



## Disaster Management Community



### Solution Exchange for the Disaster Management Community Consolidated Reply

*Query: Investigating Safe Construction Practices and Disaster Risk Reduction Techniques Undertaken by NGOs in Tamil Nadu – Examples; Referrals*

Compiled by G. Padmanabhan, Resource Person and Nupur Arora, Research Associate  
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From [Sarthak Kumar](#), United Nations International Strategy for Disaster Reduction, New Delhi  
Posted 25 February 2008

I work with the United Nations International Strategy for Disaster Reduction (UNISDR) based in New Delhi. Currently, I am undertaking a Provention Consortium research project on Investigating Safe Construction Practices and Disaster Risk Reduction techniques undertaken by NGOs in Tamil Nadu, India.

The objective of this initiative is to:

- Explore, analyze, and document the capacity that NGOs have accumulated for construction of shelters
- Explore the innovative building technologies employed by NGOs for disaster risk reduction
- Create an informal network of these organizations and awareness of this new cadre of organizations and their skills and recommend activities for the enhancement of their capacity and use in other disaster and non-disaster situations

For the above project, I request members of the Disaster Management Community to share:

- Innovative building technologies/safe construction practices employed by NGOs for constructing houses after the tsunami
- References of individuals/organizations involved in shelter reconstruction (especially from Chennai and Cuddalore)

Your responses will greatly help me in conduct this research project.

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**Responses were received, with thanks, from**

1. [Yedoti Narasimhaiah](#), Training and Development Centre, Hyderabad
2. [Sanjaya Bhatia](#), Asian Disaster Preparedness Centre, Bangkok, Thailand ([Response 1](#); [Response 2](#))
3. [M. Arulappa](#), Plan International, Viluppuram, Tamil Nadu

4. [Mona Chhabra Anand](#), Development Alternatives, New Delhi
5. [K. A. Benny](#), CARE India, Kanyakumari
6. [Nilanjan Sengupta](#), Forum of Scientists, Engineers and Technologists, Kolkata
7. [Abhishek Mendiratta](#), Consultant, New Delhi
8. [Alok Patnaik](#), United Nations Development Programme, Chennai
9. [F. B. Manik Shah Mazumder](#), ActionAid, Assam

*Further contributions are welcome!*

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## Summary of Responses

Responding to the query on building technologies/safe construction practices, members shared various techniques employed by NGOs to construct houses after the 2004 Tsunami.

Discussants broadly outlined six different building technologies:

- **Quarry pile foundations:** These are usually used when pile foundations are issued to avoid settlements and prevent cracks. Concrete piles are used in clay soil, which is quite costly. In Tsunami affected village of Neerodi the quarry powder pile foundation was designed. This is innovative and cost effective. This process of Quarry pile foundation is suitable for construction over filled-up land with filling of shallow depth. Also, if it is pond of depth say 3/4 meters, sand piling or debris piling are also possible.
- **Porosity:** This technique is used in order to maximize the resistance of a structure to an incoming Tsunami. Four independent linear supports perpendicular to the coast are created, to replace the uniform skin of the existing design.
- **Upgradeability:** Bamboo partitions are initially provided in-between the cores; they can be transformed and customized to meet the individual needs of residents. It also promotes the reuse of found elements.
- **Expandability:** This modular system allows the expansion of units to accommodate different household sizes.
- **Economy:** The total surface of the walls and roof are approximately the same as the existing house.
- **Low-Tech:** Walls are made of concrete blocks strengthened with rebars. The roof is made with traditional wooden elements, covered with tiles or tin, and partitions are constructed of recycled materials.

Respondents reiterated that one key aspect of safe construction techniques is the tendency to piggybacking on current or pipeline projects. For example, in [Uttar Pradesh](#) the [UNDP GoI Disaster Risk Management program](#) is leveraging on going government programme designed school buildings with seismic safety features. Moreover, in [Tamil Nadu](#), under a public-private partnership the Government is planning to build 55,000 structurally safe houses.

