

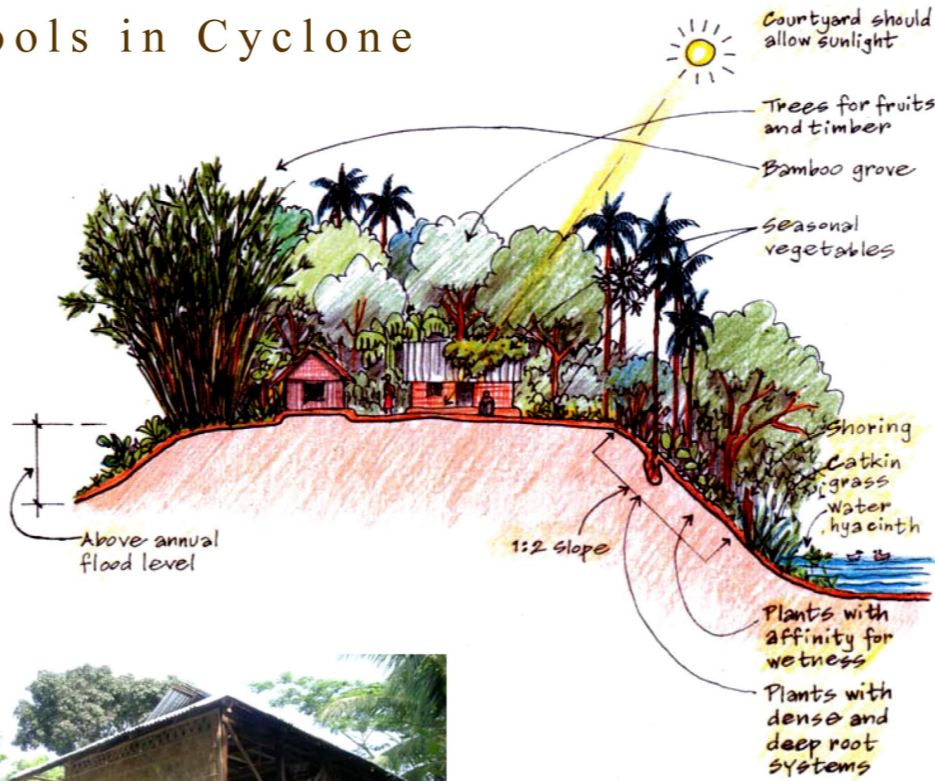
Buildings in Cyclone Prone Area

Various villages in Shubarnachar
Noakhali, Bangladesh

Architects	BRAC University, Department of Architecture Dhaka, Bangladesh
Clients	International Union for Conservation of Nature Dhaka, Bangladesh
Commission	2007
Design	2007
Construction	2008 - 2009
Occupancy	2008
Site	3,500 m²
Ground floor	100 m²
Total floor	220 m²
Costs	5,242 USD
Programme	This participatory project conceived by the department of Architecture at BRAC University in Dhaka recommends “Building for Safety” options for existing century-old typologies of rural housing instead of designing a prototype model house.

Building Stronger Houses and Schools in Cyclone Prone Areas of Bangladesh

This participatory action research project has been carried out by the Department of Architecture / PPDM, BRAC University under a project of IUCN Bangladesh. Instead of designing a proto-typical model house to be indiscriminately replicated without paying heed to context, it was conceived here to recommend ‘Building-for-Safety (BFS) Options’ to the existing century-old typologies of rural houses. These are modest technological innovations that would contribute towards improving the performance of existing house types by strengthening or improving parts of the house, which are particularly weak and vulnerable in the local climate. Because of the coastal location, houses need to be built to withstand strong wind. Perhaps the nature of rural housing would not permit it to withstand a severe cyclone, but strengthening the house structure would at least provide resistance to the frequent strong winds and storms and allow easier recovery. Need for training village-level house building specialists for replicating, disseminating and sustaining within the community new construction methods that were introduced.

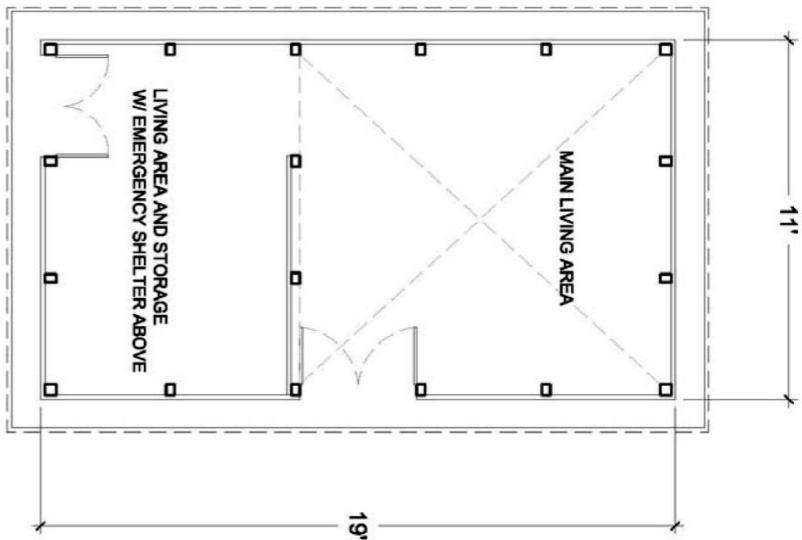
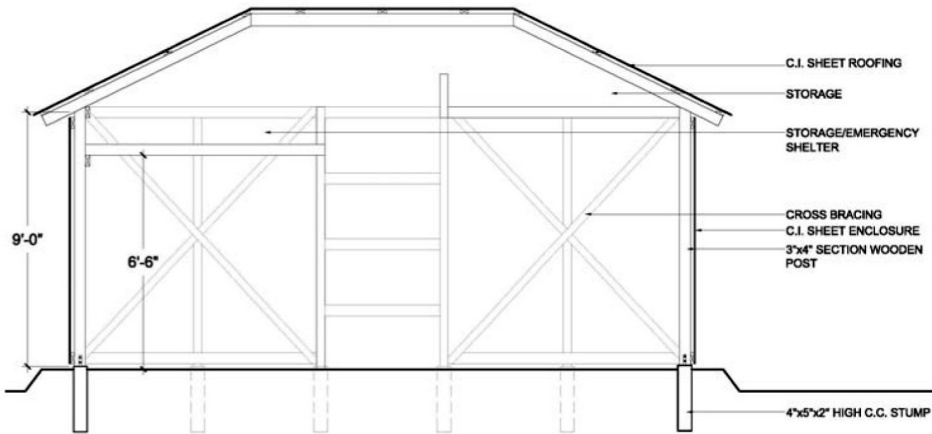


