

**Organisation:** UN-HABITAT  
**Theme:** 2. Technical standards for earthquake resistant schools.

**Learning Outside the Box.**

We do not want to use the opportunity of a position paper to contribute to the argument about engineering standards; the relative advantages between confined masonry and RCC frame systems, the consideration of traditional weaker masonry with seismic resistant improvements or even the potential use of locally specific traditions like timber frame construction.

UN-HABITAT Pakistan has been working on these issues with ERRA in relation to appropriate standards for housing reconstruction in the earthquake affected areas, and involved in the expansion of the menu of options promoted as compliant, through field research, testing, and engineering analysis in partnership with NESPAK, SDC and others. Housing reconstruction now has a range of ERRA approved solutions for different conditions, to accommodate the factors of location, access and altitude, available materials, skills, budgets, and preferences. The housing programme options may contribute to the evolution of options for school buildings, either in terms of the product in the case of small scale village schools, which are often very similar to houses, or in terms of the iterative process between the field and the policy makers in the preparation and confirmation of standards.

This paper however is not about the school as an engineered box and the engineering arguments thereon, but the school as an appropriate learning and teaching space from the point of view of the users, and the potential to optimise outdoor spaces to supplement school accommodation, meeting needs for safety as well as increasing the use-value of the site as a place for learning and play. This is about embracing existing patterns of user behaviour, optimising scarce resources, and maximising the constrained sites of large numbers of village schools in remote rural areas.

The larger and urban schools require both complex accommodation and engineering. However, the smaller village schools, with predominantly small children, and the difficult sloping sites maybe could benefit from rethinking the accommodation, and thereby also rethinking the engineering and costs required. We all agree that it is difficult to build anything at all in the earthquake affected districts, and even more difficult to build to the required standard. This paper relates to the large number of small remote village schools yet to be reconstructed in the earthquake affected areas, but also to the thousands of small primary schools in other hazard prone parts of the country where physical and financial constraints severely limit what can be constructed and constructed safely.



### Field Observation

In December 2005, we noted at almost every school in Kashmir children were sitting outside. This was the case where schools were destroyed and rubble was on the site, so they had no choice. It was likewise the case where schools had minor damage, and both teachers and children were afraid. But it was also happening where there was no damage at all. On questioning they sometimes said the children were afraid, but more often they said that they were normally outside on terraces in fine weather, especially the smaller children. This was confirmed by a survey of school accommodation undertaken in March 2006 by GOAL Ireland: of 540 schools Bagh District, PaK over 80% reported that they regularly used outdoor spaces for teaching before the earthquake.

It is common across large areas of the country to be outside. It is also common to have dry and sunny weather.

In winter it is warmer to be outside in the sun as the schools are not well heated, in summer it is cooler to be outside in the shade with a breeze. Inside is crowded and if there are fans there is often no electricity. In the steep terrain of village schools, most of the sites have a series of terraces which makes natural sub divisions to segregate classes or groups.

All of us working in the earthquake affected districts have had numerous meetings, trainings, discussions at different times of the year and can remember taking these outside, where it was possible to talk and listen for several hours, in comfort and convenience, choosing a place in sun in winter, and in shade in summer. The limits of room size did not matter, if chairs were enough, and tea was available.



December 2005



January 2008

### **Core Building**

There is of course still a need for enclosed buildings, but perhaps the school level, location and other factors could be considered in planning for inside and outside accommodation needs, rather than only taking enrolment as the basic brief for space requirements.

Enclosed rooms are needed for bad weather, including winter rain and snow, and summer monsoon. They are needed more for older children who need greater concentration and have more teaching and learning materials. It may be more a priority for older girls as the building provides privacy and security, but this could also be managed by enclosing the grounds.

Enclosed rooms provide good acoustic separation, especially where numbers are large and several classes are operating simultaneously, this can be difficult to manage outside.

The school building for less complex schools and smaller children might also be interpreted as a core building providing minimum accommodation, but also serving the wider use of the site, with secure storage of teaching and learning materials, furniture, mats, providing services including water and sanitation, staff room, or other specific accommodation.

### **Semi Building**

Additional semi buildings might consist of roofs only, ensuring protection from rain and from excessive high sun, constructed over a level plinth. Roofs could be free standing or added on the ends of gables so the gable wall could be used for the blackboard.