Overall respondents felt that various NGOs/agencies involved in the housing reconstruction have developed and adopted effective technical innovations and social processes that suite field conditions. These include appropriate building materials- in terms of availability, technology know-how, adaptability, local practices and energy efficiency. Finally, members referenced several [individuals](#) and [organizations](#) involved in shelter reconstruction in Tamil Nadu and other regions.

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## Comparative Experiences

### Uttar Pradesh

**Safe Construction for School Buildings** (from [Sanjaya Bhatia](#), Asian Disaster Preparedness Centre, Bangkok)

In order to promote safe construction practices in school buildings, UNDP under the GoI-UNDP Disaster Risk Management Programme in partnership with World Bank and the Uttar Pradesh Government designed and constructed school buildings with to better withstand seismic events. The designs were modified to include seismic safety and as a result 6,800 schools are being built with seismic safe features. Read [more](#)

### Tamil Nadu

**Constructing Safe Houses in Tsunami Affected Regions** (from [Alok Patnaik](#), United Nations Development Programme, Chennai)

Under a public-private partnership for housing reconstruction after the 2004 Tsunami, the State Tamil Nadu Government is building 55,000 structurally safe houses, work on 20,000 houses has been already initiated. Apart from this capacity development activities are also being carried out- by means of preparation of housing guidelines, training of engineers/masons and awareness creation.

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## Related Resources

### *Recommended Contacts and Experts*

**Mr. Anthonysamy, Executive Secretary, BLESS, Cuddalore** (from [Yedoti Narasimhaiah](#), Training and Development Centre, Hyderabad and [M. Arulappa](#), Plan International, Viluppuram, Tamil Nadu)

BLESS, Salakarai, Cuddalore OT, Cuddalore District, Tamil Nadu 607003; Tel: 04142-611385; [admin@bless.org](mailto:admin@bless.org)

*Has experience carrying out rehabilitation programmes with focus on housing (including safe construction techniques) in Cuddalore after the 2004 Tsunami*

**Mr. M. Subburaman , Director, Society for Community Organization and Peoples Education (SCOPE), Trichi** (from [Yedoti Narasimhaiah](#), Training and Development Centre, Hyderabad)

P/17, 6th Cross, Ahmed Colony, Ramalinga Nagar, Woraiyur, Tiruchy 620003 Kerala; Tel: 0431-2774144; <http://www.scopetrichy.com>

*Has experience conducting sanitation work in disaster prone areas and construction of ECOSAN toilets*

From [Mona Chhabra Anand](#), Development Alternatives, New Delhi

**Ms. Zeenat Niazi , Program Director, Development Alternative, New Delhi**

B-32, TARA Crescent, Quatab Institutional Area, 110016 New Delhi; Tel: 011-2680 0398; [zniazi@devalt.org](mailto:zniazi@devalt.org)

*Has done lot of habitation work in Karaikal region of Pondicherry and is an expert on new and safe construction technologies.*

**Mr. S. Patara, Chief of Eco-Building Advisory Unit, Development Alternative, New Delhi**

B-32, TARA Crescent, Quatab Institutional Area, 110016; [spatara@devalt.org](mailto:spatara@devalt.org)

*Has done lot of habitation work in Karaikal region of Pondicherry. and is an expert on new and safe construction technologies.*

**Ms. R. Kunke, Architecture and Development, Tamil Nadu**

[radha@archidev.org](mailto:radha@archidev.org); [http://www.archidev.org/rubrique.php?id\\_rubrique=197](http://www.archidev.org/rubrique.php?id_rubrique=197)

*Works on sustainable reconstruction and carried out a campaign on Reconstruction for Development after the 2004 Tsunami.*

**Mr. George Joseph, Tamil Nadu** (from [K. A. Benny](#), CARE India, Kanyakumari)

[sosod\\_social@rediffmail.com](mailto:sosod_social@rediffmail.com)