Want to build appropriate houses in rural areas of Bangladesh?

Visit the place first.
Invite local builders and facilitate a ‘design workshop’ with all.
Build trust, discuss about trust.
Trust all.
Provide them the support you can.
Let them build the first building in their places by themselves.
Several ‘first building’ in several places by several groups.

Visit those buildings with local builders.
Invite them again and facilitate another workshop on the reflection of the work.

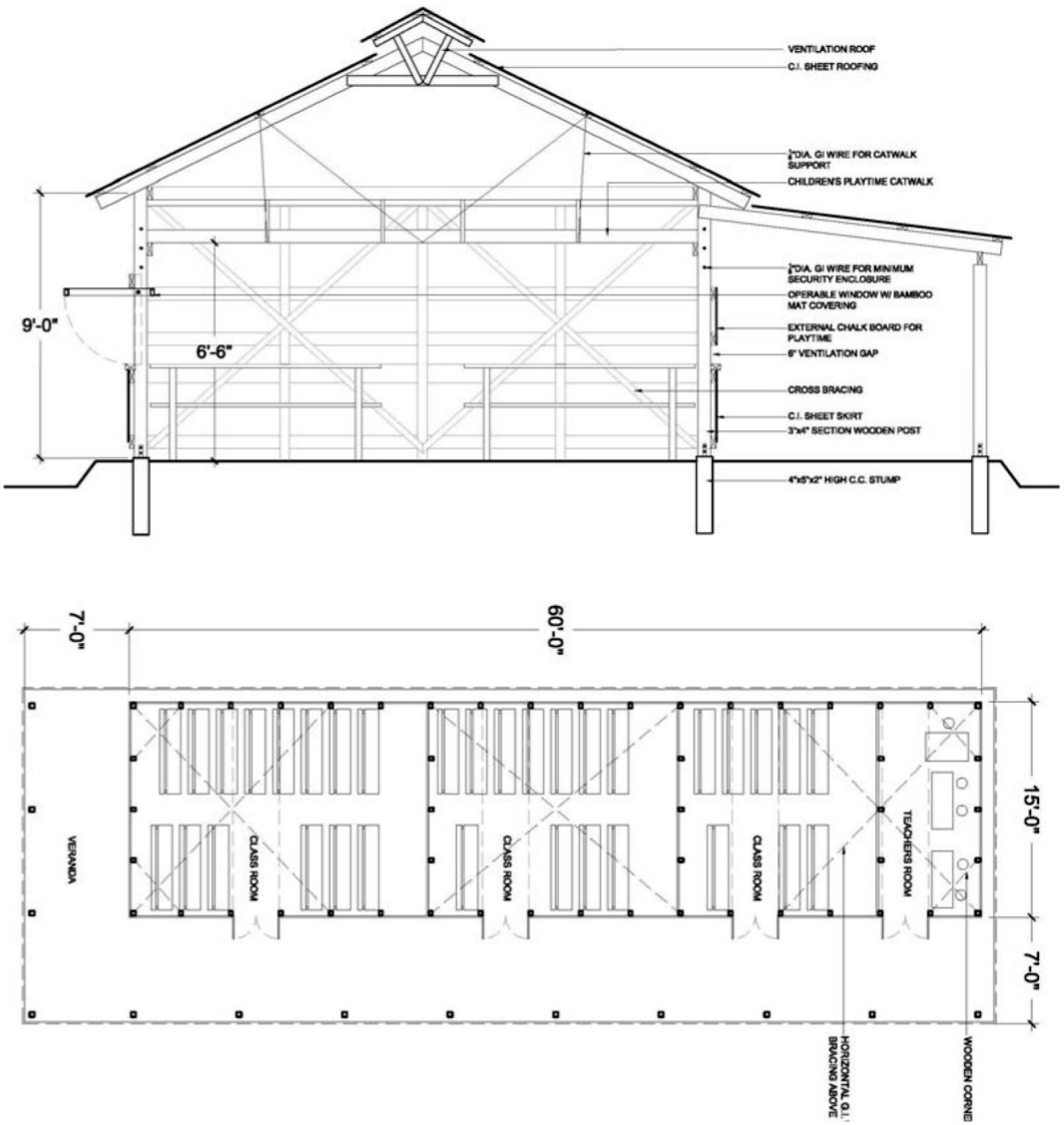
Then facilitate them to build hundreds of buildings by themselves.



