

THE EXETER WORKSHOPS

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Introduction

The Exeter leg of this conference will take the place of the fourth annual Exeter Workshop. This series of informal gatherings started in 1997 and has formed the hub of the network of UK-based Housing and Hazards Group members. Each workshop lasted one day and provided an informal setting in which participants could reflect on recent activities and guide future ones. The following list shows all the presentations made over the three years:

1st Workshop, 17th November 1997:

Disseminating safe building practice in low-income communities

Report on 1st International Workshop, Dhaka, by Dr Robert Hodgson

Rural housing and affordable innovation, by Matt Carter

Experiences from the 1970 cyclone, by Malcolm Chisholm

Economics of strengthening traditional buildings, by James Lewis

What do beneficiaries really want (need), by Iftekhar Ahmed

Local level mitigation strategies, by Dr Nick Hall

2nd Workshop, 16th November 1998:

Communicating technologies: more than just talking

Communicating awareness: the role of volunteers in H&H, by Dr Robert Hodgson

The need for better homes and BUET's research programme, by Dr Salek M Seraj

Student projects in support of international development, by Dr Edward Maunder

Village communicators in Latur, Maharashtra, India, by Rosanna Nitti

Hurricane disaster in Honduras, by Dr Deryck Laming

Communicating disaster mitigation, by Madeleine Moulin-Acevedo

Flood relief and cyclone shelters in Bangladesh, by Malcolm Chisholm

Rebuilding after disaster: Roles for H&H in Bangladesh, by Iftekhar Ahmed

3rd Workshop, 19th November 1999:

Communicating technologies: lessons for the future

Housing & Hazards: a turning point, by Dr Robert Hodgson

Building for safety in Bangladesh, by Prof Jamilur R Choudhury
 Agency intervention in low-income rural housing, by Iftexhar Ahmed
 The H&H rural workshops: realising potential, by Samantha Magne

Since their contributions made these Workshops a vital part of the Group and HEL development, we should record the names of participants (with their dates of participation in parentheses) (see Fig. 1). Members of the Housing and Hazards UK steering committee are listed as H&H:

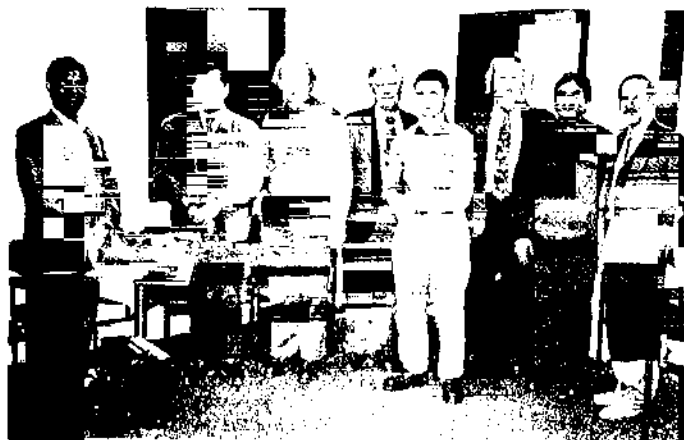


Figure 1 : Some members of the H&H Steering Committee in the 1998 Exeter Workshop

Dr Iftexhar Ahmed, H&H, Oxford Brookes Univ and BUET - 1997, 1998, 1999

Mr John Bodley Scott - 1999

Mr Peter Boorne, Univ of Exeter - 1998

Mr Chris Brown, Architect - 1997

Mr Matt Carter, H&H and Ove Arup & Partners - 1997, 1998, 1999

Mr Malcolm Chisholm, CPM Design - 1997, 1998, 1999

Prof Jamilur R Choudhury, BUET - 1999

Mr Brian Gerrish, H&H and Currie Brown Widnell - 1997

Dr Peter Grainger, H&H and Univ of Exeter - 1998, 1999

Mrs Sue Harding, H&H and Cob Construction Co - 1998, 1999

Dr Mike Heath, H&H and Univ of Exeter - 1997, 1998, 1999

- Dr Robert Hodgson, H&H and Univ of Exeter - 1997, 1998, 1999
Mr Larry Keefe, Univ of Plymouth - 1997
Dr Deryck Laming, H&H and Herrington Geoscience - 1997, 1998, 1999
Dr James Lewis, Datum International, 1997
Mr Andrew Long, Univ of Exeter - 1998
Ms Samantha Magne, H&H - 1999
Dr Edward Maunder, Univ of Exeter - 1998, 1999
Ms Kyla Moore, Univ of Cambridge - 1999
Ms Madeleine Moulin-Acevedo, IDNDR - 1998
Dr John Merefieid, H&H and Univ of Exeter - 1998, 1999
Ms Rosanna Nitti - 1998
Mrs Janetta Nuttall, Salvation Army - 1998
Mr Jamie Richardson - 1997
Dr Salek M Seraj, BUET - 1998
Mr Roland Sewell, Salvation Army - 1997
Mr Robin Tasker, Univ of Coventry - 1997, 1998
Mr Jeffrey Try, H&H and Jeffrey Try Consulting Engineers - 1997, 1998, 1999
Mr Graham West, H&H and Cob Construction Co - 1998

Selected Presentations and Discussions:

Proceedings of the workshops have been reported but not widely published. Presentations and the ensuing discussions were recorded verbatim as papers were not presented formally. This summary presents a selection of the discussions which have been chosen to reflect novel topics or important discussions. Some participants have presented their work in the more formal Dhaka symposia and the interested reader will find it there. These summaries are presented in a more or less logical order, rather than chronologically, so that a flavour of the debates which have circulated in Exeter may be gained.

