

The following reports from Aga Khan Development Network and its global affiliates were chosen to appear in REAL RISK (2006) and RISK WISE (2008).

Both titles are books formally published by Tudor Rose for the International Disaster and Risk Conferences (IDRC) with the full support of United Nations.

Multidimensional post-earthquake reconstruction: the Chakama Valley in Pakistan-administered Kashmir and the Uri Block in Indian-administered Jammu and Kashmir

Najmi Kanji, Aga Khan Development Network

The South Asian earthquake of October 2005 devastated large parts of Kashmir on both sides of the Line of Control (LOC) as well as significant parts of the North West Frontier province in Pakistan. The death toll in Pakistan was around 73,000 (almost 30,000 children) with another 70,000 severely injured or disabled and 4 million made homeless. On the Indian side, damage was confined to two districts with 1,300 deaths, 7,500 injured and over 37,000 buildings damaged. Within days of this catastrophe, the Aga Khan Development Network (AKDN) responded through its affiliate FOCUS, to provide relief assistance to the affected communities. On the Pakistan side, AKDN's fleet of helicopters flew over 1,500 sorties, providing food, blankets, tents and tarpaulin, and evacuated nearly 2,000 injured from the affected areas. On the Indian side FOCUS provided winterized tents and warm clothing to nearly 400 families in 14 villages. On both sides of the LOC, nearly 200,000 people were assisted.

Rebuilding lives and livelihoods

As the relief effort continued, AKDN began to conceptualize the implementation of a three-year, multi-input reconstruction programme in one of the poorest and remotest valleys in Kashmir, with the aim to mobilize and assist local communities to rebuild their lives quickly. It was felt that getting people to start working on daily existence problems would help them to deal with the deep trauma they had suffered. The Chakama Valley on the Pakistan side and the Uri Block on the Indian side,

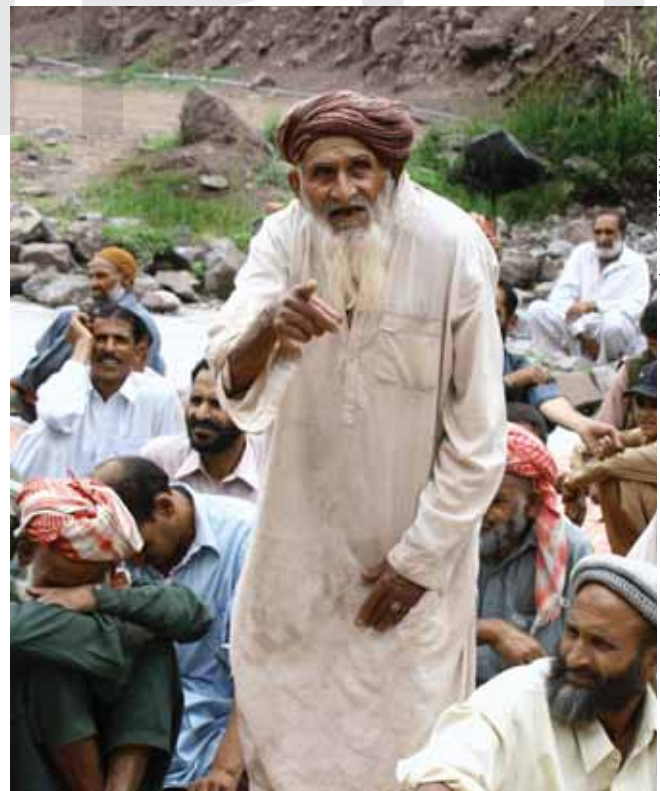


Image: AKDN Kashmir Programme

Communities in the Chakama valley take part in activity-based groups such as village organizations



Image: AKDN Kashmir Programme

Repairs helped to improve traffic on the valley road

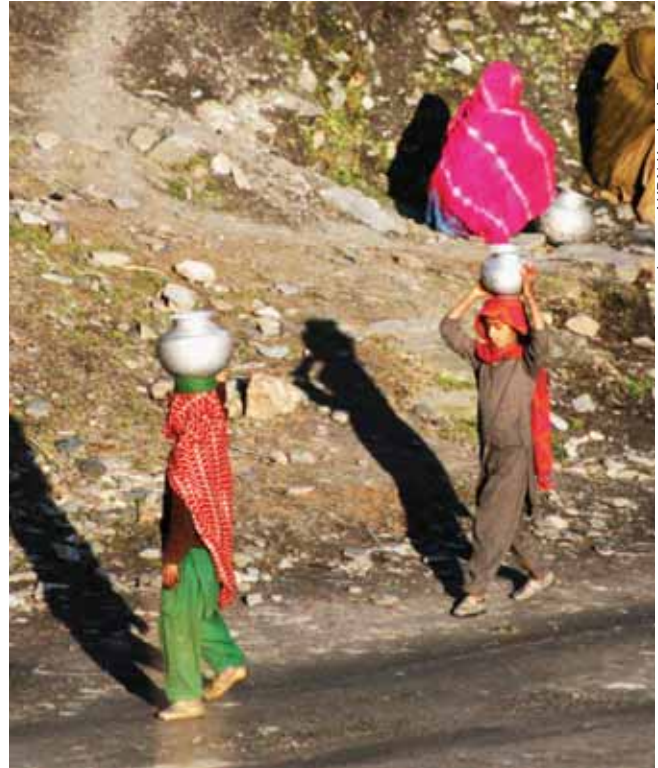


Image: AKDN Kashmir Programme

Women collecting water from the river

where rapport had been built up with communities during the relief phase, and which lie adjacent to each other across the LOC, were selected for the programme with the following objectives:¹

- Promote the establishment and strengthening of civil society organizations
- Facilitate the construction of seismic resistant and thermally insulated homes

- (Re)construct critical economic/social infrastructure, including schools and health centres
- Facilitate the (re)creation of livelihoods
- Improve the quality of health services and schools
- Promote disaster risk management with an emphasis on community preparedness.

It was clear from the start that the enormous effort required to rebuild people's lives could not be achieved unless people themselves were central to the decision-making processes and the implementation of the programme. Thus, community mobilization, with the establishment of democratic village and women's organizations, formed the programme's fundamental activity, upon which all other aspects of the programme have been built.