*Has experience of constructing houses after the 2004 Tsunami using safe construction technologies like the quarry pile foundation*

***Recommended Organizations and Programmes***

**Plan International, New Delhi** (from [Yedoti Narasimhaiah](#), Training And Development Centre, Hyderabad)

B-4/161 Gulmohar House, 5th Floor, Gautam, Nagar, New Delhi 110049; Tel: 91-11-2696-8432; <http://www.plan-international.org/wherewework/asia/tsunami3/>

*Carried out rehabilitation and permanent shelter programmes with Motif in four districts of Tamil Nadu, work focuses on long-term issues like permanent housing, livelihood, and skill training*

**Development Alternatives (DA), New Delhi** (from [Mona Chhabra Anand](#) and [Alok Patnaik](#), United Nations Development Programme, Chennai)

111/9-Z, Kishangarh, Vasant Kunj, New Delhi 110070; Tel: 91-11-2613-4103, 2689-0380; Fax: 91-11-2613-0817; [tara@devalt.org](mailto:tara@devalt.org); <http://www.devalt.org/da/esb/resg/core.htm#2>

*DA designs environmentally sustainable alternatives to enhance the quality of life in rural areas and has carried out Resettlement and Rehabilitation programmes after the 2004 Tsunami.*

From [Alok Patnaik](#), United Nations Development Programme, Chennai

**Government of India-UNDP Disaster Risk Management Programme, New Delhi** (from [Sanjaya Bhatia](#), Asian Disaster Preparedness Centre, Bangkok)

55 Lodhi Estate, New Delhi 110003; Tel.: 46532333, 24627612;

[http://www.undp.org.in/index.php?option=com\\_content&task=view&id=80&Itemid=163](http://www.undp.org.in/index.php?option=com_content&task=view&id=80&Itemid=163)

*Works to make communities resilient in 17 states of India and designed seismically safe school buildings in Uttar Pradesh*

**United Nations Team for Recovery Support (UNTRS), Chennai**

Apex Towers (opposite Kaliappah Hospital), 54, 2nd Main Road, R. A. Puram, Chennai 600028 Tamil Nadu; Tel: 91-44-42-303-551/2; Fax: 91-44-42-303-556; [info.untrs@undp.org](mailto:info.untrs@undp.org);

<http://www.un.org.in/untrs/>; [http://www.un.org.in/untrs/content\\_01.asp?ref=pa\\_05](http://www.un.org.in/untrs/content_01.asp?ref=pa_05)

*Composed of seven UN-agencies to facilitate Tsunami recovery and rehabilitation; prepared guidelines for housing and training of engineers/masons in Tamil Nadu*

**Development Promotion Group, Chennai**

Joseph Center, 60, Officers Colony, III Street, Mehta Nagar, Aminjikarai, Chennai 600029 Tamil Nadu; Tel: 91-044-23744645/23744647; Fax: 91-044-23745471; [dpgsulo@md2.vsnl.net.in](mailto:dpgsulo@md2.vsnl.net.in);

<http://www.dpgsulo.com/index.htm>

*Implements development programs with a focus on developing and adopting technical innovations on housing; involved in post-Tsunami housing reconstruction in Tamil Nadu*

**South Indian Federation of Fishermen Societies, Trivandrum**

Karamana, Trivandrum 695002 Kerala; Tel: 0471-2343711/3178/5056; Fax: 0471-2342053;  
[admin@siffs.org](mailto:admin@siffs.org); <http://www.siffs.org/Index.aspx?Page=../SiffsResponse/SiffsTsunamiResponse.aspx>  
*Currently engaged in post-Tsunami livelihood restoration and habitat reconstruction projects in Nagapattinam, Cuddalore, and Kanyakumari districts of Tamil Nadu*