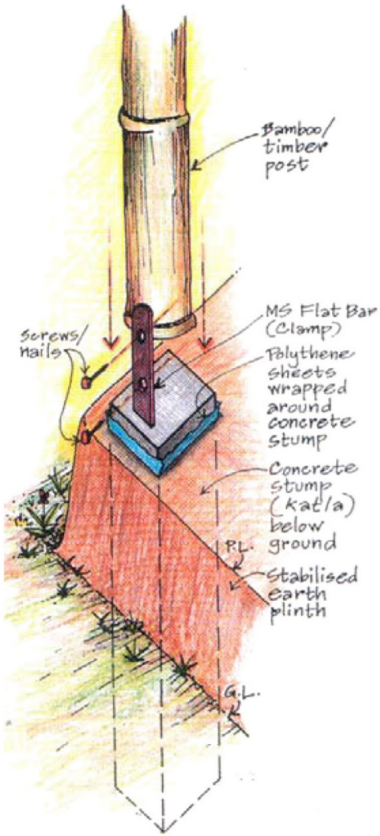
Section and plan of the demostration house. The other houses constructed by the local design and construction team were different in size respecting the need of users. Some owners added verandah with thier houses.

Kids and locals are creating “their school”

The project is more about a process than a product. It is an attempt to involve architects, the local community and builders to add to each other’s knowledge towards building safer and stronger house with available technology. The result if not totally cyclone resistant, structures are strong enough to withstand high winds and in the event of a strong cyclone, easy to reconstruct. It is encouraging to think, that if such a process were to be replicated across the entire country, a safer, stronger and resilient Bangladesh would emerge.



Cemenet-stabilized plinth construction process.



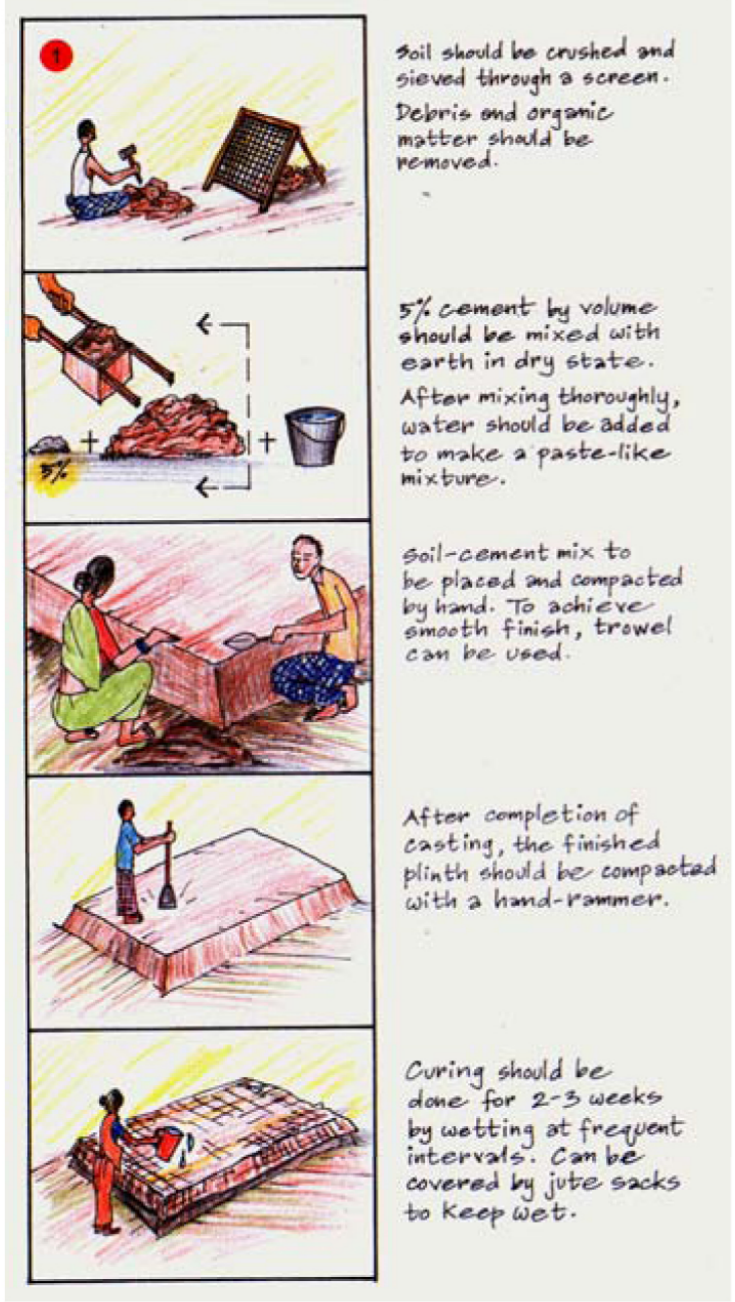
Concrete stump under wooden or bamboo post to protect them from dampness and insect attack.



Section and plan of the demonstration house. The other houses constructed by the local design and construction team were different in size respecting the need of users. Some owners added verandah with thier houses.