Enclosing walls where they are provided, might offer opportunities for similar appropriation and would allow for distribution of different activities in different parts of the grounds.

Semi building of roofs, partial walls, is potentially a useful solution in the warmer parts of the country, where shade is the most important comfort factor. In many earthquake prone areas like parts of Baluchistan, the options for building are heavy and weak local masonry, or thin fired brick masonry wall with RCC frame and slab roof. The choice becomes one between climate resistant or earthquake resistant, while the need is to resist both. Again a smaller building as core and store, supplemented by shaded learning and teaching areas, may ensure safety and some level of comfort.

Semi buildings offer the opportunity to be used for other community activities, without having to open up the school building, or risk the security of school assets.

### **Using the ground.**

In mountainous areas most of the sites are steep and form subdivisions, natural amphitheatres. Children use the best places on the site as informal classrooms. Flat areas are used with chairs or benches taken from inside, or children use rocks and outcrops. Plastic chairs are increasingly popular, they can be stacked away and they are light to move around. In some places children use mats on the ground. This is convenient for smaller children and the mats are easier to roll away and store than furniture. Whether the sites are flat or sloped, planted or bare, there are different ways of optimising the natural advantages. Most of the terrain in the mountainous regions sustains good agriculture and it is possible to grow trees, low and high hedges, grass, basically grow the landscape elements of making spaces.





### **Designing the site.**

The majority of proposed schools appear as buildings drawn as plans, elevations, or commonly now as 3D computer rendered drawings. In these drawings the buildings tend to be floating in space, or they have some structurally necessary site works like retaining walls. They may have some 'landscaping', to make the image look better. Sometimes this or other decorative landscaping is implemented, and the school does look better. Investment in the grounds, and specifically and importantly in increasing the use-value of the site is not priority, or of comparable importance to the actual building.

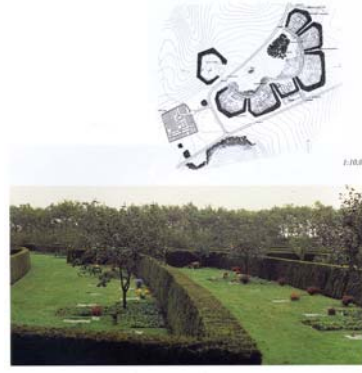
Designing the site is perhaps not best left to the consulting engineers, architects or even landscape architects commuting for a short time from offices in Lahore or Islamabad. While technical advice from professionals may generate ideas or an outline plan, the people who know the site and area intimately, and know their own needs, and preferences are key to devising appropriate schemes for use, and a garden is better made on the ground than on paper. The teachers, parents, school committee, students and local community could be involved in both planning and implementing site works, with low risk, perhaps incrementally with phased projects. Momentum for this could be supported by allocating funding from the overall budget, the amounts need not be very large. Participation in these activities might engender a sense of contribution and ownership.

### **Environmental Resource Management**

Schools and their associated grounds offer opportunities to introduce issues of and activities in natural resource management like the importance of trees, for slope stabilisation, for livelihoods, shade, timber, and how to take care of them, or water management with rainwater harvesting in PaK. It may be as simple as planting an extra tree every year. It might include small energy projects, with wind or solar power. It might be horticultural husbandry related to the local ecosystem, with an outdoor library of local plants.

## Places of Imagination

School should be a memorable place. Ideally they should all have great chinar trees. For small children formal play equipment is fine and well, especially swings, but children will also always make their own games in a thousand ways, sitting quietly on steps, or using any flat space for cricket, places to hide, to climb, places to run. Play is an essential part of learning. School is where you learn from teachers and books, but also where you learn to make friends or to stand up for yourself in a fight. Schools are for generations, or they should be. They represent continuity, the majority of children in rural areas will go to the same school as their fathers, their children and grandchildren will go to the same schools and play the same games under the same trees and get in the same trouble. Maybe the next generation of children will all have mobile phones, maybe several other unpredictable things will change, but the places will be largely the same, and the current newly built schools and their grounds will define the experience of school for a long long time.



## Safety

What we have described in relation to using the outdoors and the nature of learning and learning spaces, raises issues of educational approaches, environmental management, sustainability, flexibility. It is important to reiterate this paper has been based on the simple idea that the safest place to be in an earthquake is outside.

