

Chapter 4:

Buildings and Construction

Questions on building and construction should be addressed from both the government viewpoint and the community one. This chapter considers each in turn.

1. The Government Viewpoint

Should governments insist on minimum standards in self-help projects and on school buildings which resemble the conventional models? Or should they accept all types and qualities of construction? There is no 'right' answer to these questions. Governments must consider the issues carefully and adopt policies which they consider workable and sensible.

1. Insistence on Minimum Standards?

Governments which insist on minimum standards of construction usually do so in order to ensure that learning conditions are not compromised. They point out that:

- (a) unless roofs are properly constructed there is a danger of pupils getting wet during classes and then of catching colds because they have to sit still for lessons, and that roofs may collapse or be blown off in storms,
- (b) furniture, books and equipment are expensive, and should be protected from rain, termites and thieves,
- (c) rooms full of school children require particular attention to ventilation,
- (d) villagers often do not know about chalkboards and where to locate them to avoid glare (an especially difficult task in round buildings),
- (e) village houses — even for chiefs and headmen — often exclude so much daylight that prolonged reading and writing

is difficult and bad for the eyes.

- (f) smart buildings can be a source of pride, and can raise the prestige of education, and
- (g) some buildings may be cheap to construct but have such high maintenance costs and short life-spans that it is often wiser to build more expensive but sturdy ones.

2. Acceptance and Encouragement of Local Designs?

At the same time, governments should be careful to avoid imposing high standards on communities. Arguments favouring local designs are:

- (a) It is important to encourage and respect local cultures, of which building designs are a prominent part. Because of its status and role, it can be especially desirable for the school to be built in a local style.
- (b) In many remote areas, building out of locally available materials is the *only* way that schools can be built. It is impossible to carry roofing sheets, metal windows and cement to such remote areas.
- (c) Villagers often find it easier to maintain buildings when they are familiar with them and have built them out of local rather than imported materials.
- (d) Use of community labour usually saves money. Payment of contractors to erect buildings places a heavy financial burden on the communities. Also, if the contractors are incompetent or come from neighbouring villages rather than from the communities themselves, their work can lead to disputes and social divisions.
- (e) If a school already has some buildings which do not meet the government's standards, demolition of these buildings can do more harm than good. It can destroy the very spirit that the government is seeking to encourage.
- (f) Many government buildings are themselves of a low standard, and it could be both hypocritical and unfair to require self-help communities to put up buildings of a higher standard than government ones.

If communities are to be totally responsible for the design and construction, the government must accept that the schools may

neither look like a conventional ones nor comply with established standards for school design and construction.

3. Try to Achieve the Best of Both Worlds?

(a) Working Sharing. Some governments combine their own work with self-help. Swaziland practice, for example, has been for the government to construct the floors, pillars and roofs of classrooms and then to require communities to provide the walls. In Malawi standard classrooms have been built with the government providing most materials and communities providing labour, sand and bricks. In both countries these schemes have encountered the risk that the classrooms will still not be built properly, or will not be built at all, but they have given communities 'head starts' and encouragement.

(b) Technical Advice. Even if governments do not insist on minimum standards, they can give technical advice. Here are six examples:

- * Traditional mud roofs sometimes leak or collapse during heavy rain. In Afghanistan, mud roofs have been made waterproof by insertion of a very thin sheet of plastic, 10 cms below the surface. In Northern Nigeria, brushing a silicone-based liquid on the roofs was found to be equally effective.
- * In parts of Angola, the thatch on round mud buildings used for schools was replaced by hollow, burned clay tiles which formed a waterproof dome.
- * Architects in Pakistan have successfully recommended designs that are more resistant to earthquakes than are normal classrooms.
- * The CINVA-ram machine for making stabilised soil blocks has helped villagers build schools all over the world. In Papua New Guinea the machine has been modified to ensure that the same pressure is applied to all blocks and the products are uniform.
- * Governments can recommend designs which allow schools to expand in a planned way.
- * Governments can offer advice on contracts between communities and local contractors, to help ensure that buildings are reasonable in price, are of an adequate standard, and are completed on time.

However, experience also stresses the need for caution:

- * In one traditional design, the feet of walls wear away because water splashes from an overhanging roof. A government architect once insisted on parapet construction to prevent this. His design worked well until the spring: water from melting snow could not escape over the edge of the roofs, and the buildings collapsed.
- * Villagers are not always able either to understand technical drawings or to carry out the construction of sophisticated designs. In some cases either the buildings have not been put up properly, or skilled labour has had to be hired from outside.