Image: AKDN Kashmir Programme

Household contributions have enabled the construction and maintenance of water systems

Chakama Valley and the Uri Block

Both programme areas lie off the main Muzaffarabad/Srinagar highway, but comprise some of the remotest and highest valleys in the region. The Chakama area comprises 14 revenue villages and around 33 hamlets, with a population of around 34,000 in some 5,500 households. In the Uri Block, the programme covers around 20,000 people in 17 revenue villages. The topology is very similar across both areas, and maize, wheat and rice in lower areas, are grown mainly as subsistence crops. Walnuts are an important cash crop in Uri. Incomes are derived primarily from government/army employment and remittances. The areas' strategic importance, from a military perspective, meant that the population had been reasonably well serviced by the respective Government and army, and the desire to do things for themselves was limited. Furthermore, the communities were somewhat divided along party political and clan lines, with decision-making firmly in the hands of clan leaders.

Overall earthquake-related damage in both the programme areas included:

- Over 2,700 deaths; 2,000 injured and around 200 disabled

- More than 90 per cent of homes destroyed, the rest damaged
- All 102 schools and nine health facilities destroyed or rendered unusable
- All shops and businesses destroyed
- Extensive damage to water systems, irrigation canals, link roads and to the main road connecting the Chakama Valley to the Muzzafarabad/Srinagar road and urban areas
- Increased vulnerability to landslides and flooding
- Generalized psychosocial trauma.

Understanding and defining priorities

In the early spring of 2006, we thought that community priorities would focus on rebuilding homes to ensure shelter for the next winter, and planting crops for the autumn harvest. As social mobilizers commenced dialogues with the communities, it became clear that whereas people wanted support to plant spring maize, the immediate priorities for the people of Chakama related to ensuring drinking water and to opening up the main valley and other link roads to facilitate vehicular transport of people and goods. Rebuilding homes was not seen as urgent, partly because the process of financial compensation from the Government had not been completed, partly because building designs initially proposed by the government were not suited to the lifestyles and traditions of remote rural areas, and partly because communities were fearful of building again. On the Indian side the situation was similar, with more support requested for repairing damaged irrigation channels. Improved maize seed was distributed to all households to ensure an autumn harvest.

Hence, crop inputs and water supply (for drinking or irrigation) became programme priorities. Water supply became the activity around which communities were mobilized and organized into village groups, with office bearers elected in open meetings attended by at least 75 per cent of villagers in all cases. Simultaneously, women were encouraged to form activity-based groups that could be supported through training or through the provision of grants or credit. Both programme areas now have around 50 village organizations (VOs) of development committees and around 70 women's groups organized around specific, income-generating activities.

A key element of the programme has been to help communities understand natural risk within their living environments and to prepare for potential disaster. As a first step in addressing the seismic risk affecting the area, AKDN commissioned a microzonation study which helped to divide the region into areas of relative risk. This categorization allowed discussions with government and communities on the absolute necessity of reconstructing seismic resistant homes and selecting areas where public buildings such as schools and clinics should, or should not, be built. This macro-level information is being combined with localized hazard assessments by a team of geologists working with village elders providing historical information on local level disasters, to create village-level vulnerability maps.

Critical social and economic infrastructure

With the clearing, repairing and rebuilding of some parts of the main valley road in Chakama, traffic along it improved dramatically and essential materials for building and general sustenance began to arrive in the valley. Simultaneously, the intense work of

mobilizing communities to create their own organizations began. It was essential that the traditional leaders did not feel threatened by the process of dialogue that encouraged communities to elect officials they felt were dynamic, honest, and would put community needs before their own.

The enormity of collective and individual need, combined with AKDN's clear commitment to support infrastructure that would benefit whole communities, convinced people of the need to create democratic organizations that would take the lead in the reconstruction process. Thus, the size, route, types, and above all the sustainability of the priority infrastructure projects for drinking water and irrigation were intensely debated with communities before construction began. In all of the 42 water systems, 19 km of irrigation channels, 29 water mills and a micro-hydroelectric project, the communities have elected project implementation and audit committees to ensure quality and probity in the projects. In addition, significant community contributions have been made either in the form of labour or as a one-off contribution by each household together with an agreement to pay a nominal user charge to ensure that the systems can be maintained. The water systems provide each village with a steady income that is also used for other development purposes. In Chakama, health and hygiene committees (50 per cent women) work with communities on reducing the prevalence of water-borne diseases.

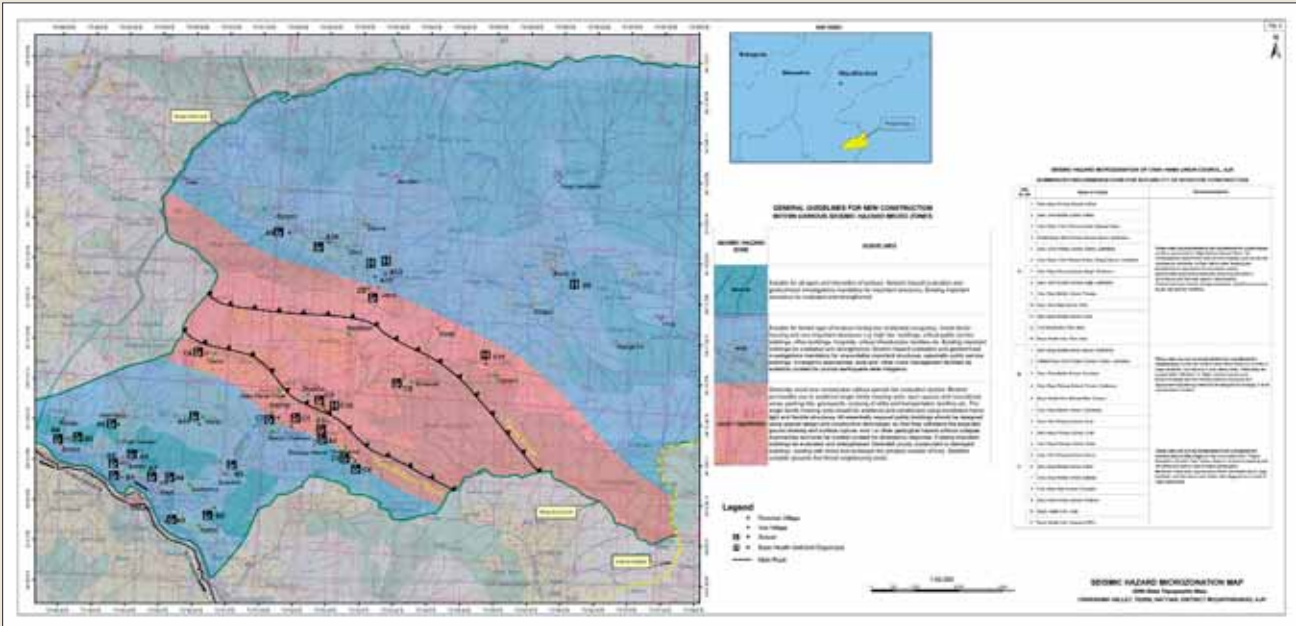
Rebuilding seismic resistant homes

With basic infrastructure reconstruction underway and the harvest completed, communities turned their attention to the coming winter and the need to rebuild their homes. It was imperative that people rebuild homes that were seismic resistant. To promote this, AKDN adopted the following approach:

- A subsidy (in the form of materials and transport) would be provided to each family wanting to build a seismic resistant house based on the guidelines for reconstruction that had been issued by the governments of India and Pakistan; the value of the subsidy would cover the cost of incorporating the elements providing seismic resistance and thermal insulation in the construction.²
- For the very vulnerable families in the villages, the value of the subsidy would be doubled.³
- For the poorest and most destitute family in each of the revenue villages, to be identified by the VO, AKDN would build a demonstration house, free of charge. The construction of this would provide the practical opportunity to train local masons in seismic resistant construction.
- Construction would be owner-driven with regular technical assistance and supervision provided by AKDN engineers to ensure compliance with seismic resistant construction guidelines.
- In Chakama, AKDN would establish a materials' hub at the foot of the valley to help offset transport costs for families, and a transport subsidy would be provided to families living in the upper valleys of both programme areas.
- Each house would be provided with an environmentally friendly, smoke-free stove.

By the end of March 2008, almost 3,000 seismic resistant homes were being built, with around 900 completed. Nearly 200 local craftsmen (masons, plumbers, carpenters and electricians) had

The microzonation map



AKDN commissioned a microzonation study to divide the region into areas of relative risk and allow discussions with government and communities on the construction of seismic resistant buildings

Source: Commissioned by AKDN

been trained. The training of local masons has ensured that seismic resistant building technology is now known in the area. A positive spin-off in the home construction programme has been the reintroduction of the traditional *dhajji* (timber frame) construction, a seismic resistant design that had been abandoned over recent decades in the quest for modern cement/steel structures. In addition to being technologically sound, the *dhajji* design is more appropriate for the higher valleys where wood is locally available, and where transport costs for steel/concrete can be exorbitant. In the Uri programme, homes are being built with roof-water harvesting pipes and tanks.

Public buildings

The microzonation studies that categorized both programme areas into 'medium' (suitable for all types of land use), 'high' (suitable for limited land use) and 'highly hazardous' (generally avoid new construction without special risk evaluation), revealed that many of the schools and health clinics had been built in high and highly hazardous zones. This information was shared and discussed with government officials and VOs, and it was decided that in Chakama, AKDN would build four schools and one Basic Health Unit (all seismic resistant and thermally insulated) in zones deemed appropriate for constructing public buildings. To ensure that children continued to go to school, the Network partnered with the United Nations Children's Fund (UNICEF) to provide first winterized tents, and later prefabricated structures to replace the destroyed schools.⁴ In Uri, AKDN is building three schools, including the only Girls' Secondary School in Uri, and retrofitting another four schools. The construction of schools has been complemented by training teachers in improved teaching and learning methods, materials development and the reactivation of school management committees which are beginning to play an active role in the running and maintenance of the schools.

Where soils studies have shown existing school sites to be unsafe either because of slope instability or flooding risk, communities have offered safer plots for their own land holdings when possible. Not only has the importance of safe sites for public buildings been fully internalized by communities, but when possible, they are willing to provide their own land for the collective safety of their children and of the sick.

In the Chakama programme, apart from the physical construction, a major effort has focused on the soft elements of health and education. Over 36,000 health consultations have been carried out; 500 children under one year old have been fully immunized; over 200 pregnant women and 1,200 women of child-bearing age have received anti-tetanus vaccination; and 29 community health workers, two health promoters, nine lady health visitors and 28 traditional birth attendants have been trained and are working. Similarly, over 150 teachers have received formal training and continue to receive support through a mentorship programme. A learning resource centre has been established for teachers to access teaching materials, and school management committees are functioning in all primary and middle schools. Six boys and four girls have received two-year, merit-based scholarships for higher education. The teacher training programme for the schools in Uri is scheduled to begin in July 2008.

Recreating livelihoods

Most households had lost the seed that they were saving for planting in the winter of 2005 and spring of 2006. Therefore, the first priority was to distribute maize seed to all households in April 2006, to be harvested in November of the same year; and then wheat seed in October to be planted after the maize harvest and reaped in May 2007. To improve incomes, vegetable seed was distributed to willing households in the lower and middle valleys, where climatic conditions are more suitable, at a subsidized rate.



Image: AKDN Kashmir Programme

A dhajji design demonstration home with its traditional timber frame construction



Image: AKDN Kashmir Programme

Children in a primary school class studying inside a transitional shelter

Over 22,000 animals in the valley were wormed and vaccinated; sheep, goats, cows and buffalo were distributed to selected members of the communities to start the process of restocking the animals lost during the earthquake. To create livelihood opportunities for poor women, nearly a thousand poultry birds were distributed. In Uri, mountain-hardy goats have been distributed to women's groups on the basis that each woman will receive a kid to start the slow process of rebuilding animal stocks. Recipients were all selected by VOs on the basis of need and ability.

In an effort to stabilize some of the slopes and to provide an income for local communities, over 120,000 trees have been planted in block plantations, and over 30 demonstration orchards have been established with nearly 4,000 saplings planted. Another 55,000 fruit and forest trees have been planted in 30 backyard nurseries in the hope that, if afforestation can become an income and fuel source for communities, there is a better chance of deforestation continuing at current rates.

On the Pakistan side of the LOC, the AKDN has established a branch of the First Micro Finance Bank in Chinari, the nearest commercial hub to the Chakama Valley. This has allowed people to access credit for reestablishing or starting new businesses, and to open savings accounts that can be used to support loan applications. Up to March 2008, communities in Chakama had saved over USD90,000 and accessed loans of nearly USD200,000. Sixty per cent of the savings account holders and 59 per cent of those who received loans were women.