Steps		Objectives	Methodologies	Actors	Activities
1	Initial study	To enhance local adaptation to climate change in Noakhali through improvement of housing	Partnership with local development NGO; Support through adequate consultancy services	IUCN Bangladesh	Finding appropriate consultant; Agreement with the Department of Architecture, BRAC University
2	Study	To be familiar with the locality and its problems	Literature survey; Field visit; Observation; Measured drawings; Focus Group Discussions (FGD); Interviews	Multidisciplinary team from BRAC University and local development NGO	Documentation of settlement patterns, house types, local construction techniques, construction materials, cost of construction, impact of disaster on houses Building rapport with local communities and development NGO Tentative planning for subsequent steps in consultation with local stakeholders
3	Initial design	To develop potential Building-For-Safety (BFS) options	Analysis of step 2 (study)	Multidisciplinary team from BRAC University	Development of design options Development of BFS options Development of tentative budget for construction Development of implementation strategy
4	Design workshop	To develop appropriate BFS options for the place	Focus Group Discussions (FGD); Focus Group Drawings and Discussions (FGDD); Site visit and interviews	Local builders, prospective participants/beneficiaries, multidisciplinary team from BRAC University and local development NGO	Finalizing design options to be implemented Reviewing and developing BFS options to be implemented Finalizing tentative budget and time of construction Site visit and observation of prospective sites and discussion with communities about demonstration houses and extent of participation of each party
5	Design and implementation	To construct one demonstration house using appropriate BFS options	Focus Group Drawing and Discussions (FGDD); Construction Trial and Errors; Both-way training	Local builders, prospective participants/beneficiaries, multidisciplinary team from BRAC University and local development NGO	Collecting information about the site Dismantling and clearing site as required Preparing inventory of building materials which can be recycled Finalizing design with the participant household Making sure of active participation by the household including decision making and contribution of labor and available resources Agreeing about each party's responsibilities Finalizing the time frame of construction, strategy of material procurement and builders to be involved Initiate the construction Documentation of construction Discussion about strengths and weaknesses of the demonstration house
6	Transition/ Exit Strategy	To make local people independent from external consultants	Absence of multidisciplinary team from BRAC University	Local builders, prospective participants/beneficiaries, local people	Construction of two more houses and strengthening of three existing weaker houses replicating the activities of step 5 (design and implementation)
7	Dissemination	To make the gained knowledge base available locally, nationally and internationally	Publication (both in Bangla and in English) Seminar (local and national level) Assisting people to make use of the knowledge in practice.	IUCN Bangladesh Local builders, participants/beneficiaries, multidisciplinary team from BRAC University, local development NGO and other organizations.	The local builders who were involved in different levels played the most important role for dissemination of the idea across the region. Other development organizations which were interested in housing took the idea and constructed more than 300 houses in the region. The knowledge base gained from the process became a resource for teaching in universities, sharing in other regions of the country and other countries in the world.