What do beneficiaries need? Iftekhar Ahmed (1997)

Well-intended attempts by non-governmental organisations (NGOs) to provide "improved" houses with non-traditional or "innovative" construction technologies to disaster victims often fail to serve the intentions of the NGOs. An example of this in Bangladesh is that of the provision of houses with metal posts and roof framework, designed for durability and a degree of resistance to natural hazards, such as cyclones or floods. Quite often, it can be observed that beneficiaries of such houses sell off the metal components and build a traditional type house, using the extra money to buy land, other preferred building components such as metal sheets, or assets considered desirable by the

beneficiary household. This, therefore, causes the household to revert to the original pre-disaster vulnerable position. It can also be seen in some cases that beneficiaries have modified the houses provided by utilising local building elements and materials which NGOs have not used in their house designs.

The main cause of such phenomena stems from the lack of beneficiary participation in the housing design and implementation process, and from external technical input without consideration of specific local and community needs. Much could be gained from participatory consultation with beneficiaries to assess their preferences and needs, as well as extensive study of the context before implementing housing programmes. It may well be that after a major disaster people are so greatly affected that they are not in a condition to engage in participatory dialogue; there may also be limitations of time in such situations, necessitating prompt response from disaster-relief organisations. Thus, on this rationale, the mismatch between household needs and agency-based post-disaster housing could be justified. However, this cannot entirely negate the importance of beneficiary participation in the process of housing provision. How communities can be involved without compromising exigencies of post-disaster situations requires careful consideration. It is expected that discussion among participants at this seminar may lead to better understanding of potentially effective methods of participatory housing rehabilitation.

Discussion:

Sewell: Is development training of any value, and can it be quantified? -we (the Salvation Army) believe so, but how do you prove it? *Carter:* 85% houses are rebuilt anyway; donors prefer to act quickly but should take a longer term view. *Chisholm:* Disasters should be regarded as interruptions to ongoing development which is longer-term and on a bigger scale.

Tasker: Much disaster mitigation work that goes on doesn't get recognition, if it is disaster relief; we need to develop public awareness of the importance of mitigation. *Ahmed:* After a disaster donors are not interested in ordinary housing. *Hodgson:* The skills that are transferred cannot be photographed, but post-disaster housing can be.

Sewell: We must avoid thinking that we have found 'the answer' -although still only a very small one, participation is an important step on the way, but we can't expect donors to accept this process. Should we look at participation in disaster management/preparedness?

Laming: Location of dwellings must be checked out against known or potential routes of hazards such as mud slides and pyroclastic flows.

Gerrish: People should be helped to make their own risk assessments; if

we teach them properly, help will be focussed on risky locations. If donors are to be convinced, H&H must convince itself. We need to attack the traditional solutions and to educate donor agencies. The donors should be at this seminar [Editors note : they were invited but could not come].

Rural Housing and Affordable Innovation: Matthew Carter (1997)

Introducing his 100 page report (H&H Monograph Number 1), Matthew said that he had spent a most rewarding nine months living and working in Sundarban, Dinajpur District, on the H&H Housing Project. Copies of the report were presented to participants and further copies could be obtained from H&H.

The key element in the project was implementation of ideas, which had to be communicated to villagers who need to be motivated to put them into operation. Although northern Bangladesh is less prone to cyclones, flood and wind are still significant hazards. The local organisation, Chetonar Dak, was implementing education projects assisted by Tiverton Sundarban Support Group.

The objectives of the project were to develop intermediate level improvements in house design and construction within the capacity of the local communities, that could be spread to other villages. It was essential to learn Bengali, which allowed interviews with local builders as well as residents. The project began with mapping village house types, which was very good for local awareness, followed by evaluation of local techniques and development of these in the local context. The project included workshops for discussion and training, the construction of an improved building and the training of a song team to promote the message of safe building to other villages. With the low level of literacy this overcame the difficulties of dissemination.

Sundarban village was typical of much of rural Bangladesh with people living in small clusters of houses (paras) on slightly raised ground. Although there was no identifiable village centre, people would congregate at markets. Houses were made of corrugated iron, mud and bamboo with a thatched roof, while the Grameen house has reinforced concrete pillars and a corrugated iron roof. A bamboo floor on a raised mud plinth was standard, though cross-bracing was found in only some houses. Discussions with builders showed that although 25 year old bamboo could be much stronger, only young bamboo stems was now available.

A demonstration building was constructed to act as a Sewing Training Centre. This had a flat corrugated iron roof and a bamboo frame, thatched eaves with cross-braced bamboo posts. The walls were wattle and the roof frame was

bound with bitumen and wire. The cost was 8% more than a conventional building.

Workshops with the villagers were the core item of the project. These took place one morning a week for 15 men and 15 women (separately) over a period of seven weeks. The concept of "hazard + vulnerability = disaster" was difficult to translate, but the workshops progressed through practical exercises in building with mud and bamboo and then to the problems of budget, credit and maintenance. It was found that the inclusion of rice husk in mud walls was better than just mud and sand, but it would be vital to check how the demonstration building stood up to the monsoon. Bamboo posts in the ground tend to rot and get eaten, but if these are scorched before construction and covered with bitumen paint, they are much more durable. The paint is available in the local market.

A song team proved very popular at musical events and weddings and spread the message beyond the immediate community through a culturally appropriate medium.