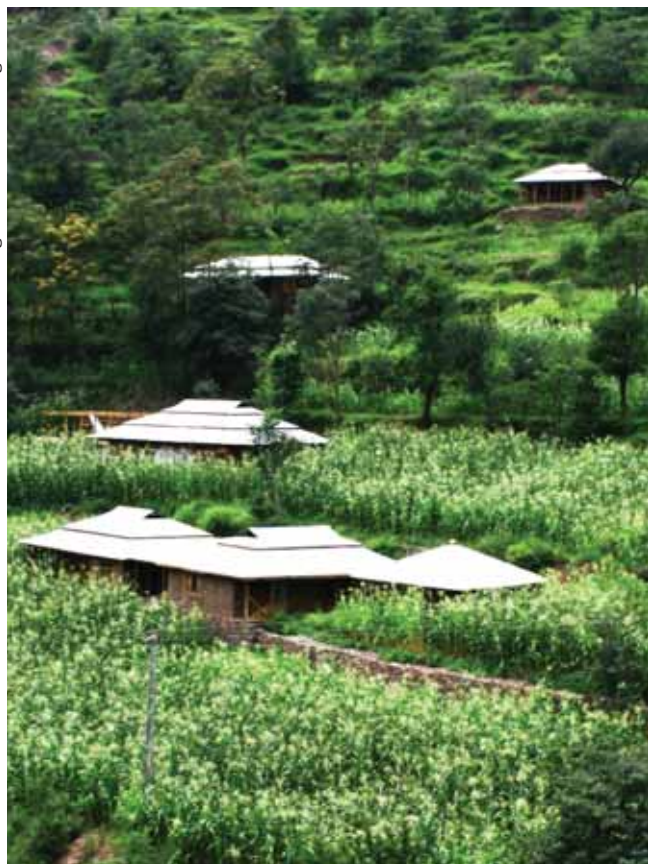
Understanding risk and being prepared

Mobilizing people to understand the types of natural risk in their environments and preparing to mitigate the effects of future disasters proved initially difficult. There was a general

feeling of resignation and helplessness among communities, and a lack of belief about how anybody could do anything to withstand the sort of disaster they had recently experienced. It was only after the basics of life were reestablished and a limited sense of normality returned, that people started thinking of the future.

Simplifying the results of the microzonation study, soil studies and hazard assessments to share them with communities was critical in terms of people beginning to think of how to be more prepared for future disasters. Involving communities in developing village-level hazard/vulnerability maps allowed them to think through what measures were, or were not possible with regard to localized hazards such as rockslides, avalanches and flooding. The whole concept of building seismic resistant homes and public buildings brought about a level of confidence amongst communities on the issue of disaster preparedness. Discussions about moving out of the area also prompted people to think that if they were going to stay in this earthquake prone area, they would have to reconsider where and how they built and, most importantly, learn skills and acquire knowledge about what to do before, during and after a disaster.

School students, teachers and health workers have all been trained in how to react when tremors are felt. Other risks such as fires, slides and floods have also been discussed and the basics of first aid and search/rescue techniques taught to teachers and older students. School and health unit evacuation plans have been drawn up, and regular simulation exercises are carried out to ensure a degree of preparedness. At the village level, 33 search and rescue kits, containing basics such as spades, rope, buckets, torches and batteries, have been housed at safe sites. A further 17 will be placed after the local emergency response teams have been trained. These kits are managed by a committee of the VOs and are for use by the Local Emergency Response Teams (LERTS) that have been



Maize seed was distributed to all households in April 2006

formed to cover all the villages in the valley. The LERTS will have nearly 2,000 trained members, 40 per cent of whom will be women.

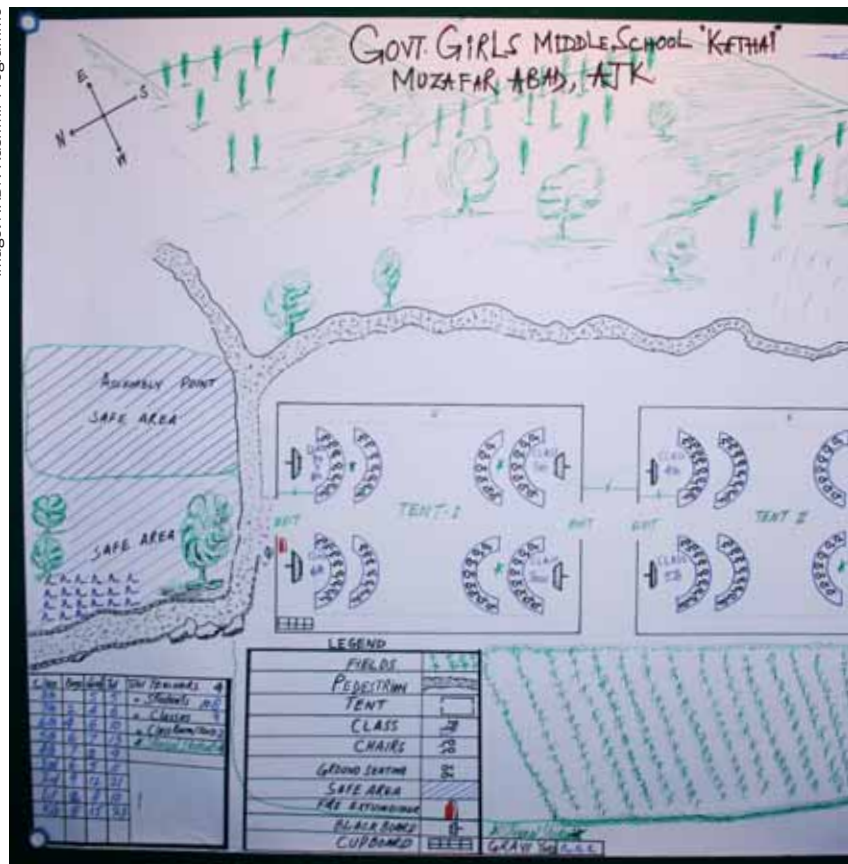
What has been learned?