**Centre for Environment Education Himalaya (CEE), Ahmedabad**

Thaltej Tekra, Ahmedabad 380054 Gujarat; Tel: 91-79-26858002; Fax: 91-79-26858010;  
[ceehimalaya@ceeindia.org](mailto:ceehimalaya@ceeindia.org); <http://www.ceehimalaya.org/>  
*Strengthens environmental education interventions towards sustainable development and disaster preparedness; involved in post-Tsunami housing reconstruction in Tamil Nadu*

**Orissa Development Technocrats' Forum (ODTF), Bhubaneswar**

256, Forest Park, Bhubaneswar 751009 Orissa; Tel: 91-674-2595850/1, 2595627; Fax: 91-674-2595254;  
[dtfindia@yahoo.co.in](mailto:dtfindia@yahoo.co.in); <http://www.geocities.com/dtfindia/index.htm>  
*Facilitates an effective rural housing delivery system through promotion of appropriate construction technologies and was involved in housing after the Tsunami in Tamil Nadu*

**Pondicherry Multipurpose Social Service Society, Pondicherry**

#81, Laporte Street, Pondicherry 605001 ; Tel: 91-413-2222928; Fax: 91-4132222982 ;  
[pmssspondy@hotmail.com](mailto:pmssspondy@hotmail.com); [www.pmsss.org.in](http://www.pmsss.org.in)  
*Has been involved in tsunami relief, recovery and rehabilitation process and now in the housing reconstruction programme in various villages*

**Auroville Earth Institute, Auroville**

Auroshilpam, Auroville 605101 Tamil Nadu.; Tel: 91-0-413-262-3064 ; Fax: 91-0-413-262-2886;  
[earthinstitute@auroville.org.in](mailto:earthinstitute@auroville.org.in); <http://www.earth-auroville.com/?nav=menu&pg=disaster&id1=1>  
*Organises hands on training for masons on safe construction technologies and constructs community level buildings to display various appropriate technologies*

**Lutheran World Service (LWS), West Bengal**

84 Dr. Suresh Sarkar Road, Kolkata 700014, West Bengal; Tel: 91-33-22849730/443062; [lws@vsnl.com](mailto:lws@vsnl.com);  
[http://www.lutheranworld.org/What\\_We\\_Do/DWS/Country\\_Programs/DWS-India.html](http://www.lutheranworld.org/What_We_Do/DWS/Country_Programs/DWS-India.html)  
*LWS has demonstrated adequate project management techniques and processes during the implementation of housing reconstruction after the 2004 Tsunami.*

**COSTFORD, Kerala**

Thrissur Main office Trivandrum sub center, Ayyanthole, Thrissur Savan, Neerazhi Lane, NLRA 381, Uloor, 680003 Kerala Medical College PO, Trivandrum ; Tel: 0487-360788, 382693, 364203 ; Fax: 0487-641678;  
[costford@sancharnet.in](mailto:costford@sancharnet.in);  
[http://www.archidev.org/mipaa/mission\\_presentation/costford/costford\\_activities.htm](http://www.archidev.org/mipaa/mission_presentation/costford/costford_activities.htm)  
*Provides technological assistance for rural development; constructed community level buildings to highlight various appropriate construction technologies in Tsunami-affected regions.*

**Palmyrah Worker's Development Society, Tamil Nadu**

Crystal Street, Martandam 629165, Tamil Nadu; Tel: 91-4651-270241, 4651-270138;  
[palmyrah@dataone.in](mailto:palmyrah@dataone.in)  
*In association with UNDP, constructed community level buildings to showcase various appropriate construction technologies and organized hands-on training for masons during tsunami.*

**Habitat Technology Group, Kerala**

Pushpavanam Lane, Poojappura PO, Thiruvananthapuram 695012 Kerala; Tel: 91-471-2344904, 2342723; Fax: 91-471-2344977; [habitat@asianetindia.com](mailto:habitat@asianetindia.com)

*Largest NGO working in the building sector promoting appropriate, safe construction technologies and Green Architecture in India and worked for rehabilitation after many disasters.*