Evaluation and future extensions

1. A wide diversity of house types existed but poor people building houses cannot afford the concrete prototypes.
2. The workshops were enthusiastically attended, with low drop-out and a marked development of confidence and interest. The participants were relaxed with the local trainers, and were very interested in practical exercises and budgeting. Post-evaluation suggested that participants were happy in training, and want to renovate their houses in the next dry season using the new skills.
3. The project had a catalytic function, with extensive shared knowledge; only limited technical knowledge was needed to run such a project. The use of local trainers was integral to its success, and they assisted in making an informed assessment of traditional techniques.
4. There was a gap between listening and application.
5. This type of workshop can be implemented by grass-roots NGOs: manuals should be in English and Bengali.
6. The Grameen Trust Programme for Poverty Alleviation was interested in repeating this activity in their nearby project area.

Questions and Comments

- Did the villagers know about other hazards elsewhere? A-they knew about cyclones, which were more severe in other areas.
- What is the point of doing these things with the possibility of a major

cyclone? A-in coastal regions such a building would be too fragile. Cyclone shelters in coastal regions have both good and bad points, but the workshops would probably still be applicable there.

- The process is interesting. The most vulnerable people are those least likely to be involved in the project. Addressing immediate needs is important. A-participants were a cross-section of the village chosen by Chetonar Dak. It is not the role of H&H to give houses away; right from the start villagers were told they would have to learn from each other. Sundarban had relatively little "aid culture", being far away from the coast.
- Did local people dismiss any variation to pukka household design? A-one risk is that the demonstration building could be destroyed, which would spoil the project.
- Do the local builders have specialist knowledge? A-not really; there is a lot of self-help building with the professional builder mainly doing the roof.
- Was there any evidence that the increases in hazard resistance were successful? A-Evaluation of the process will take time: mud walls were tested immediately by the monsoon, and there is no practical proof of the increase in bamboo pole life. BUET needs to test the technologies under controlled conditions; they looked at failed buildings to see points of vulnerability.
- Building work should relate to a local standard A-some houses would last a few more seasons for 8% extra cost.
- An Incremental approach is needed. A-it cannot all be done at once, use 50/50 mud/bamboo walls and thatch/flat-corrugated-iron.
- What level of support was provided to the volunteer? A-The volunteer was self-funded, lived in a pukka building, and bought his own food: once a month he had a weekend in Dhaka, where he discussed his observations with other experienced field workers. Other areas in Northern Bangladesh could replicate this model and funds are available.

Housing in Latur, Maharashtra, India: Rosanna Nitti (1998)

The Latur/Osmanabad earthquake of 1993 (6.4 on the Richter scale) destroyed 52 villages and caused 9000 deaths. The World Bank supplied a \$350m loan for a three-year programme of reconstruction. The traditional housing in this hot dry area is stone, mud and timber; earthquake-resistant buildings using alien materials and fancy methods were far too expensive for local people, and they did not have the expertise to construct them.

Response by NGOs

A network of NGOs grew up in response to the earthquake with each one learning from the others' experience. Junior engineers appointed by the Government had little effect: they plastered the houses on the pretence that this made them earthquake-resistant. Demonstration buildings became quarters for civil servants, though money was provided for corrugated iron sheets, steel and cement. The information activities continued but were inadequate. It was important to get a field-tested scheme in operation, to understand the role of various agencies and develop new implementation strategies (whatever that means!). The need was to focus on basic earthquake-resistant technologies but to re-use existing materials -bricks, recycled stones, door frames etc. Cluster strategies in 1300 villages involved people-to-people learning, specially in women's groups. Communities were involved with co-operative transport but the only quality control in rebuilding was from the householders themselves, especially the women who were always on site (the men were away in the fields).

Development of village communicators

The major problem with the Government scheme for rehabilitation was that it was top-down to the junior engineers -a passive system with information flowing only one way, so that when the Government said everything was going well, it really did not know. There was a need for a motivated person in each village to feed back information to the Government. A representative selected from the local women's organisation was paid a salary by the Government and, after training, this lady was able to check that the money had been used for repairs and rebuilding. At monthly meetings the representative reported on progress and any innovations in rebuilding. This system was a big success: the women became 'barefoot engineers', developing ad hoc methods for implementing the scheme in the villages. Corruption was reduced and information flowed both up and down. The Government scheme is now over, and because corrugated iron is not supplied any more, traditional methods are being used again. There has been no research on alternate systems of roofing, and the corrugated iron roofs are very hot during the day. Materials bought locally by the community were cheaper (see Fig. 2).

Importance of women's involvement

The new phase of activity allows alternative techniques to be introduced. Mobile building centres show these to women's groups in the villages, and regular network meetings train women masons and upgrade training of expert masons. The women also plan long-term village development, including

schools etc. Information meetings are still being held for continued contact with Government. Women masons have also built a women's centre with a stone exterior, using a cement mixer given by the Government.

VILLAGE COMMUNICATORS

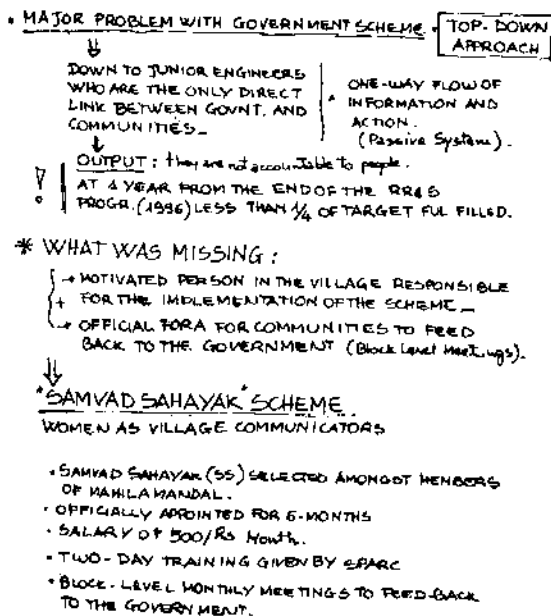


Figure 2 : Explanation of the Barefoot Engineer Scheme in Latur

Discussion.