One clear lesson is that much of the reconstruction effort may have stalled or had limited effect if communities had not been encouraged to be in the forefront of decision-making and taking responsibility for many of the activities. Secondly, community priorities were defined by social, economic and psychological factors that did not necessarily match the donor funding timelines or priorities. Thirdly, reconstruction after a major disaster cannot be limited to one sector or aspect of life — it needs to address them all. From the wider perspective of what risk means to people, how they can be supported to prepare for risk and how development agencies might promote this more effectively, some further points may be of consideration:

Reconstruction efforts need time to plan and implement — Often, people need time to overcome or deal with the trauma they have suffered before they can effectively start rebuilding their lives. In contexts like this, one year or less donor funding for infrastructure projects is unrealistic.

Areas need to be assessed for risk — If reconstruction is to avoid building public and other infrastructure in inappropriate (risky) areas, then time, effort and funds are required to carry out the appropriate studies to define areas and types of risk. Such understanding is currently limited in donor countries.

Mainstream risk analysis and mitigation — Donor support for reconstruction is currently provided through humanitarian assistance or rehabilitation funding lines. If people, govern-

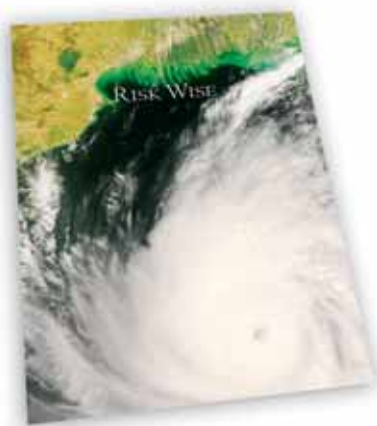


Local level village hazard map plan to evacuate a school in time of need

ments and development agencies are to be encouraged in carrying out a reasonable amount of risk analysis before embarking upon development programmes, then risk analysis and mitigation must be mainstreamed into general development thinking and budgets.

Information needs to be understood — Risk analysis needs to merge hard science with community knowledge and create simple, understandable information that communities can internalize and act upon.

Retrofitting is essential — In many seismically active zones of the world, longer-term retrofitting programmes need to be initiated to make homes and public buildings seismic resistant. This requires sharing risk information with communities and also making available microinsurance and loans for home retrofitting. The costs of rebuilding after destruction are likely to far outweigh the costs of retrofitting.



This report is reproduced from RISK WISE, a Tudor Rose publication for IDRC 2008

Risk resilient communities: the Aga Khan Development Network in northern Pakistan

*Asif Merchant, CEO, and Khizer F. Omer, Manager Planning and Evaluation,
Aga Khan Planning and Building Service, Pakistan
Karim Nayani, Nusrat Nasab and Samina Sardar, FOCUS Pakistan*

The northern parts of Pakistan are among the most isolated areas of the western end of the Himalayas, surrounded by high mountain passes. The area's remote human communities reside in narrow valleys dominated by mountains and rivers. Ethnic diversity of these areas is unique, and many of the passes are migration routes between central Asia and the Indian sub-continent. The construction of the Karakoram Highway has opened the area to outside influences.

Pakistan's northern regions are disaster prone, falling in a seismically unstable zone at the point of confluence of the Indian and the Eurasian plates. These regions are regularly impacted by natural disaster events such as earthquakes, floods, landslides and droughts. Degradation of natural resources, especially the loss of foliage and vegetation, has caused land degradation and soil destabilization. Earthquakes have resulted in the destruction of houses, infrastructure, facilities and property, as well as creating economic and social hardship.

The Northern Areas and Chitral (NA/C) portion of northern Pakistan encompasses two of the country's poorest regions — 50 per cent or more of its overall population of approximately 1.2 million lives below the poverty line. Cultivated land per capita is only 33 per cent (0.11 hectares per person) of the national average,

with per capita income being 56 per cent of the national average. Only 5 per cent of the available land in NA/C is suitable for human settlement, the rest occupied by high mountains. Due to the extreme climate, winter temperatures in most areas fall to as low as minus 15 degrees Celsius.

Understandably, thus, the region has poor housing conditions. Over 80 per cent of all houses are made of mud, or of dry masonry for wall construction. All houses have wooden roofs with a heavy layer of mud for insulation. These houses are a death trap in the event of an earthquake, as demonstrated by the earthquake in nearby Kashmir on 8 October 2005.

The Aga Khan Development Network (AKDN), through its various development agencies and affiliate bodies, has been working for the social, economic and environmental uplift of the NA/C communities for decades. Recognizing the connection between poverty, high seismic risk and poor housing construction, habitat risk management has always been essential to the AKDN development process, with physical development undertaken to minimize risks associated with natural disasters.

As part of the AKDN, the Aga Khan Planning and Building Service, Pakistan, (AKPBSP) undertakes initiatives to develop built infrastructure and promotes indigenous construction technology in these areas. AKPBSP assists organizations and institutions to improve communities' built environment and living conditions through applied research and implementation; improved technological products and tools; and institutional capacity building.

Focus Humanitarian Assistance (FOCUS) is a crisis response agency affiliated with the AKDN. FOCUS provides disaster risk management and emergency humanitarian assistance for vulnerable communities in the developing world, and has units in Canada, Europe, India, Pakistan, Afghanistan and the USA. Through its Prevention, Mitigation and Preparedness (PMP) programme, FOCUS Pakistan builds communities' capacity to reduce their vulnerability to natural and man-made disasters; prevent disasters where possible; reduce the harmful effects of disaster; and assist communities and institutions in preparing for effective disaster response.

Public buildings – schools and health centres

The Kashmir earthquake killed approximately 83,000 people, including about 18,000 children who died in schools when the school buildings collapsed (around 5,300 schools — 66 per cent of all schools in the affected area — collapsed during the earthquake). Yet another 15,000 or so children perished when around 400,000



General view of northern Pakistan

housing units collapsed during the earthquake. The earthquake also destroyed 420 health facilities (74 per cent of the total health facilities in the area), paralysing the entire healthcare delivery system and increasing the difficulty of relief and rescue efforts.

Education and health are cornerstones of AKDN's socio-economic development efforts. AKDN recognized, early on, the importance of constructing health and education infrastructure facilities to appropriate seismic resistant standards, and was constructing hospitals, health, and education facilities to such standards as early as 1983.

The region's education has traditionally been provided primarily by the Government using a system of free primary, middle and, more recently, high schools. However, in the 1950s, there were not enough government schools, especially for girls, in the region. In the early 1950s, His Highness Sir Sultan Mahomed Shah Aga Khan III, then Imam of the region's Ismaili Muslims, began constructing additional 'Diamond Jubilee' girls' schools. With stone walls and corrugated iron roofing on timber trusses, these schools were often built by the communities themselves on community-donated land, with some financial support from the Imam.