**Society for Environment Protection, Tamil Nadu**

142, 'O' Block, 36th Street, Anna Nagar East, Anna Nagar Tamil Nadu ; [dipan@sepindia.org](mailto:dipan@sepindia.org)

*Works on retrofitting of non-engineered rural buildings and constructed 32 retrofitted units across Tamil Nadu coast and Kollam after the 2004 Tsunami*

**Florida Construction, Unites States of America**

1940 North Monroe Street, Tallahassee FL 32399; [Call.Center@dbpr.state.fl.us](mailto:Call.Center@dbpr.state.fl.us) ; [subash@floridacon.com](mailto:subash@floridacon.com)

*In association with UNDP, constructed community level buildings to display various appropriate, safe construction technologies and organized hands-on training for masons after the Tsunami.*

**Gandhigram Rural University, Tamil Nadu**

Gandhigram 624302, Dindigul District Tamil Nadu; Tel: 0451 2452371 to 2452375 ; Fax: Fax No. [gri\\_sirkali@yahoo.co.in](mailto:gri_sirkali@yahoo.co.in); [www.ruraluniv.ac.in](http://www.ruraluniv.ac.in)

*In association with UNDP, constructed community level buildings to showcase various appropriate technologies and organized hands-on training for masons during tsunami.*

**UNDP Shelter Project, Bhubaneswar** (from [Nupur Arora](#), Research Associate)

Orissa Hub, UN House-II, 256, Forest Park, Bhubaneswar 751009 Orissa; Tel: 91-674-2530015/4850/1; [anindya.sarkar@undp.org](mailto:anindya.sarkar@undp.org); [http://www.archidev.org/mipaa/mission\\_presentation/undp/Shelter.htm](http://www.archidev.org/mipaa/mission_presentation/undp/Shelter.htm)

*Project to catalyze and sustain a movement to bring about capacity development of communities and local NGOs involved in relief and rehabilitation.*

***Related Consolidated Replies***

**Skill Trainings for Safe Construction, from Anindya Kumar Sarkar, United Nations Development Programme (UNDP), Bhubaneswar (Examples).** Work and Employment Community and Disaster Management Community. Issued 11 June 2007

Available at <http://www.solutionexchange-un.net.in/drm/cr/cr-se-drm-emp-11060701-public.pdf> (PDF, Size: 311 KB)

*Shares examples of Mason training Modules, provides suggestions on imparting skills safe construction training and referrals of organizations who can contribute to the issue.*

**Structural Mitigation for Schools Buildings, from A. S. Arya, Ministry of Home Affairs, New Delhi (Advice; Experiences).** Disaster Management Community. Issued 21 September 2007

Available at <http://www.solutionexchange-un.net.in/drm/cr/cr-se-drm-ed-21090701.pdf> (PDF, Size: 150 KB)

*Seeks advice on various issues that need to be factored in for reducing risks arising out of unsafe school buildings and experiences of effective structural mitigation in schools*

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**Responses in Full**

**[Yedoti Narasimhaiah](#), Training and Development Centre, Hyderabad**

You can contact Mr. Anthonysamy of BLESS ([admin@bless.org](mailto:admin@bless.org)) at Cuddalore for housing and Mr. Subburaman of SCOPE ([scopeagency@yahoo.com](mailto:scopeagency@yahoo.com)) for sanitation in disaster prone areas.

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**[Sanjaya Bhatia](#), Asian Disaster Preparedness Centre, Bangkok, Thailand** (response 1)

Please refer to this report on Earthquake Resistant School Buildings in Uttar Pradesh (<http://www.solutionexchange-un.net.in/drm/cr/res25020801.doc>) on the work on safe construction of school buildings done in Uttar Pradesh.

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**[M. Arulappa](#)**, Plan International Viluppuram, Tamil Nadu

In Cuddalore, BLESS (NGO) is involving in construction of permanent shelter. Their e mail id is [admin@bless.org.in](mailto:admin@bless.org.in).