Heath: This is the right channel for communication, a woman working with women: does gender have an influence? *Nitti:* Originally the men dominated, but roles changed because the men had to work in the fields and the women's value as unskilled labour emerged after the earthquake. They were invited to meetings and quickly learned supervisory skills; they drew plans of their previous houses and what they visualised they should be in the future. Government engineers wanted to just finish and go, but the women wanted the process to continue.

Carter: let people make informed choices and give them materials instead of money. *Nitti*: The people were unsure how to use the money at the start although the junior engineers urged them to get started and use it. No earthquakes had occurred in living memory in this area and it was not realised that some very old houses with thick stone walls resting on teak pillars were earthquake-resistant, but this traditional style had been ignored. Stabilised mud blocks were very popular.

The H&H Rural Workshops: Realising Potential : Samantha Magne, H&H (1999)

Copies of the report on the second H&H field study (Monograph Number 2) were circulated to all participants. The following notes summarise the presentation.

H&H's second pilot project was made in association with Chetonar Dak and the BUET-University of Exeter Higher Education Link, between September 1998 and March 1999. Its main objects were to find out what difference the first project had made to the ways in which people in Sundarban built their homes and to evaluate whether the learning objectives of the first study had been met. Subsidiary aims included clarifying the gender issues that need to be addressed, suggesting ways of strengthening BUET's links with rural areas and to recommend how the workshop process could be developed.

To do this, it was necessary to learn conversational Bangla. English-speaking local village staff were recruited to help as translators and as survey staff. Muti (Matthew Carter, the first researcher) had been a wonderful predecessor. The summary conclusion from the survey was that the participants had been quick to learn, but slow to act. Because of prevalent illiteracy, pictures had to be used, but eventually words were included. Poverty had been a persistent bar to the path of progress.

Despite the presentation of affordable self-help ideas, many respondents had insufficient money for non-urgent tasks. Only 2.7% of original workshop participants had been pro-active in strengthening their existing houses after the workshop. 10.8% had done new building work motivated by the need for extra space and privacy. Meanwhile, in 21.6% of the cases no action had been taken within 6 months to repair buildings damaged by the 1998 flood. 29.7% had done no building at all on homes unaffected by the 1998 flood. Only six people had done some building work: four women-headed households had used ideas from the H&H workshop. The demonstration building (sewing centre) was ineffective because poor people considered it to be "like a rich person's house" and therefore not relevant to their circumstances.

Although H&H's methods are intended to be appropriate to marginal spending, dire poverty after the floods means that people only just get by. When there is then no rain, mud for rebuilding has to come from the base of ponds. Food is scarce and more expensive. Any money available is converted to possessions, or credit has to be taken out, which is risky. Houses do not outlast the loans. People become disillusioned by agencies who do much talking and little action.

I wonder whether giving help with materials is a contradiction or a complement to the H&H approach? Large handouts of materials may get sold off and field workers need to distribute materials equitably. As examples of possible assistance, people need good quality wire for joints, tar and brushes for poles, rice husk, bricks and cement for footings, and the loan of compaction rammers.

An H&H follow-up worker is needed to reinforce the messages and raise people's confidence to carry them out. This is especially important for women participants. Refresher meetings twice a year are recommended, and song/drama teams help to reinforce the ideas. The village NGO, like many similar ones, proved more interested in concrete and "modern" materials than in improved traditional homes and there was still work to be done in convincing such organisations of Building for Safety benefits.

In the family homesteads the living/sleeping areas are generally the best built and maintained houses. The kitchen (where the women spend most of the time) are commonly the worst. "Distressed sales" where materials such as corrugated iron sheet are re-sold to realise capital can adversely affect the women and children who are left exposed in the home.

Summary

To sum up, input is needed in specific types of assistance with materials, closely associated with the workshop technologies. Field workers should be trained to facilitate the workshops and maintain momentum of the programme subsequently. Preliminary negotiations with the community concerned should establish programme objectives, develop understanding of the social, economic and materials constraints prevalent in that community, and to arrive at a mutually agreed plan of action in which the motivators work alongside community based organisations to bring about reductions in hazard vulnerability.

Initial groundwork for providing a route into beneficiary communities has been done in setting up a triangular partnership between H&H, BUET and the Grameen Trust. There were signs of success - a meeting room had been built by a group of women as a Grameen Savings group. The outlook of some NGOs

is that bamboo and mud may be affordable, but concrete and steel are the materials associated with images of progress and modernity; and dealing with this dichotomy will be a key issue in taking forward H&H's approach.

Discussion

Ahmed - My observation was that cynical villagers welcomed Matthew Carter and entertained him. The poor were enthusiastic about our ideas but needed follow-up help. One problem is the immaturity of the village NGO culture

Bodley Scott - No one has a magic solution. Why doesn't health education work? *Ahmed*: Family planning has caught on in Bangladesh. *Choudhury*: Cholera has been defeated in a 5-year programme. Now every woman and child knows how to make rehydration salts, and a psychological approach with messages and jingles is used. *Bodley Scott*: Primary health care is very important - everybody knows the jingle, but do they do it? Birth control is modern; H&H is more traditional in approach and in people's perceptions.

