated staff.

Working means will mostly be related to travel. The vulnerability and capacity mapping, the review of best practices and the consultation at the end of the process, all require travel. All regions of Bangladesh are to be included, so travel could become a substantial cost. This can be countered, partially, by a good work division and sensible team set-up for these steps. If organized well, a lot of the work can be done locally.

Other costs will be minimal, because this is a primarily intellectual work. More than some computers and provisions for meetings are not deemed necessary.

One way of looking at the funds, is to compare the cost of the development of shelter strategies with the total amount of funds spent on sheltering in the last ten years. The shelter quality improvement and more efficient use of time and resources in future responses that can be obtained with this process in the next ten years, at least, could justify the investment.