For a permanent shelter program in 4 districts (Cuddalore, Viluppuram, Karaikkal & Nagapattinam) of Tamil Nadu, Plan International hired Motif, Pondicherry as Technical Support Organisation. Its mail id is [motif@rediffmail.com](mailto:motif@rediffmail.com). You may like to contact both the above for your research.

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**[Mona Chhabra Anand](#)**, Development Alternatives, New Delhi

You might also want to look at the work of Development Alternatives in Karaikal (contact Mr S Patara - [spatara@devalt.org](mailto:spatara@devalt.org)/ Ms Z Niazi - [zniazi@devalt.org](mailto:zniazi@devalt.org)) and Architecture and Development in Cuddalore and Nagercoil (contact Ms R Kunke - [radha@archidev.org](mailto:radha@archidev.org)).

Both these organisations have tried innovative and safe construction techniques in their post-tsunami projects. Also interesting is the use of environment friendly materials and technologies that reduce the negative effects of habitat development (overall - besides construction of buildings alone) on the environment.

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**[K. A. Benny](#)**, CARE India, Kanyakumari

I want to share an Innovative safe technologies used in the construction of houses in Tamil Nadu called Quarry pile foundation. Usually pile foundation is used in the structure to avoid settlements and thus prevent the cracks. The concrete piles are used in the clay soil, which is costly. But in the tsunami affected village of Neerodi the quarry powder pile foundation was designed which is innovative in nature and cost effective. The land was low lying so the land was filled with earth, due to urgency the work was started immediately. We calculated the bearing capacity of the soil is very low. With the technical consultancy of the Gandhigram Rural University we designed the quarry powder pile foundation.

The technique is that after digging the foundation of 90 cm depth, 10 cm dia hole of depth of 1.5 m was drilled and quarry dust was filled and rammed. The holes are drilled at 60 cm intervals. This improves the bearing capacity of the soil. We constructed house on this, it is safe and cost effective. The quarry dust cost is less than the sand cost. You may contact George Joseph at [sosod\\_social@rediffmail.com](mailto:sosod_social@rediffmail.com) for more information.

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**[Nilanjan Sengupta](#)**, Forum of Scientists, Engineers and Technologists, Kolkata

The process of Quarry pile foundation is definitely a nice one and it is suitable for construction over filled-up land with filling of shallow depth. If it is pond of depth say 3/4 metres, you may go for sand piling (boring holes of 150/200mm diameter and 4/5 metres depth and filling them with sand mixed in water. the holes may be bored at 1m apart. The sand will fill the voids and increase the bearing capacity for small constructions. This takes very little time and simple machinery) or debris piling (like your quarry piling but of greater depth. Holes are made with boring machinery up to a depth of 5/6 metre and it is filled with building rubbish, stones, slags etc. followed by ramming at intermediate levels).

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**Abhishek Mendiratta, Consultant, New Delhi**

I want to share some Innovative safe technologies used in the construction of houses in Tsunami affected area.

- **Porosity:** In order to maximize the resistance to an incoming tsunami, four independent linear supports perpendicular to the coast are created. They replace the uniform skin of the existing design.
- **Upgradeability:** Bamboo partitions are initially provided in-between the cores; they can be transformed and customized, engaging the residents with their individual choices, it also promotes the reuse of found elements.
- **Expandability:** A modular system allows the expansion of units to accommodate different household sizes
- **Economy:** The total surface of walls and roof is approximately the same as the existing house. The cost would be equal or less.
- **Low Tech:** Walls are made of concrete blocks strengthened with rebars; the roof is made with traditional wooden elements, covered with tiles or tin; partitions are made of recycled materials.

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**Sanjaya Bhatia, Asian Disaster Preparedness Centre, Bangkok, Thailand (response 2)**

One aspect of "Safe construction" is to piggyback on going or pipeline projects. When we were working in Uttar Pradesh under the UNDP GoI DRM program, we were able to dovetail with a World Bank loan to the Uttar Pradesh government for construction of school buildings. The designs were modified to include seismic safety and as a result, 6,800 schools are being built with seismic safe features. To view the report click <http://www.solutionexchange-un.net.in/drm/cr/res25020803.doc>

Hope this gives you some idea on how to leverage funds for safe construction.