Magne: Maybe architects can come up with a new and modern way to make houses with bamboo walls? *Ahmed*: Treated bamboo has a 10% increase in durability, and in Dhaka there are thatched gazebos on the roofs of rich people's houses. *Choudhury*: Bamboo is associated with poverty. Ideas will take a long time to trickle down from the rich.

Carter: In Sundarban 50% of houses have no corrugated iron or reinforced concrete, and people aspire to having them: so if they were given corrugated iron sheets and were saved from the next flood it would move people up. *Magne*: Corrugated iron is such a saleable asset, and we have found people selling it on. *Choudhury*: Corrugated iron is the worst building material you can imagine as it is very hot, and can be hazardous in wind.

Merefield: How do we motivate village NGOs? *Magne*: We talk to them, work out what's feasible; but if there is no agreement we must let them go their own way. *Heath*: It is not our philosophy to enforce our ideas. *Magne*: Participants in the Carter workshops felt they had ownership of the ideas, but had no confidence to take the responsibility to organise the community. The NGO had agreed to do it, but did not.

Bodley Scott: We need to have people to interpret, and talk to the people who really matter: only certain patterns work because of village hierarchy. *Choudhury*: We are asking in the coastal area what people want to be done, but they are reluctant to talk. *Magne*: In Sundarban we used young people to interview older ones, as they were not perceived as a threat. Interviews took three hours, with women talking to women, and men talking to men. *Hodgson*: Interviewing is quite an art - one cannot believe everything that respondents say!

Choudhury: (referring to pages 26-27 in Magne's Report) The Bengali in the questionnaire is not a good translation, and very difficult to follow. *Magne*: The translator had difficulty with some words. However, the answers showed that they did understand. He was a young man and keen to improve his English. *Bodley Scott*: We must simplify the questions in future. *Ahmed*: The village Bangla is complicated by the gestures which often accompany it. *Grainger*: In order to get ideas across, do you not add some value to the things that you are proposing, in terms of status, by building houses a foot longer?

Magne: The song teams get organised and spread the spirit of the ideas.

Carter: Were the songs made up on the spot? *Magne*: Some were written down.

Heath: Future Recommendations: So far the Workshops have been the main process, but should we continue with this approach? To avoid disillusionment and running the risk of "talk but don't act", more is required than the Workshops perse. If we move outside our self-imposed remit there are lots of implications for the way forward. Do we improve our approach, or think of a different one? *Magne*: The use of proper materials is linked to the Workshop project: we need to prepare a document at the end of the Workshops, and enable these people to put it into action.

Choudhury: There are other efforts going on, and it is important to coordinate with other groups involved with the Grameen Bank and BRAC, and learn from their experiences. The Grameen Bank has already provided loans for half a million homes. *Hodgson*: I will look into the possibility of involvement with other groups when I am next in Dhaka.

Magne: Those who can access loans are relatively well-off and not our prime target group. *Choudhury*: People have to repay two loans before qualifying for a Grameen Bank loan. After a disaster the landless poor are supposed to get free land, houses on raised plinths and corrugated iron sheets.

Heath: We would need to have someone in place to whom we can link to distribute simple building materials. *Ahmed*: The audiences at workshops need to be carefully picked, we need to draw together people who are already involved in building, possibly at a Housing Forum - these ideas are ours and such a forum might generate others. *Choudhury*: We should try two or three other areas. Maybe somewhere close to the river, such as in Buriganga, Rangpur, Sylhet or low-lying areas. *Bodley Scott*: In areas with a different disaster profile.

Hodgson: We need to identify local NGOs who are really interested. Also, should we do this somewhere else in the world? *Magne*: We should get to know about what is being done in South America, and take our work wider than Bangladesh. *Ahmed*: What other things have they done in India which we

don't know about? *Hodgson*: There are various things. I am interested in the landslide problems. *Grainger*: We should build on existing links with other countries.

Agency Intervention in Low-income Rural Housing: Iftekhar Ahmed, Oxford Brooks University and BUET (1999)

This brief presentation is based on extensive field work into village perceptions conducted for my doctorate. The aim of the study was to fill a gap in knowledge concerning the outcomes of low-cost housing projects promoted by NGOs and other agencies. Although the work was conducted in Bangladesh, there should be applications in other regions.

Until now, there has been little evaluation of agency intervention. Possible impediments include financial and resource constraints, hazard vulnerability and natural resource constraints.

The most significant factor in the vulnerability equation is poverty: poorer people are more exposed in hazardous areas. Lower initial cost building materials need more and continual maintenance with ongoing cost implications.

Urban growth has a big part to play. Dhaka has a 6.1% per annum population growth, the world's fastest. There is an emphasis on urban growth, but a dependence on rural areas for natural resources. The result is spiralling costs of bamboo and other natural materials plus depletion of resources. The land/income distribution is asymmetrical and the majority of the population is landless.

International aid has limited impacts. Only after disasters is there any incentive to do anything, but this quickly evaporates. Corruption is prevalent; there is a perception that distributions made after the 1988 floods were much more equitable than in recent times.

Research methodologies used

The study sought to obtain descriptive reviews showing adaptation to natural features and resources. Research methods were empirical. Visits were paid to 12 locations, for up to one week each. Comparisons were made between income and cost of houses, preferences, etc. Two groups of respondents were selected for comparison: the first included those who had received intervention while the second was of those who had not. Responses were also sought from agency staff.

Financing options open to home-builders include loans from agencies, local money-lenders and grants after disasters. The Grameen Bank cannot reach the bottom 10% of the population: poor homes are rebuilt every year, sometimes with loans from friends, which increases indebtedness. A typical

feature of agency building is corruption and a decline of traditional morality. There is a great preference among homeowners for self-built homesteads, which cuts down on opportunities for corruption.

