

PARTICIPATORY POST DISASTER RECONSTRUCTION

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Abstract

Aga Khan Planning and Building Service, India (AKPBSI), acting in the field of built environment, has worked on post-earthquake reconstruction in Kutch and Kashmir and post-Tsunami reconstruction in coastal Andhra Pradesh. AKPBSI implemented construction, repairs & retrofitting of housing, public buildings and public infrastructure as well as restoration of fresh water sources and provision of sanitation facilities in the disaster affected areas.

The objectives of the programs included demonstration of safe construction practices to communities living in disaster-prone areas for improving their resilience to future disasters. It included mobilizing community partnership for wider acceptance of safe construction practices and promotion of value-added local and vernacular building practices as appropriate technology.

Reconstruction strategies were based on assessment of prevailing construction knowledge through baseline surveys and mapping of resources available in the community. Solutions were formulated with community's participation, based on their needs. These included training and capacity building of local resource persons, demonstration of safe building technology using local materials and skills, formulating a policy for extending subsidy and assistance for promoting safe construction and finally, dissemination and documentation of safe building practices.

Results of the initial assessment showed large gaps in knowledge of safe construction practices among skilled craftsmen as well as laypersons. An inclusive action plan for reconstruction involving communities was required to create awareness of the importance of safe construction. During program implementation, demand for safe construction methods grew exponentially with increase in capacity building and training of resource persons in the use of local materials. The impact of the program was the creation of disaster resilient communities.

Keywords: Community Participation; Safe Construction Practices; Training & Capacity Building; Dissemination.

Introduction

The Aga Khan Planning and Building Service, India (AKPBSI), a not for profit organisation under section 25 of the Government of India's Companies Act 1956 is an agency of the Aga Khan

Development Network (AKDN)¹(www.akdn.org) engaged in enhancing quality of life for urban and rural communities through appropriate built environment interventions for more than three decades. Its key focus areas are Disaster Management, Water and Sanitation and Habitat Improvement.

Disaster Management as a thematic area was institutionalized following the Gujarat Earthquake of 2001. There onwards, AKPBSI has worked on post-Tsunami reconstruction in coastal Andhra Pradesh and post-earthquake reconstruction in Kashmir and ongoing DIPECHO program in Gujarat. This paper is based on implementation of Tsunami and Post-Earthquake Rehabilitation program in Jammu and Kashmir (J&K) program.

Table 1. Project Profile

Program	Types of interventions	Construction Approaches Adopted	Remarks
Andhra Pradesh- from relief to development (APR2D- 2006-2009)	Construction of cyclone / shore based shelters, village roads, rejuvenation of water bodies, sanitation	Village community trained for monitoring	Base line survey revealed that coastal communities do not have semi-skilled manpower, whereas in J&K and Gujarat, there is huge potential of improving skills of existing masons
Jammu and Kashmir Earthquake Rehabilitation program	Construction of housing, retrofitting / new public building (schools, health centers)	Construction led by trained masons.	

Program planning was based on initial assessment² of the affected communities, which revealed a dire need for sensitizing and educating communities in safe construction, which they could easily learn, imbibe and adopt on their own terms. There was a need to demonstrate that the flaws in their existing homes were due to improper engineering and not because the materials used were faulty (People’s Response to Tackle Shelter Needs, page 7, NCPDP, 2006). In both Jammu and Kashmir and Andhra Pradesh, the general myth created over a period of time about the use of Reinforced Cement Concrete (RCC) and the only safe construction materials needed were burnt bricks. Base line showed that affected communities had a very low level of awareness of safe construction practices. Simultaneously, it became quite evident that major loss of lives and economy was primarily due to poor construction and compromising on construction quality. The program therefore focused on developing disaster resilient communities by building awareness through demonstration and enhancing local skills for safe construction practices using local resources.