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**Alok Patnaik, United Nations Development Programme (UNDP), Location**

The public-private partnership in Tamil Nadu is in the final stage of completion of phase 1 housing reconstruction. In the second phase of housing reconstruction the State Government is planning to build 55000 vulnerable houses, of which work for 20,000 houses have been already initiated. UNDP / UNTRS is associated in the capacity development activities - by means of preparation of housing guidelines, training of engineers/masons and awareness creation.

To access these guidelines and handbook please click the following links:

[http://www.un.org.in/untrs/content\\_01.asp?ref=pa\\_05](http://www.un.org.in/untrs/content_01.asp?ref=pa_05)

[http://www.un.org.in/untrs/reports/Masonry\\_booklet.pdf](http://www.un.org.in/untrs/reports/Masonry_booklet.pdf)

**Various NGOs / Agencies** involved in the housing reconstruction have developed and adopted technical innovations and social processes - suiting to the field conditions – *appropriateness of building materials in terms of availability, technology know-how, adaptability, local practices, energy efficiency*. To name a few agencies – SOS, Development Alternatives, Development Promotion Group, SIFFS, PMSSS, Architecture and Development, CEE, Tata Relief Committee, LWS etc have demonstrated adequate project management techniques and processes during the implementation of housing reconstruction.

UNDP in association with the following agencies constructed community level buildings to showcase various appropriate technologies and organized hands-on training for masons.

Agencies Involved	Technology Demonstration	Districts	Contact Address
Auroville Earth Institute	Walling – CSEB, Roofing – Filler	Cuddalore, Villupuram,	<a href="http://www.earth-auroville.com">http://www.earth-auroville.com</a>



	slab, Ferro-cement channels	Kancheepuram	
COSTFORD	Walling – Rat-trap bonding (KB Bricks), Roofing – Filler slab with mangalore tiles	Sirkazhi, Nagapattinam	<a href="mailto:costford@sancharnet.in">costford@sancharnet.in</a>
Orissa Development Technocrat Forum	Walling – Rat-trap / Flemish, Roofing – Filler slab; foundation – cone foundation and sand pile foundation	Villupuram, Kancheepuram	<a href="mailto:odtf.secretary@gmail.com">odtf.secretary@gmail.com</a>
Habitat Technology Group	Walling – Flemish , Rattrap; Roofing – filler slab	Kollam (Kerala); Kanyakumari, Tirunelveli	<a href="mailto:habitat@asianetindia.com">habitat@asianetindia.com</a>
Palmyrah Worker's Development Society	Walling – Fly-ash bricks – rattrap and Flemish; Roofing – Filler slab	Kanyakumari, Tuticorin	<a href="mailto:palmyrah@dataone.in">palmyrah@dataone.in</a>
Gandhigram Rural University	Walling – Rat-trap brick masonry / Concrete block; Roofing – FC Channel, Filler slab	Nagapattinam	<a href="mailto:gri_sirkali@yahoo.co.in">gri_sirkali@yahoo.co.in</a>
Tamil Nadu Slum Clearance Board – Building Center, Vellachery	Walling – Rattrap brick masonry, Roofing – Filler slab	Chennai	<a href="mailto:tncsbbuildingcentre@hotmail.com">tncsbbuildingcentre@hotmail.com</a>
Florida Construction	Walling – Concrete block, fly-ash – Flemish / rat-trap Roofing - Filler slab,	Vanagiri, Nagapattinam, Cuddalore, Thiruvallur, Kancheepuram	<a href="mailto:subash@floridacon.com">subash@floridacon.com</a>
Society for Environment Protection	Retrofitting of non-engineered rural buildings	32 retrofitted units across Tamil Nadu coast and Kollam	<a href="mailto:dipan@sepindia.org">dipan@sepindia.org</a>

I would like to highlight two foundation designs that have been demonstrated in the project (by ODTF) as an option towards cost effective solutions in case of weak soil.