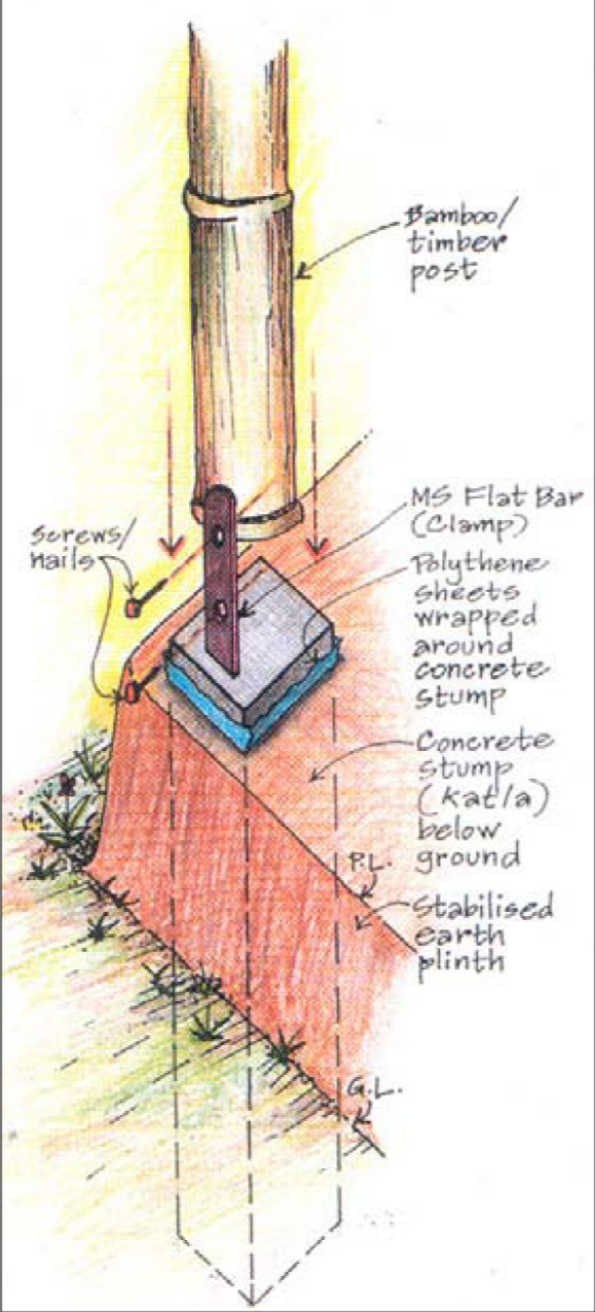
Building Stronger Houses step-by-step



Cement-stabilized plinth construction process



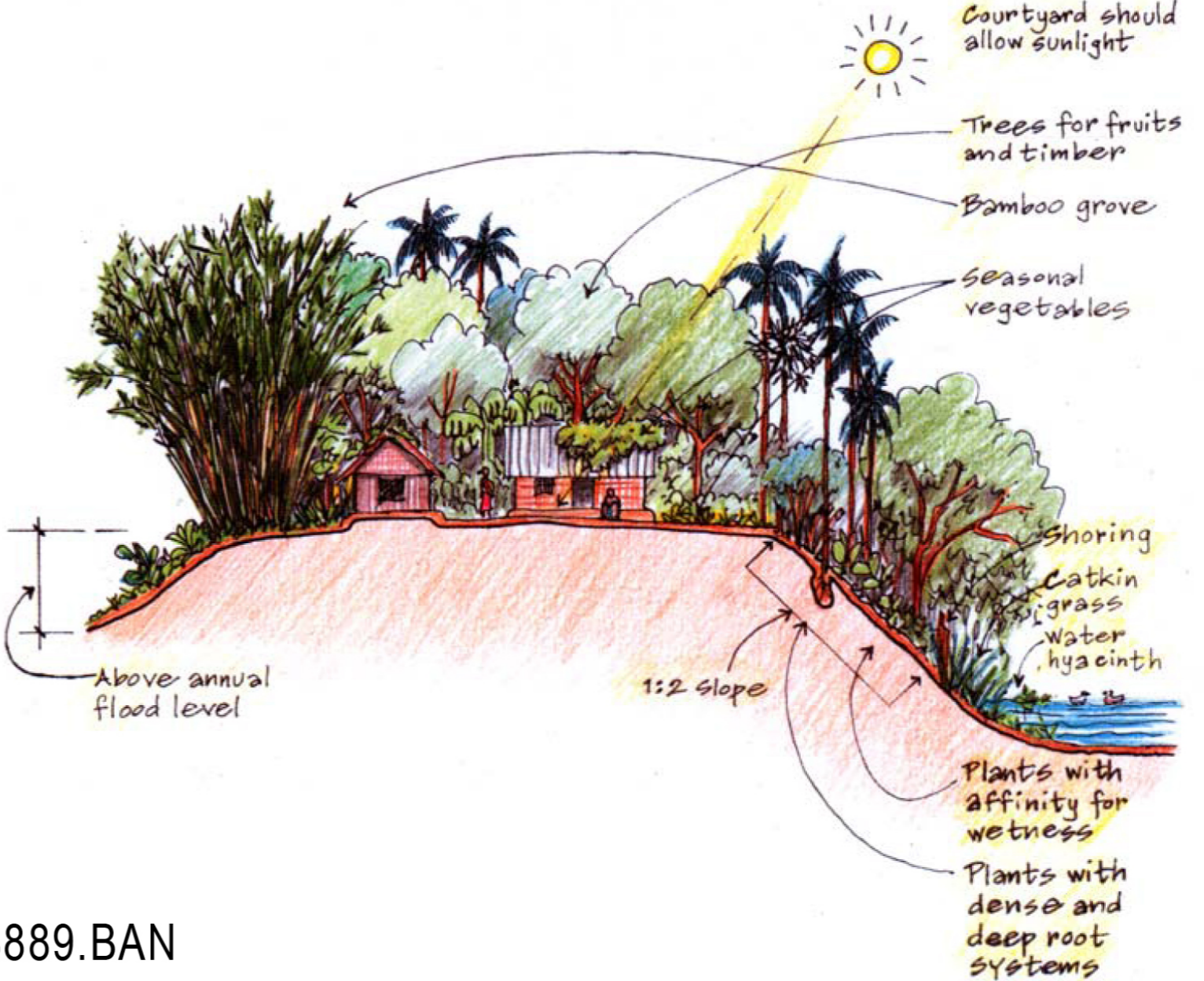
Workshop in Charbata with local builders and user groups



Concrete stump under wooden or bamboo post to protect them from dampness and insect attack



Dismantling existing house and recycling materials as much as possible



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Landscaping criteria for rural homesteads



Ramming is important for earthen plinth



Procuring good quality wood is necessary for safer houses



Trial tests of cement-stabilized local soil for durable and stronger plinth



Making of concrete stump for damp-proofing base of wooden posts



Horizontal and vertical cross-bracings make houses stronger



Erection of structure of house



Construction of platform above 6.5 feet level (if possible, with recycled wood from the existing house)



Active participation of family members during building cement-stabilized mud plinth



Recycling materials for enclosing indoor space



Freedom to build own houses heightens aesthetic sensitivities and brings diversity

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Note: Cost of demonstration house (19'x11" in plan with 16 wooden posts) is not more than Tk 60,000 (US\$ 850). It includes everything except the walling materials. Individual owners of houses will provide walling materials. The idea is to emphasize safer structure against disaster in traditional housing and to also promote the diversity of individual owner's needs and aspirations. Unity will be achieved through safer building options and diversity will be achieved through owners' participation at all levels. **Cost of strengthening a house is not more than Tk 10,000 (US\$140).**