In 1984, it was realized that these school buildings were not strong enough to resist earthquakes. Thus started the Self-Help School Construction Programme (SHSCP), initially supported by the Aga Khan Foundation, Pakistan, (AKFP) and later funded by other international donor agencies. The primary objective for the SHSCP was to develop a system that could improve the educational environment for girls in NA/C, particularly within the 100 or so Aga Khan Education Service, Pakistan (AKESP) schools that were then housed in temporary accommodation. In the event of an earthquake, the earthquake-resistant schools were to provide temporary shelter to those whose houses were destroyed.

The school design had to respond to the hilly and narrow terrain with the limitation that many sites were inaccessible by modern transport, and to cope with long cold winters as well as heat and solar radiation during the summer. Local skills were used maximally to reduce costs and to enhance ownership by the community, which was to maintain the building as its asset once the construction was over. Therefore, the buildings also had to be low maintenance so as not to overtax the community's resources.

The prototype design consisted of 13 rooms, built in four phases to provide three, six, ten and then thirteen rooms as the school grew through primary, middle, secondary and then high school levels. Village communities contributed free unskilled labour, sand, aggregate and gravel, while the SHSCP paid for the skilled labour and all non-indigenous materials.

gate and gravel, while the SHSCP paid for the skilled labour and all non-indigenous materials.

Responsive design solution

The result was a single-storey building with concrete, hollow-block, un-plastered walls made onsite using locally available sand and gravel. The building was shaped like an eight-cornered star: a core, comprising five classrooms and an administrative office was built first, with 'corner' rooms added incrementally as the need arose. The design avoided the need for shuttering in vertical elements, and reinforcement was embedded in the hollow blocks, making the school easy to build by semi-trained craftsmen. The roof was also of pre-cast concrete, though it did require some cast-in-situ concrete work with shuttering. The buildings were designed to withstand seismic loads according to the then existing US building classification codes.

In 1990, it became clear that the school design used too much flat land, and that the cast-in-situ concrete elements required complex skills. A research and development exercise tested several alternatives and a revised design — maintaining its concrete, hollow-block walls — added the option of a soil-stabilized block wall. The roof was fully pre-cast, requiring no cast-in-situ concrete work. The footprint of each four-classroom block was considerably smaller and each block could be built on a different slope. The seismic requirements were upgraded to the revised and updated US building classification codes.

Further design development exercises in 1996 and 2003 resulted in revisions including a double-storey option to further reduce the footprint, and random rubble stone walls with metal roofs to cater for varying constraints in different villages. Seismic resistance, however, remains a key design parameter. To date, over 800 classrooms have been built in over 250 villages providing safe schools to over 25,000 students in the NA/C region. The ongoing programme has been recognized by UN-HABITAT as good practice in human settlements.

Similar to the SHSCP, the Aga Khan Health Service, Pakistan (AKHSP) and AKPBPSP in 1993 initiated a Health Centre Construction Programme (HCCP) on self-help construction concepts. The health facilities' buildings consisted of a consultant room, a procedure room, a ward, and nurses' accommodation. Successive improvements have increased the design's cost-effectiveness, durability, and responsiveness to local needs. Almost 40 such facilities have been built to date, with German and British support.



Seismic resistant Aga Khan Girls Academy, Hunza, Northern Areas



A typical seismic-resistant rural health centre

Training to build seismically safe buildings

Wood has traditionally been used for building reinforcement in northern Pakistan. This has lessened over recent decades as forests have diminished and more cement, steel and bricks are being used for local construction. This has made the local houses unsafe and non-durable, as craftsmen lack the skills to properly use modern materials and the resulting elaborate, high-maintenance structures are vulnerable to earthquake risks. To address these issues, AKPBSB initiated two programmes in 1988:

- The Mobile Training Course (MTC) for semi-skilled adults
- The Basic Engineering Course (BEC) for schoolchildren.

The 5-6 week long MTC takes place in villages, with hands-on training in the form of constructing an actual building. At the end of each MTC, a toolkit and a manual are given to the village organization to be loaned free of charge. Enhancing the community participatory approach, the course deals with topics including site selection and planning for construction, house orientation, and building materials.

The BEC aims at creating awareness among schoolchildren about improving and maintaining the quality of the environment. Manuals are carefully conceptualized to be accessible to children of various age groups, and are continually upgraded, while an inbuilt monitoring system charts the success of the course.

The popularity of the MTC/BEC is clear from its social acceptability and increasing enrolments. Its value is also evident in the improved shelter construction in NA/C. Through community effort, trained people also help unskilled neighbours, and there is a marked improvement in living standards. Over 3,000 craftsmen and children have benefited from MTC and BEC courses. A recent internal evaluation found that over 70 per cent of MTC participants have been able to significantly improve their earnings because of the course.

Housing and construction improvement

Private dwellings in northern Pakistan are often found in clusters, combined to form communities or villages. There are three distinct types of house: Bipush or Kho houses, plain area houses, and terraced area houses. The houses are mostly made of timber columns and beams with non-load-bearing infill walls of stone, and mud-reinforced walls with horizontally placed timber logs. Most houses are highly vulnerable to the impacts of natural disasters, such as high-intensity earthquakes. The problem has been exacerbated by the extensive use of wood for traditional house construction, heating and cooking, which has caused excessive degradation to vegetative cover. In addition, most community buildings, schools and other public buildings in the valleys are non-engineered structures.

AKPBSB develops, manufactures and delivers affordable, regionally appropriate home improvement products which provide practical solutions to issues including seismic resistant, energy efficient house construction and insulation. These products and techniques include lighter bow-string and composite beams for reducing timber use in roof construction, HDGI wire wall reinforcement (earthquake resistant) to replace timber wall reinforcement and reinforced concrete columns, and proper foundation techniques to improve load bearing capacity. These techniques, on average, cost only 5-10 per cent more than traditional construction, but are more seismically resistant, less damaging to the environment, and easy to build as they optimize traditional skills.