1. Sand pile foundation (using the pre-cast well rings – few photos attached)
2. Cone foundation ( few photos attached)

We are in the process of compilation all innovative technologies demonstrated in the UNDP supported project.

In the meantime, UN has initiated “compilation of good practices” demonstrated by various agencies in the post-tsunami reconstruction context looking at various habitat planning aspects. My colleague Ms Divya Jacob will further elaborate on this.

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### **F. B. Manik Shah Mazumder, ActionAid, Assam**

ActionAid International is implementing Disaster Risk Reduction through Schools Project in seven countries, including India. The implementing countries are Nepal, Malawi, Haiti, Kenya, Ghana and Bangladesh. The Project is supported by the DFID and is being implemented in two phases. In the 1st phase Bangladesh, Malawi, Ghana, Haiti and Nepal started implementing the project from 2006 and in the second phase India and Kenya started implementing in March 2007.

The main goal of the project is to reduce people’s vulnerability to natural disasters by contributing towards the implementation of the Hyogo framework.

The purpose is to make the schools in high-risk disaster prone areas safer, enabling them to act as a locus for disaster risk reduction and institutionalizing implementation of the Hyogo framework within education systems.

In Assam our objectives of Disaster Risk Reduction through Schools Project is-

- To minimize the possibilities of causality among children, teachers, parents and the communities in the catchment of the schools and to make the schools safer.
- To reduce the loss of academic days of the children in schools due to disaster.
- To enhance community ownership in environmental protection and environmental sustainability interventions based on an improved understanding about the environment, climatic pattern and changes and its immediate and long term effect in the line of Hyogo framework of action and its subsequent changes (amendments)
- To improve local capacities for coping with disasters by developing appropriate coping mechanisms and improving situational understanding among children, teachers, parents and the communities.
- To develop an appropriate strategy for policy advocacy, so that the policies of the state are influenced to respond to the emerging crisis.

In Assam we are planning to organize a Workshop on “Structural Transformation for Safe Schools in Assam” and try to develop Guidelines on Safe Schools.

Our understanding about Safe schools and educational buildings is that it is well known as potential ‘safe havens’ against different hazards have proven effective in saving lives. In terms of structural risk reduction, the first priority is the structural transformation for safe schools that will reduce the risk of casualties to students, staff, and visitors. The second priority is the reduction of damage that leads to downtime and disruption. The third priority is the reduction of damage and repair costs. Protection of schools and their occupants requires a careful study and understanding of the localized situation. The proposed workshop is designed for two days for 50 participants. It is believe that the workshop will provide an opportunity to different stakeholders and experts to discuss on school safety and came up with low cost & viable suggestions for structural transformation.

In order to come up with careful suggestions it is essential to carry forward the discussion with different groups. Thus, we are planning to organize a consultation workshop is in the line with the aforementioned workshop on structural transformation that will provide us scope to put forward the details of our work before consultative bodies for review. It is planned to organize two consultation workshop may be in the month of June and July.

Structural transformation of schools being a technical subject it requires to be reviewed by the technocrats before finalization. Thus we are planning to provide a scope for reviewing the suggestions by the experts before finalization of minimum standards for structural transformations for safe schools in Assam.

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***Many thanks to all who contributed to this query!***

*If you have further information to share on this topic, please send it to Solution Exchange for the Disaster Management Community in India at [se-drm@solutionexchange-un.net.in](mailto:se-drm@solutionexchange-un.net.in) with the subject heading "Re: [se-drm] Query: Investigating Safe Construction Practices and Disaster Risk Reduction Techniques Undertaken by NGOs in Tamil Nadu – Examples; Referrals - Additional Reply."*

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