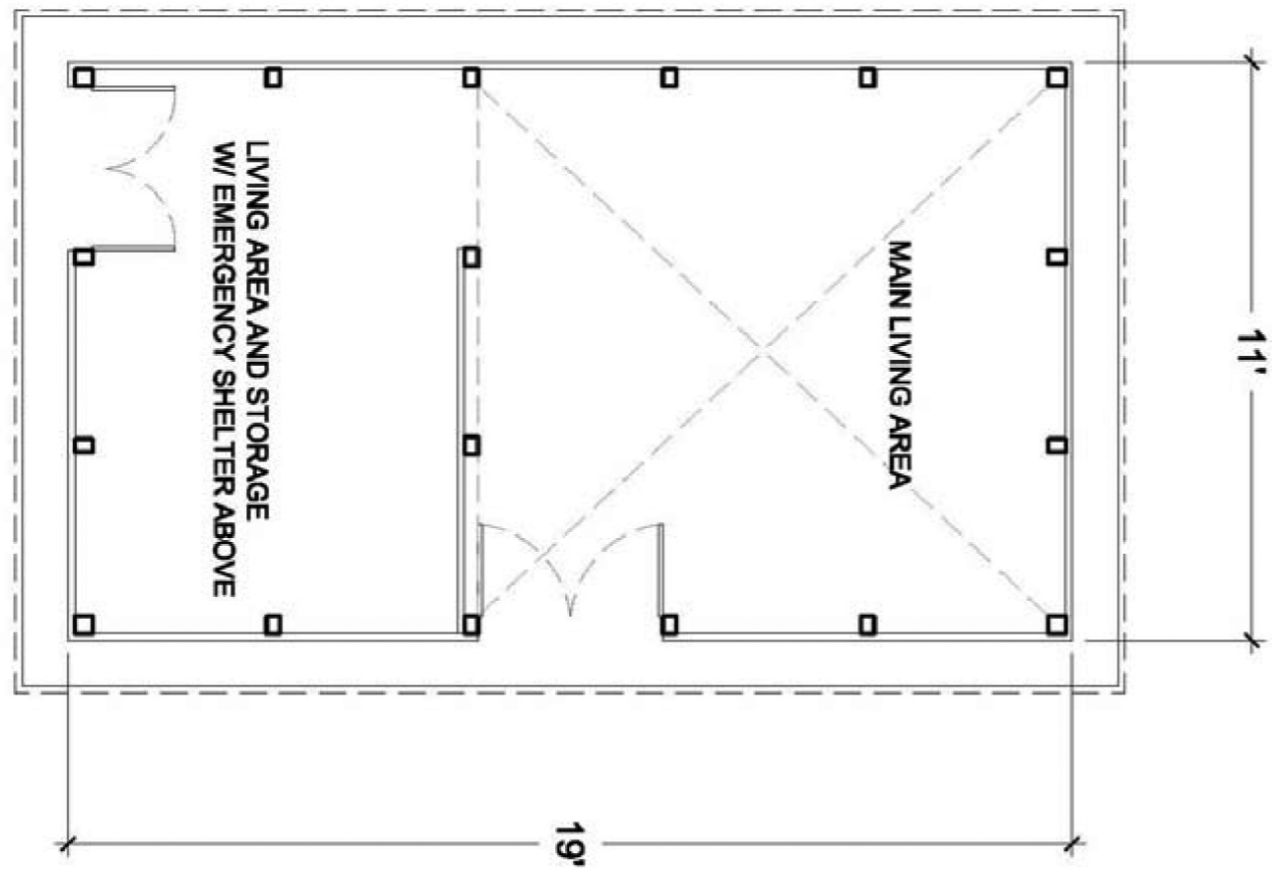


Fig. 4.1 Plan of the demonstration house. The other houses constructed by the local design and construction team were different in size respecting the need of users. Some owners also added verandah with their houses.