The problems of complex designs can be reduced in several ways:

- (i) Governments can accompany building materials with simple and well illustrated *booklets*. Left hand pages might be in English and right hand pages could carry the same message in the local language. Different booklets can be written for different people. Page 31 shows a set of booklets written in Nepal for administrators, buildings overseers, and community leaders.
- (ii) Governments can employ *technical advisers*, whose job is to travel round communities and work with villagers. The advisers require salaries and travelling allowances, but this money can be a good investment.

* ***The Personality and Role of a Good Technical Adviser*** *

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* *Where participatory planning and execution is important, the* *

* *role of the government's technical adviser is critical. The best* *

* *advisers are skilled, energetic and sympathetic, and speak the* *

* *local languages. They attend planning meetings in their* *

* *villages, and remain silent until a useful opportunity occurs to* *

* *intervene with a specific suggestion. There is no place for what* *

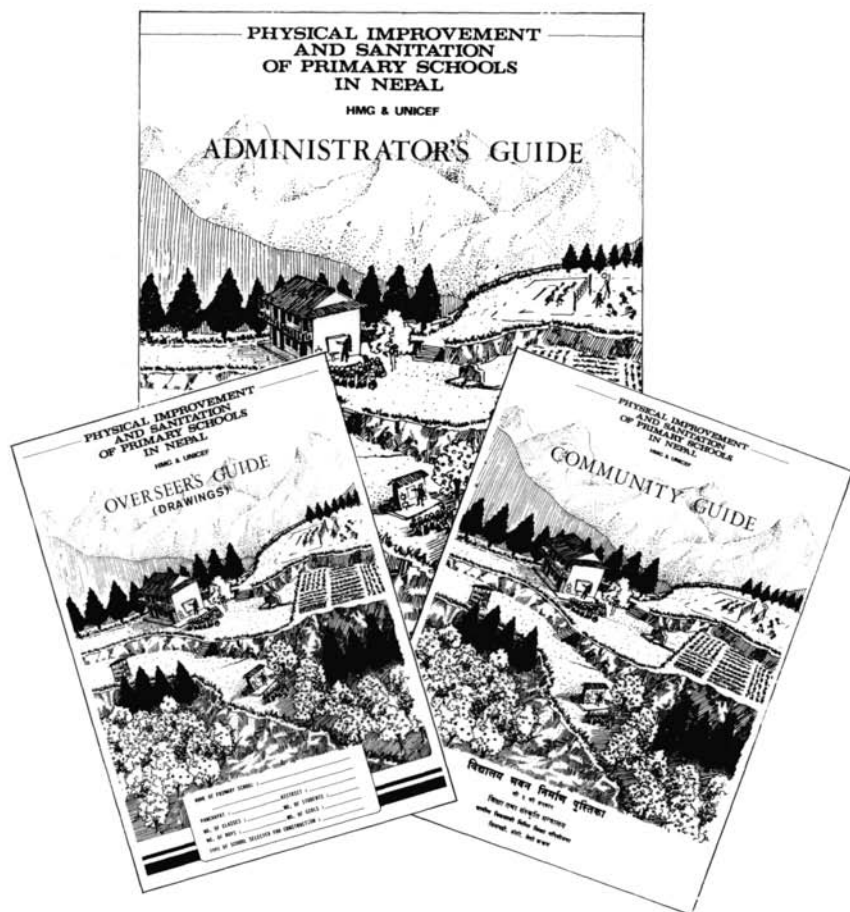
* *in one country are known as 'trousered gentlemen', who arrive* *

* *in large cars, are in a hurry, and expect to be listened to. The* *

* *adviser in a successful project is no more than one person in a* *

* *village team.* *

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The government of Nepal, in conjunction with UNICEF, has produced a set of three manuals: for administrators, construction overseers, and community leaders.