There is a variety of vernacular building forms which typically use a range of natural resources: bamboo, rush-thatch, mud walls and woven bamboo walls. In flood-prone areas a raised platform inside may be used for cooking and storage purposes. These are used as living areas in times of flood.

Agency project experiences

The Grameen Bank houses often have corrugated iron sheets for roofing. These, built around a courtyard, are often not successful as the smoke from the kitchens can blow into other homesteads. In another example, the Chittagong World Vision houses were built too close to each other and there was no room for extension. The Dinajpur Govt. settlement was protected by a river embankment which breached; the settlement is now abandoned. Some houses were rebuilt near to villages where jobs could be found.

Agency-built houses often show a lack of understanding of design issues and sociological factors. Houses with concrete roof tiles (heavy and dangerous in seismic areas) and stabilised mud walls (cracking due to excessive sand in the clay walls) are not unusual. Mud block compressing machines have been promoted but seldom catch on because they are expensive.

Roofing is a major problem, as thatch needs renewing annually. The alternative, corrugated iron, is fifteen times more expensive initially.

Discussion

Choudhury: Where houses are given freely to people they have sometimes been sold to the more affluent neighbours, since housing is not a poor person's top priority. Reinforced concrete posts are preferable to bamboo, as bamboo rots at the bottom; when the homestead has to be shifted there is plenty of manpower available. When houses are destroyed or damaged people still have to repay the loans they had, as there is no insurance. Pre-stressed concrete posts are being produced but are twice the cost of reinforced concrete posts. Another type is a hollow concrete post into which bamboo can be inserted above ground. This is lighter to move around. Even the poorest homes have a plinth, which the women replaster with mud and cow dung after rain; the pillars go through the plinth, 4 ft into the ground, and thus raised above the flood they do not blow away. The Local Government Engineers Department is now making and selling concrete posts to the public. Dissemination of hazard awareness is partly through the NGOs getting into the schools. Hazard studies are now part of the School Curriculum,

to instruct the children what to do in times of cyclones and other natural hazards. Regarding the financing of H&H programmes, *Choudhury* said that the Grameen Trust has funds for research involving demonstration houses but not for housing as such. There are very few research proposals.

Magne: Should H&H should abandon their building research studies and concentrate on village-level empowerment? The Group might then get involved in other projects by offering their expertise to other agencies. This might tap into international funding.

Ahmed commented that re-afforestation was underway in Bangladesh. *Enfants Du Monde* had some ideas for housing projects and had tried stabilised mud blocks. However these had not been fully tested and the results were not successful.

Economics of strengthening traditional buildings: James Lewis, Datum International (1997)

James has been involved in Bangladesh with the Cyclone Shelter Preparatory Study (CEC/World Bank) since 1995 and earlier related missions have entailed recurrent travel in the coastal regions and to offshore and deltaic islands. The project was renamed the Cyclone Resistant Infrastructure Development Project to widen its application beyond one building type now known as "cyclone shelter". About a dozen different building types have been developed based upon various "normal time" uses (schools, madrassas, mosques, markets, ferry terminals etc) and these integrated with thana and community development and local participation.

There are already (1997) about 60 shelter buildings being constructed, but the design consensus shifts daily as they are built. Cyclone Resistant Infrastructure Development relates shelters to existing infra-structure, especially modifying existing buildings. There is a relationship between construction and security: people are reluctant to leave houses in the face of disaster, so houses themselves should be cyclone-resistant. Information on what really happens in a cyclone is very scarce, for instance the storm surge in Chittagong 1991 was said to be 8 metres. Does the water come as a wall or just a rising level? What is the effect of embankments? The water may also outflank embankments along channels which cannot be blocked. Project understanding is of a relationship between domestic construction and other cyclone resistant infrastructure, especially in a refined "high risk area" recognizing that as storm surges and floods are better understood, wind will prevail as the most serious hazard. Houses built on stilts to cope with rising water are more vulnerable to wind and design must take this into account.

Within a loose association with some NGOs in Bangladesh there is something of a contradiction between the development of methodologies and strategies to achieve improved construction in traditional materials, when an increasing number of projects incorporating precast concrete and steel framed domestic construction might suggest to rural communities that traditional construction of any kind would not stand a chance? Funding sources for these projects need to know local conditions and understand local attitudes; is it agreed by participants that simple technical modifications to domestic construction will actually work?

Is it the donors, or our perception of donor expectations, that require obvious technical credibility? Is it possible to convince donors that traditional construction can be made cyclone wind resistant? Are we convinced ourselves? How would such projects be mobilised so as to begin to influence the occupants of the traditional eighty-five percent of Bangladesh dwellings.

Discussion

Carter: It is worth developing traditional methods. People tend to build their own houses and should be enabled to include these improvements. Exchange of views is not costly.

Chisholm: Large-scale disasters would require very costly construction, so not much improvement is worthwhile on the coast.

Carter: In the extreme hazard zones the aim should be to make houses last between disasters.

Ahmed: In the disasters many people took refuge in pukka houses because there were not enough cyclone shelters to go round.

Hodgson: It is important to protect livelihoods as well as lives. The 1991 cyclone left many people in debt. Perhaps a strong box should be built within each house.

Lewis: The Permatent relates to earthquakes where houses fall down but materials are left in place. In cyclones materials are all swept away.

Sewell: The root cause of disaster is because people don't have resources for pukka houses.

Carter: Research and implementation sectors: if donors are told that only 30% of funding goes on infra-structure and 70% on training, what would they say?