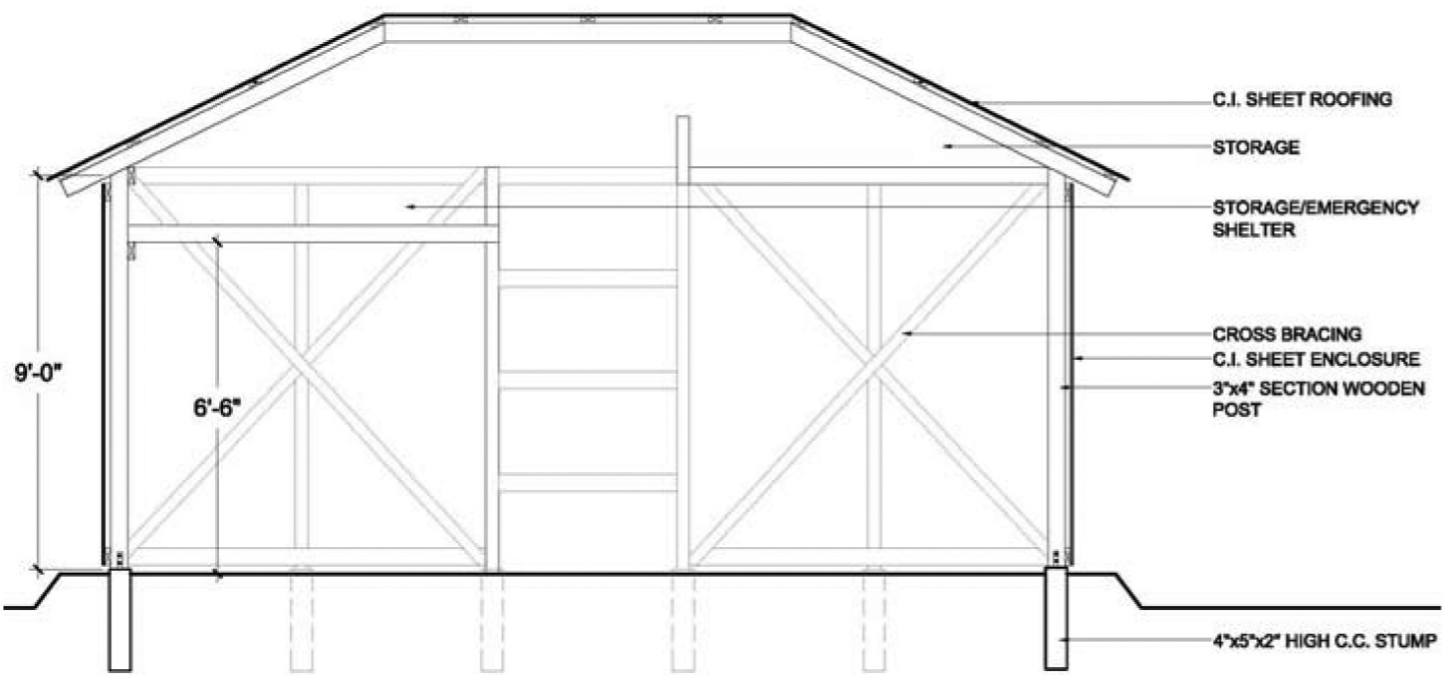


Fig. 4.2 Section of the demonstration house

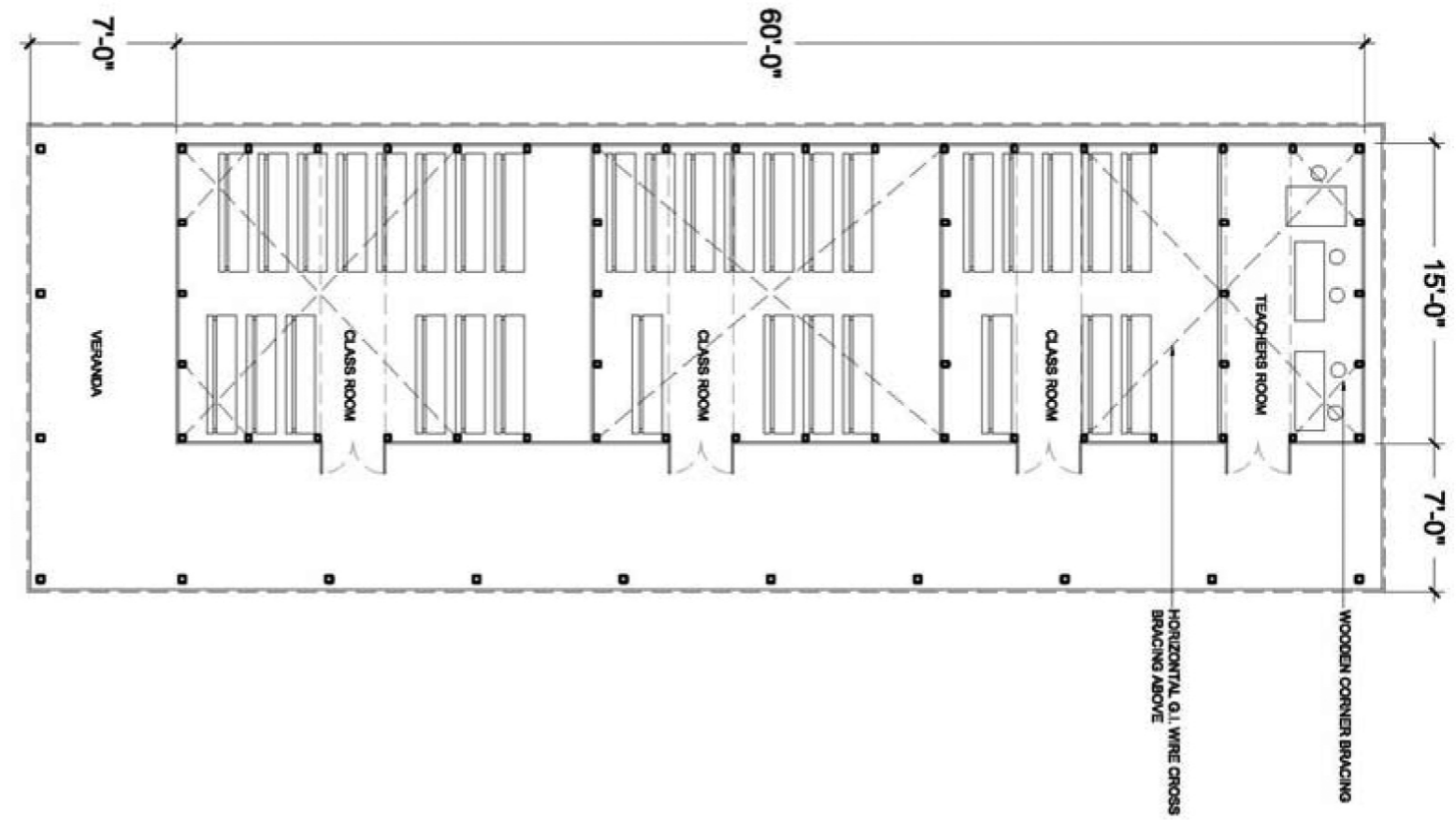


Fig. 4.3 Plan of a primary school

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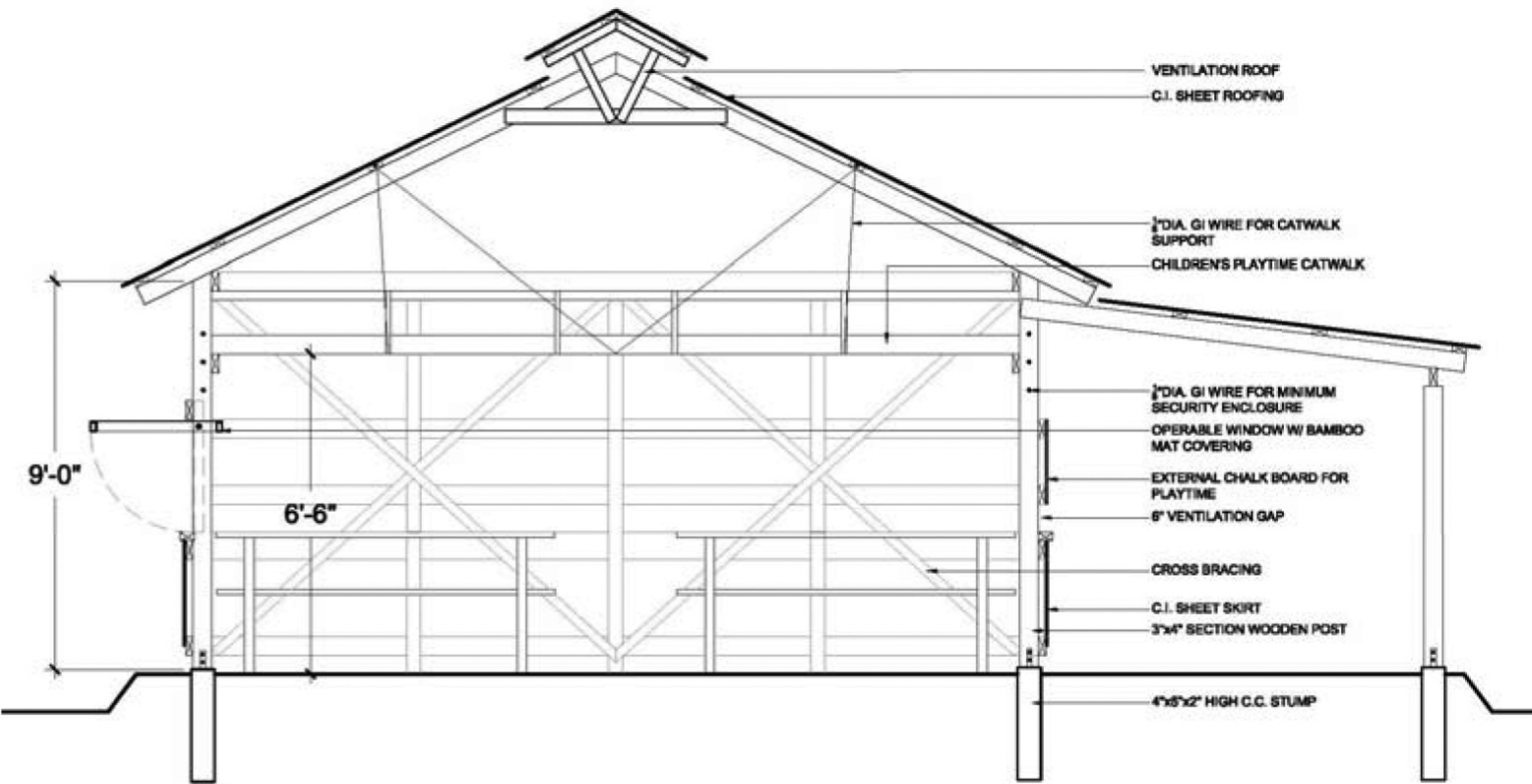


Fig. 4.1 Section of a primary school

Building Stronger Schools step-by-step 3889.BAN



Workshops and meetings for creating school construction committee and sharing responsibilities



The existing dilapidated school and the users



Preparing the site for new school building. Appropriate orientation and placement of new building in the site is very important.



Reusing the materials from old school to build the new one



Trial tests are going on for making an effective window



Trained engineer, architects and local builders are sharing the trial tests of timber joints



Screws and nails need to be used in appropriate places



Tying the edge of roof with the posts to make it stronger against wind



Ventilation roofs were constructed for venting the hot air outside



Construction of platform above 6.5 feet level and testing G.I. tension wires for structural load bearing capability.



Participatory landscaping initiative. Fruit-bearing trees were prioritized in planting scheme.



Last but not least the most important aspect of this project is the sharing of information to the next generation.



Kids are creating “their school”



“Our school”



Continuous blackboard is a surface to expresses

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Kids climb and discover their spaces



Placing buildings in right place was very important

Lessons learned in the process of the “project”

The process

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appropriate houses in rural areas of Bangladesh?

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Visit those buildings with
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on the reflection of the work.

Then facilitate them to build
hundreds of buildings
by themselves.



The toilet and the school

Participation

Participation between
architects and local builders
is not difficult. But
architects and local builders
are not going to use the space
after building. Users’ participation during
design, budget and construction is
the most important aspect
to sustain the space. If, sometimes,
participation costs more
money and time even
we must go for that.
Where everybody will say “I designed it”.
The more we take care of it
The more it becomes complex and beautiful.

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