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- * Points to be Listed in a Handbook on Building Construction ***
- * (a) Site Preparation ***
- * 1. Clear site of all rubbish and grass. *
 - * 2. Strip site of top soil (average of 6 inches or 150 mm deep). *
 - * 3. Level site. *
 - * 4. Set out building. *
- * (b) Foundations ***
- * 5. Excavate trenches for foundations. *
 - * 6. Lay the concrete foundations. The proportions and the means of mixing, placing and curing the concrete should all be described. *
 - * 7. Build the foundation walls. The bonding and mortar proportions should be described. *
 - * 8. Spread, level and compact filling between the foundation walls. The importance of compacting the filling in layers to avoid future settlement of the floor slab should be stressed. *
 - * 9. Apply ant-proofing solution to the surface of the filling and tops of foundation walls. Warnings should be given that the ant-proofing solution is poisonous. The method of mixing and applying the solution should be described. i.e. make a rough framework of one square metre, apply the specified number of litres within that area, move framework to adjacent area, repeat until the whole of that area has been covered. *
- * (c) Floors and Walls ***
- * 10. Erect formwork for edge of slab. *
 - * 11. Lay concrete floor. The proportions and means of mixing, placing and curing should all be described. *
 - * 12. Build walling. The bonding, mortar proportions and use of wire-ties should all be described. *
- * (d) Doors, Windows and Roof ***
- * 13. Fix door and window frames. The fixing of the lugs, pointing around the frames and method of forming arches and lintels should be described. The bracing of metal door frames to ensure squareness to receive the door should be emphasised. *
 - * 14. Construct truss. The importance of correct nailing should be emphasised. *
 - * 15. Erect truss. *
 - * 16. Fix and level purlins. The importance of fixing the purlins with the narrow width supporting the roof sheeting should be emphasised. *
 - * 17. Secure purlins and truss with hoop iron. *
 - * 18. Fix roof covering. If the covering is fixed to large span purlins (e.g. the classroom block), the importance of propping the purlin to the floor should be emphasised. This prevents 'bounce' in the purlin when the covering is being nailed, ensuring a sound fixing and reducing the risk of loss of the roof during high winds. Lapping of the roof sheets should be described. *
- * (e) Finishing ***
- * 19. Apply plaster to walls. The proportions and means of mixing and applying should be described. *
 - * 20. Lay floor paving. The proportions and means of mixing and applying should be described. *
 - * 21. Fix glass in windows. Back-puttying and puttying should be described. *
 - * 22. Hang doors and fix ironmongery. *
 - * 23. Paint and decorate. The use of different materials, e.g. the items to be finished with gloss paint, should be indicated. *
 - * 24. Clean out the building. *
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(c) *Purchase or Donation of Special Supplies.* Items like plastic sheeting, silicone liquid and block-making machines may be hard for ordinary villagers to purchase. Governments can facilitate self-help construction either by helping communities to buy these items or by donating them. The best person to take responsibility for purchase or donation would be the technical adviser.

If the government decides to donate the items, it could encounter a budgetary problem. Since by definition the projects are to be low-cost ones, it might be reasonable to set aside one per cent of the cost of a conventional building for items identified by a technical adviser as essential to the project. This would require clear guidelines on which the adviser can and cannot supply. The adviser should not be put in the position of one who comes 'bearing gifts'. As projects progress and experience is gained, the one per cent figure might be modified.

A Final Warning

Governments must be quite clear about the objectives, costs and benefits of their schemes. Sometimes it is better to use contractors rather than to ask villagers to do the work themselves, even when village labour is unpaid. This is because the quality of work done by contractors may be better, and the buildings may last longer. This can be illustrated as follows:

	Villager-Built Units	Contractor-Built Units
Capital cost	\$7,000	\$10,500
Life expectancy	10 years	20 years
Maintenance costs	\$150 p.a.	\$100 p.a.

Although in this case the villager-built units have a lower initial cost, their life expectancy is shorter and their maintenance costs higher. Because of this, it is arguable that the contractor-built units are a better investment in the example cited.

This argument only views the situation from one cost angle; and project designers may feel that the benefits from involvement of villagers outweigh the costs of inefficiency. Nevertheless, the costing emphasises the need for careful evaluation at the start, and warns against the assumption that unpaid village labour is necessarily cheaper than commercial contracting.

II. The Community Viewpoint

Obviously, communities have to work within the government framework. If they are required to use standard designs, the range of options open to them is rather limited. But if governments allow communities to choose their own designs, they have more choice.

Some of the points to which communities should pay particular attention have already been drawn out in the previous section. Three points are worth highlighting again:

1. Design:

- * Communities may decide to build in the traditional style, to assert their cultural identity, save money, and make construction easier. Or they may decide that modern buildings are preferable because that is how the 'best' schools are built. It may be easier to attract good teachers if they are given modern houses.
- * Communities should pay careful attention to ventilation and lighting, to the positioning of chalkboards, etc.

2. Costs:

- * Communities should be aware of the recurrent costs of certain styles of building. Estimation of capital costs tells only half the story. Traditional buildings may be cheap to construct but require replacement within a few years. Glass windows may look nice but easily get broken.
- * Use of community labour usually saves money, but it requires careful planning and supervision. Sometimes, better value can be obtained from a contractor.

3. Quality of Workmanship:

- * If they do employ contractors, communities should assess the reliability of local firms. If the local contractors are unreliable, they may be faced with a difficult decision. They may decide to support the local economy at the cost of slow or poor quality construction, or they may decide to give the work to outside contractors.
- * Communities should consult their District Education Officers to find out if any grants or technical assistance are available to them.