Non-masoned houses depend on good stone construction with adequate tie-stones, roof diaphragms, minimum openings, low wall

constructions and short wall lengths for earthquake resistance. Nevertheless, even the best-constructed non-masoned houses will fail in a major earthquake. HDGI wire is provided in the shape of a long, ladder-like mesh that can be produced locally. It is applied horizontally between courses of stone or mud block, binding the two faces of the wall and providing longitudinal reinforcement. The technique is equally applicable to dry-stone masonry using stabilized mortar only; mud walls and adobe construction; and in masoned construction with either stone or cement blocks.

Through in-house research, AKPBSB has developed, tested and applied over 60 different interventions to improve living conditions in NA/C, from portable shelving and food storage containers to energy-efficient and thermal-efficient house construction techniques, solar products, double-glazed and roof hatch windows, and water heating facilities. Over 12,500 products have been installed in 5,000 households, benefiting over 43,000 people across 100 villages and reducing annual household biomass consumption by up to 60 per cent in the region. The ongoing programme has been recognized by UN-HABITAT as good practice, and by the UNDP Small Grants Programme as best practice in human and environment development.

Community preparedness

FOCUS' Community Based Disaster Risk Management (CBDRM) project aims to build the knowledge and skills that will enable communities to survive and recover from natural and man-made disasters. Community involvement and social cohesiveness are key to the success of the project at the local level.

CBDRM has been designed for both urban and rural communities to enhance local awareness and understanding of hazards and disasters and, most importantly, to impart skills and knowledge required to enable sustainable responses to disaster by local communities. Whether a disaster is major or minor, it is these people who suffer most. Coping and survival strategies enable them to respond to the situation long before outside help arrives from the government or non-governmental organizations (NGOs). Communities wish to protect themselves through community-based disaster preparedness and mitigation.

The following is a list of key elements of CBDRM, derived from FOCUS' experience in the NA/C:

- *Community participation* — Community members are the main actors and propellers; while sustaining the CBDRM process,



Photo: FOCUS

Training volunteers for post-disaster rescue work



Water supply installed by AKPBSP in Kashmir

they directly share the benefits of disaster preparedness, mitigation and development.

- *Priority for vulnerable groups* — Subsistence farmers, children, women, elderly and indigenous people are the most vulnerable in rural areas.
- *Hazard vulnerability capacity risk assessment* — Risk reduction measures are community-specific and are identified after an analysis of the community's disaster risk.
- *Recognition of existing coping mechanisms and capacities* — CBDRM builds upon and strengthens existing coping strategies and capacities, such as cooperation, community/people's organizations, volunteerism and local knowledge and resources.
- *Capacity building* — FOCUS has trained over 25,000 community volunteers to use local resources to respond to and manage different types of disaster.
- *Provision of stockpiles* — FOCUS has also provided stockpiles at community and regional levels to support community response efforts.
- *Acceptance and recognition* — The ownership of the CBDRM remains with the community and is therefore easily accepted and recognized within it.

AKDN-AJK earthquake response

The Kashmir earthquake in 2005 was the worst to have affected South Asia over the past 100 years. With a magnitude of 7.6 on the Richter scale, its epicentre was about 95 km northwest of Islamabad in Pakistan-administered Azad Jammu and Kashmir (AJK). This major quake was followed by many aftershocks of severe intensity for many days.

The earthquake covered approximately 30,000 square kilometres, causing massive destruction in nine districts of Pakistan, in the Northwest Frontier Province (NWFP) and AJK. Apart from the dead, severely disabled or injured, the earthquake left over 2.8 million people without shelter, assets and livelihood.

Immediately after the earthquake, AKDN was able to mobilize its resources, initially for relief, and then for the reconstruction phase. FOCUS' experience with search and rescue and its relationship with RAPID-UK was used to mobilize the first international search and rescue effort. Its trained team and logistical support were extensively used for distributing relief goods and tents. AKPBSP installed water supply and sanitation facilities in camps and villages and constructed temporary shelters before

the winter onslaught. Other agencies, such as AKHSP, AKFP, and the Aga Khan University Hospital (AKUH) also provided extensive services. The AKPBSP and FOCUS relief-phase experiences were shared with the local communities, NGOs and the Government, where AKPBSP house construction techniques have been incorporated in official infrastructure reconstruction guidelines.

AKDN is now undertaking a multi-input programme in an entire valley of the Kashmir, covering over 25,000 people. Inputs include water and sanitation, housing, education, health, livelihood, other critical infrastructure and disaster preparedness, to be supplemented by the construction of two schools in NWFP.

The AKDN organizations' experiences reveal several key lessons:

- Disaster preparedness is a long process, as infrastructure and facilities are built over a long period, and needs to be part of the development attitude incorporated in all approaches and programmes
- While constructing safer public buildings is important, most damage is done by houses falling down and this sector cannot be ignored
- Underdeveloped and poor communities require programmes and technologies specifically developed for their circumstances and with their continuous input, in order to make them sustainable, affordable and socially acceptable
- Technological solutions need to be supplemented by preparedness activities such as training for relief work
- AKDN experiences in Pakistan affirm the effectiveness of involving communities in disaster preparedness and mitigation. While communities have built on local coping strategies and capacities to reduce some vulnerability, many necessary structural mitigation measures involve large capital outlay
- Vulnerability is a complex web of conditions, factors and processes, which can only be reduced through complementary and concerted action among multiple stakeholders from various disciplines.

AKDN has been working on various aspects of disaster risk reduction in northern Pakistan for decades with a multi-faceted approach that is unique in Pakistan and has been of considerable assistance to the Government and other agencies, especially in responding to the Kashmir earthquake. AKDN has promoted its experiences and techniques at various forums in Pakistan and has campaigned extensively for a national earthquake preparedness programme. However, much still needs to be done, especially in the housing sector. This clearly underlines the huge task involved in making communities resilient to earthquake risks, and the urgency of starting such work wherever there is risk.



This report is reproduced from *Real Risk*, a Tudor Rose publication for IDRC 2006

Disaster risk management in Tajikistan: a Focus approach

Hadi Husani, Executive Officer, Focus Humanitarian Assistance, USA

The Republic of Tajikistan is the smallest and southernmost republic of the former Soviet Union. A landlocked country with a total land area of 143,000 square kilometres, it shares borders with Uzbekistan to the west and north; the Kyrgyz Republic to the northeast; China to the east and Afghanistan to the south. More than 93 per cent of the territory of Tajikistan is mountainous and only 7 per cent of the land is arable. Over 72 per cent of the population lives in rural areas.