Lewis: The World Bank is fickle because there is a conflict between the technological approach and indigenous techniques. Donors want to see concrete and steel, not just better bamboo.

Sewell: Donors do want to see local participation, but need to be assured that it produces effective results.

Building for Safety in Bangladesh: Jamilur R Choudhury, BUET (1999)

Introduction

Bangladesh is well known for its natural hazards. Extreme winds, floods, cyclones, storm surges, earthquakes, tornadoes, drought and river bank erosion all affect the country making it one of the most hazard-prone in the world. 60% of Bangladesh was under water in September 1998, causing damages of between \$1bn and \$2bn, some 3-4% of the GDP. The 1970 cyclone, one of four supercyclones since 1960, and accompanying storm surge killed half a million people. The 1989 Tangail tornado completely cleared an area 2 miles wide by 12 miles long.

My own interest in improving our rural housing dates from 1973. Manuals such as the "43 rules" for wind resistance, produced in US, help to raise the issues but do not in themselves produce solutions. The past three years since the 1996 Dhaka workshop have seen some useful progress in developing hazard-resistant technologies and in evaluating methods for disseminating those.

Planning constraints and successes

Up to 150,000 people annually have to relocate their homes because of river erosion. This has an impact on house design in such areas because pukka brick homes cannot be moved. Corrugated iron and timber are preferred for portability and ease of storage.

Earthquakes pose a significant hazard in Bangladesh. I was impressed to find yesterday an account of the 15th June 1897 Assam 'quake reported the following day in the Devon & Exeter Gazette. Dhaka, then a relatively small provincial city, was severely affected by that event. It is, however, very difficult to convince policy-makers of the immense risk that a repeat of that event would, will pose to the present city of 10 million.

Sometimes disaster-affected people do not want to return home. Up to 15 million people were displaced during the 1988 floods. One third of these went into relief camps, often temporarily accommodated in schools. Dhaka had one million in 435 camps and it was difficult to persuade them to return to their ruined homesteads.

The 1991 cyclone catalysed efforts to improve disaster management and response. 140,000 died in the storm, many drowned by the 6m high storm surge. Analysis afterwards showed that there were too few shelters and many were in poor repair. This led to the formation of the Multi-purpose Cyclone Shelter Project which I had the honour to lead. We recognised that saving lives must be the first priority but that it is also vital to protect livestock and property. The

result was a range of designs which include safe areas for animals. Where a storm surge can be expected, the shelter will be placed on a Killa, or mound, with space for stock. Elsewhere, a design on stilts with space underneath may be used. The important thing is that shelters should have another, principal use during the year. Most will be used as schools to ensure that they are maintained and available when needed. 2,500 such shelters are planned to be built in the high risk coastal belt.

Engineered solutions - the Building Codes

The 1993 Bangladesh National Building Codes (BNBC) published maps and procedures for calculating wind speed hazards. The map shows, for example, that the Dinajpur District can expect maximum wind speeds of 200 km/hr. It also incorporates criteria for engineered coastal zone buildings. For example, it stipulates that all government buildings must be two-storey to give shelter on the upper floor. The 1996 Interim Government, of which I was part, took steps to make the BNBC legally binding on developers but it is not always easy to enforce compliance.

The seismic zoning map clearly shows the high-risk areas of Bangladesh. However, more work is needed to refine this since the lack of early records and the great depths of sediments in Bangladesh make it difficult to define the epicentres of events before 1897 accurately. Certainly, the north east is particularly vulnerable. Sylheti houses are traditionally built with timber frames and mud plaster to make them resilient. However, modern construction ignores the risk (since memories are short) and vulnerable 4 storey brick houses are now common. Warnings of the risks have been broadcast on TV but there is no mechanism for enforcement of the codes so the risk remains.

Engineering non-engineered construction

There is a big need for easily understood guidance and manuals for non-engineered construction. The "43 rules on how houses can better resist high winds" were published in 1977 and the IAAE manual, 1981, covered siting, design, materials and construction methods for rural houses. The BUET group is doing finite element analysis of bamboo frames to better understand their behaviour. The problem is in translating these manuals and findings into practical results. Poor communication of methods and lack of technologies and materials all impede progress.

Another problem is that most poor people have other, more immediate priorities, such as food and clothing. There is also a correlation in peoples' minds between corrugated iron and status or wealth that makes it hard to

convince them that "bamboo is better". The role of the NGOs has to be explored more fully. There may be a role for using modern information technology such as CDS and the Web to disseminate ideas in local languages.

The way forward

When IDNDR started, the emphasis was on disaster relief. It is very encouraging to find that prevention and mitigation have become the main focus as the decade closes. Unfortunately, this facet of our work is often seen as a punishment posting, making it difficult to build up a body of professionals educated and experienced in disaster prevention.

I think that the following pointers will help to address the concerns that I have just expressed:

- a. The NGOs, PVDOS and community groups all have to be involved; It is sometimes hard to persuade faculty members to get into the field but some are interested and academics have to be part of the process too.
- b. Regular workshops would help in the exchange of ideas with and among NGOs
- c. More work is needed to formulate recommendations for the transfer of technologies to the community, such as the use of visual materials.
- d. Post disaster reconstruction provides good opportunities for introducing new technologies. The availability of extra funding should be channelled into adding hazard resistance to housing.

Discussion on Dr Choudhury's presentation:

Magne: You have raised a lot of issues that we should discuss after my presentation this afternoon. I would like to highlight your points on choosing the right materials, the role of Permahouses and of removable housing: I would also say that Intermediate Technology has a department working on Building Regulations. *Ahmed:* Intermediate Technology are revising standards, refining and trying to implement them.