Tajikistan, one of the countries with the fastest-growing population rate in the former Soviet Union, presently has a population of just over 6 million, with a little more than 10 per cent of the total population residing in its capital, Dushanbe. The country gained its independence on 9 September 1991. Since then, Tajikistan has had to deal with the dual challenges of a collapsed state-centric political and economic system along with a brutal civil war which lasted approximately five years. This has been a challenging period of transition that has included the abrupt discontinuation of universal social benefits provided by the Soviet Union, a high level of unemployment with approximately 80 per cent of the population living below the poverty level, and national and regional tensions. It is only since the signing of the Peace Accords in 1997 and with the ensuing relative political, economic, and social stability that the country has been able to fully concentrate on addressing issues regarding its long-term development.

Tajikistan: highly vulnerable to natural hazards

The designation of the International Decade for Natural Disaster Reduction in 1989 was critical in highlighting the significant increase in disaster-related loss of life and livelihoods in recent years. It is estimated that the number of people affected by natural disasters was three times higher in the 1990s than in the 1970s and economic losses were five times higher. Moreover, it is expected that this trend will increase during the 21st century with issues such as population expansion, displacement, and environmental degradation all contributing to the increased vulnerability of populations and infrastructure. Natural disasters affect all regions and countries, but it is clear that when such disasters occur in developing or transition countries, they serve to undo development gains and add further burdens on weak systems which do not have adequate capacity to respond effectively. The end result is further economic and often social and political instability.

Due to its geography and climate, Tajikistan is prone to a number of natural hazards. According to an Asian Disaster Reduction Centre report, Tajikistan has experienced three of the ten most severe disasters between 1975 and 2000, according to the ratio of amount of

damage to GDP. In fact, in the span of two years, 1992-1993, Tajikistan experienced two floods and one landslide which together resulted in almost 1,600 deaths and more than 100,000 people affected.

In addition to these hazards, Tajikistan is located in one of the most seismically active zones of Central Asia and the world in general. In the 20th century alone, Tajikistan experienced a number of major earthquakes which resulted in substantial loss of life and damage to social and economic infrastructure. The combined intensity and location of an earthquake in the Western Pamir mountains in 1911 resulted in a massive landslide covering the village of Usoi, backing up the Murghab river, creating Lake Sarez and the world's highest natural dam. Similarly, the Khait earthquake in 1949 created a landslide which moved at a catastrophic speed and buried under it several villages, costing 28,000 lives. Most recently, in 1989 an earthquake 30 km from Dushanbe, although measuring only 5.3 on the Richter scale, caused a massive landslide which resulted in 274 deaths and left more than 30,000 homeless. In addition to these high magnitude earthquakes Tajikistan experiences a number of earthquakes of a lesser magnitude, which may be more isolated in their impact but still serve to disrupt the lives and livelihoods of thousands.

In recent years, the cultivation of more marginal lands and increased migration to urban areas, due to the economic pressures in the post-independence era, have created conditions which multiply the likelihood and impact of natural hazards, increasing the overall percentage of population at risk.



Photo: Hadi Husani

Tajikistan has experienced a number of major earthquakes resulting in loss of life and damage to infrastructure



Photo: Hadi Husani

Lake Sarez has been the focus of studies to identify potential long-term risk reduction options



Photo: Hadi Husani

Tajikistan is located in one of the most seismically active zones of Central Asia

Addressing areas at risk

The Government of Tajikistan has actively engaged the international community in developing partnerships to address natural hazard risk. Using the example of Lake Sarez, in 1999 at the request of the Government, a consortium was created to study the risk faced by Tajikistan of an outbreak flood from the lake. Representatives from the Ministry of Emergency Situations and Civil Defence (MoESCD), the World Bank, the Aga Khan Development Network (AKDN), Focus Humanitarian Assistance (FOCUS), USAID and the Government of Switzerland conducted an assessment of the lake to identify potential long-term risk reduction options.

The resulting initiative, named the Lake Sarez Risk Mitigation Project (LSRMP), focused on the installation of early warning systems coupled with community emergency preparedness to decrease the risk to those most vulnerable within the immediate impact zone. FOCUS worked with communities to develop systems of stockpiles and safe havens, along with community based response and search and rescue teams.

In addressing the risk to communities at risk from Lake Sarez, it was observed that numerous local hazards such as mudslides, rock falls and flooding posed a significant immediate risk, which was reduced using similar interventions. To this end, working with the MoESCD and the international community, FOCUS developed a longer-term approach to addressing the hazards posed to communities in the high mountain environments of the Pamirs.

FOCUS' strategic approach

Established in 1994, FOCUS is an international group of agencies engaged in Europe, North America and South and Central Asia with a specialization in disaster preparedness, mitigation and prevention, as well as disaster response.

Taking the Pamir Mountains, and specifically the Gorno Badakshan Oblast (GBO) as the subject for an integrated risk reduction approach, FOCUS has engaged in a long-term plan to build the disaster resilience of communities through an approach that encompasses risk assessment and modelling, scenario planning and a series of interventions targeted to limit the impact of disasters.

Public, private, community partnerships

Over the years the FOCUS programme has expanded tremendously, numbering the following among its achievements:

- Development of an emergency communication system utilizing solar powered CODAN radios

- Over 200 structural mitigation initiatives
- Risk assessments in over three-quarters of the at-risk communities across GBAO
- A vibrant disaster management GIS and risk model tied to a joint Government and FOCUS incident reporting system.

With an emphasis on community empowerment, FOCUS's approach has been to engage communities in the assessment process along with national technical experts. These joint assessments conducted with the communities result in the design of risk reduction initiatives championed by communities. They include the development of emergency committees and funds, the design and prioritization of disaster mitigation initiatives, three-way agreements on the use and maintenance of communication systems and early warning systems between FOCUS, MoESCD and the community, and numerous other preparedness measures such as the development of stockpiles and safe havens.

Results and impact

As measured by the FOCUS risk model, there has been a reduction in risk of over 20 per cent to the highest risk communities in GBAO over the past four years. Where in 1997 it could take as long as two weeks to receive information in the centre about potential emergencies, it now takes hours. Where once communities looked to the state for every mechanism of emergency support, most now have village disaster plans and committees that work with state agencies as distinct civil society organizations. The lessons of the west have been incorporated into Tajikistan and as the road to development continues, communities are ensured of a more secure future.



This report is reproduced from Real Risk, a Tudor Rose publication for IDRC 2006