Hodgson: Nick Hall said that the important thing is the process, not the solution. How do we get people to improve housing standards? *Chisholm:* There is a problem in getting builders and developers to conform with regulations as it entails a higher expenditure, unless an economic return can be provided for the minimum cost. The desire for an ideal house internationally came up in 1970s - many were unsuitable: octagonal foam houses (Oxfam) caused health problems and were used for pig-sties in Uganda. Overlaying coded maps shows that a certain type of indigenous housing may be suitable for only part of Bangladesh. *Magne:* The problem with that approach is that the

problem has many complexities and it is hard to incorporate all aspects of housing types, poverty and economic conditions.

Choudhury: Traditional housing is not necessarily the best. In Northern Bangladesh they use mud walls and a very heavy roof with mud on top, the worst thing for seismic risk. Tradition does not correlate with hazard resistance.

Laming: In the aftermath of the 1970 cyclone disaster, many designs for cyclone shelters were produced. What has happened since then?

Choudhury: After the 1970 cyclone 1500 shelter designs were produced, and only one was chosen. 232 shelters were built, of reinforced concrete with the ground floor left open: the walls were designed to collapse when the storm surge comes. 90% are schools, some Council offices. People are reluctant to move more than 1.5 km. from their homes. A larger number of cyclone shelters would be more effective, with primary schools as the best option.

Laming: How will livestock be accommodated in shelters?

Choudhury: The architects are not very happy about mixing livestock and people, as you cannot have the same design replicated. Killa mounds are often far from the village, so people are reluctant to take their animals there and then try to save their own lives. They tend to move in with their livestock and when the storm surge comes they move into the building.

Chisholm: Were there 300 cyclone shelters in 1991?

Choudhury: Another 500 were built, and there are now 1000 existing or under construction. Land availability in the right places is the problem. We need to protect 7 million people, with 2000 people in each shelter. 2ft² per person enables people to survive for a few hours.

Maunder: How much warning do they get?

Choudhury: A few hours. Unfortunately no one can predict the landfall of a cyclone accurately. Warnings were disseminated by 34,000 volunteers with radios, megaphones and mackintoshes! Information dissemination was not well-prepared, but Bangladesh is better organised now.

Building a Safer World for the Twenty-First Century :

Communicating Disaster Reduction.

Madeleine Moulin-Acevedo, IDNDR, (1998).

IDNDR gives great importance to the H&H initiative and its programme of affordable safe homes, which accords with the Decade's objective of strengthening the capacity of vulnerable populations to withstand the worst effects of disasters. Natural hazards are part of life, but the hazard itself is not the disaster, it is the impact on communities, and the aim is to prevent the disaster because the hazards generally cannot be prevented.

Effects of disasters worldwide

Over three million people died from natural disasters during the past 30 years. However, individual years vary: 1997 had only 12,600 deaths from 538 disasters while 1998 will record some of the highest statistics, including Hurricane Mitch, the Bangladesh floods and so on. Disaster consequences are very serious in poor countries where 90% of natural disasters occur, and these have shown a four-fold increase in number since 1960. Moreover, the death toll in poor countries is many times that of a disaster in a rich country, because people live in hazardous locations, on marginal land, vulnerable hill-slopes, on the sides of volcanoes, and their houses are flimsy and lack foundations. Deforestation adds to the risk. In addition, response preparedness is less, and rescue may take up to 36 hours to reach disaster areas. No reversal of this trend can be foreseen, especially as environmental degradation and urbanisation grow steadily.

One aim of the IDNDR is to focus on the prevention of disasters, going beyond disaster response management, and to make people realise that disasters may indeed be prevented or minimised by appropriate measures and sound practices. This is now considered as a vital policy component in sustainable development. While IDNDR is based in Geneva, it has an international mandate but recognises that disasters happen at local community level, and this is where effective measures must be established.

It is important that local people are fully involved and that they absorb the culture of prevention. Such a culture cannot be imposed. It consists of establishment of policies by authorities; public awareness of hazards; and bringing together of the people and the organisations for shared exchange of knowledge and experience. Information collection and rapid dissemination are crucial links in the chain (see Fig. 3).

The Information message

"Prevention begins with Information" was the message of the World Disaster Reduction Campaign of 1998. The media have a special role in shaping public understanding, and have a duty to inform with integrity. They not only report disasters but fashion public attitudes and actions, and thus have a responsibility to create realistic awareness about disaster mitigation, but in general they are not prepared to discuss preventive measures except for storm forecasts.

In Costa Rica a Public Awareness Information System was established and a public poll revealed the effectiveness of the System. Workshops were held with local communities including the indigenous people, and this led to an information campaign expressed in their own words for the local media, which is far more persuasive.



Figure 3 : Communication Tools produced by IDNDR

As the Decade nears its end..

The Decade is now entering its final consolidation phase with a regional perspective, where common risks call for shared solutions, bringing it closer to local realities without losing contact with the international framework. The strategy is to project its competence for disaster reduction beyond 2000, the two main targets: compilation and appraisal of accomplishments in hazard awareness and disaster reduction; and identification and refinement of the capabilities required for sustained international commitment for the next century.

At the end of the Decade success will be measured by the willingness of communities to deal effectively with natural hazards. It is people who will make the difference, with the idea that "prevention of disasters is better than a temporary cure".

In discussion, Jeffrey Try commented that the aim of the 1998 Campaign was praiseworthy but media are not interested in preventive measures, only in the spectacular aspects of disasters. How could this be resolved?



Figure 1. A group of people, including women and children, standing in front of a building.