In Jammu and Kashmir, community consultations revealed a presence of skilled masons within the community who were willing trainees for the Masons’ Training course devised for promoting seismic resistant construction using locally available materials.

These trained masons went on to become master masons in the program. The training was carried out through the process of constructing demonstration houses to provide hands-on experience (Collaboration for Vulnerability Reduction, page 9, NCPDP, 2006). These trained masons then took other village masons as their under-study and were employed in the construction of other seismic resistant homes in the same manner in which they had been trained.

¹ AKDN agencies are non-denominational development agencies and institutions that seek to empower communities and individuals, often in disadvantaged circumstances, to improve living conditions and opportunities. Working in over 20 countries, the Network’s underlying impulse is the ethic of compassion for the vulnerable in society, and its agencies and institutions work for the common good of all citizens, regardless of origin, gender or religion.

² Baseline surveys for all the projects were undertaken. Base line focused mainly on existing construction, skills, people affected.

This was the foundation on which the entire reconstruction program was based and it covered new construction as well as retrofitting (strengthening of originally under designed buildings) of vulnerable housing and public infrastructure. Houses of vulnerable families were reconstructed and served as demonstration homes and training sites in each village.

However in Andhra Pradesh, a detailed resource mapping revealed that there was insufficient availability of skilled man power such as masons and carpenters for implementing construction work at the local level in the communities, which the project aimed at involving in the construction of cyclone shelters, shore based shelters, a road for safe evacuation, various water supply and sanitation units. The affected communities were mainly involved in their traditional occupations of fishing and farming and did not evince interest in developing construction skills.

This ruled out the possibility of implementing community-led construction of multiple interventions and other methods were needed to involve the communities in the construction activities. The methods developed promoted intensive community mobilization to include women and members from marginalized sections. They also focused on capacity enhancement of members in good construction practices, which would be used for monitoring and supervisory activities.

Program Implementation Methods

Program Questions:

- How can appropriate disaster resilient construction technology be introduced to communities for long-term sustainability?
- How can the most vulnerable sections of society also have access to and participate in adopting appropriate disaster resistant technology?

The first step in both the post disaster reconstruction programs was to conduct a need assessment through field visits, individual discussions with the affected villagers, group discussions with the communities for habitat development in the communities as well as a resource mapping to identify availability and skill level of skilled local craftsmen.

In Kashmir, the study showed that villages had large numbers of masons and that some senior masons called Ustad³ were well known for their high levels of skill. The most encouraging aspect was the fact that they were willing to participate in training since they were eager to learn. They wanted to understand why the walls built by them collapsed and what could be done to prevent such collapses in future. In the gatherings of the villagers and these masons addressed at religious places over a period of time the proposed building systems and plans of proposed houses were shared for their review and inputs. In turn, they were asked to share their knowledge of local construction practices with the program engineers (Collaboration with Aga Khan Development Network (AKDN) – Mason Training Program & Demonstrations, page 12, NCPDP, 2006).

³ Ustad means master in Urdu language

Program Objectives:

- To determine the drivers of post disaster reconstruction activities within the community
- To survey available local resources and their suitability for sustainable post disaster reconstruction.
- To devise appropriate strategies for involving local communities to participate in post disaster reconstruction activities
- To determine lessons learnt for the purpose of devising programs for building resilience among communities through dissemination of safe construction practices.

Training and Capacity Building of Local Masons in Jammu & Kashmir:

Based on the willingness of the village masons to participate in the program the following interventions were implemented (Intervention for capacity building for earthquake risk reduction' page 8, NCPDP, 2006).

i. Technology Demonstration:

Demonstration of construction helped establish the economics of the improved technologies. It also helped prevent confusion that could arise out of different types of construction that came up through interventions by different outside agencies.

ii. Training of "Wastukar" or Building Artisans:

Hands-on training of artisans in building construction was the greatest need of the hour since they were the ones who were going to help people rebuild their houses. Unless and until those artisans were intensively trained in earthquake resistant new construction as well as in restoration and retrofitting of existing houses, they would not be able to respond appropriately to the need of the hour (Intervention for capacity building for earthquake risk reduction, page 8, Collaboration with Aga Khan Development Network (AKDN) – Wastukar Trainer's Training Program, page 11, Mason Training Program & Demonstrations, page 12, NCPDP, 2006)

These training programs exposed the artisans to the following:

(a) Ways of ensuring adequate earthquake resistance in vernacular construction

(b) Techniques for restoration and retrofitting of existing vernacular buildings

The training focused on earthquake resistant new construction and on restoration and retrofitting of existing structures. Training for new construction was carried out through mock-ups while retrofitting techniques were demonstrated in a damaged school building. The training also attempted at targeting common myths as well as poorly understood new materials like cement and steel. Through a dialogue that got established between the participants and us, doubts were cleared in a friendly atmosphere. Confidence in local materials was also restored.

iii. Refresher trainings:

Additional training programs were conducted to reinforce the learning among the masons. Additionally, the demand for brick construction from some village communities prompted training in earthquake resistant construction using brick masonry.

iv. Absorbing trained masons in the program:

During training it was observed that the skill level varied significantly among masons. Some of them were specialists with some having more masonry experience and others more carpentry experience. The more experienced ones were able to take lead, especially when something new had to be done, and taught the junior masons hands on as the work progressed. In this region the tradition of “Master and Disciple” (ustaad and shagird) is still alive among the building artisans.

Therefore, Ustaads were offered employment by the program, working full-time on reconstruction of houses. This assured a source of livelihood which was welcomed by the masons and proved to be another strong aspect in the progress of reconstruction activities.

Involving Local Communities in the Reconstruction Process:

i. Construction of demonstration houses:

It was decided that for the purpose of demonstration and training, a house would be built in each village for a vulnerable family belonging to a widow, a disabled person or an elderly individual. The selection of these families was based on community consensus and further validated by the program team against a set of selection criteria.

The selected family participated in site clearance, providing unskilled labor and salvaged material from their damaged houses. The sites of these demonstration houses became hubs for communities to experience the new technology first hand and familiarize themselves with it.

ii. Extending housing reconstruction support program to cover more families:

The next incremental step was to extend the housing program to other vulnerable families and promote a two third – one third model of financial contribution between the agency and the participant. The participant’s contribution could further be made through material supply or as construction labor. The only condition to this arrangement was to make use of earthquake resistant technology and the construction expertise of masons trained in the program. This part of the reconstruction program set the pace for participants to use their own resources for construction and avail of the enhanced skills and capacities of their own village masons and artisans.

For the housing reconstruction support program, vulnerability criteria were developed to include the poorest widows and women headed households, the elderly with no support systems, physically and mentally disabled persons, and orphans. While VDC (village Development Committee) members initially proposed names of the most vulnerable, these were subsequently verified by field staff and masons, and discussed with the community to obtain consensus.

iii. Increasing coverage through “Technical Assistance Program”:

Gauging from the reaction of communities towards adopting earthquake resistant construction practices based on local building techniques, it was evident that the additional expense of providing seismic resistant measures was proving to be a hurdle in faster coverage. Hence the next phase was devised to overcome this challenge through a system of technical guarantees and marginal subsidy.

The technical assistance program was centered on a scheme to provide Rupees 36,000, in two installments, to assist those who wanted to build earthquake resistant housing. All construction material had to be provided by the house-owner. The subsidy level was based on the labor costs for hiring masons for construction. Following community dialogue in program villages, the scheme

was expanded to both provide Rupees 36,000 as well as critical building materials, which were not readily available.

Criteria and inspection schedules were laid out for construction. Site engineers and four master masons working on the program were given the responsibility of site inspection, assessment of adherence to agreed criteria, and recommendation for release of payment installment. Several of the masons also learnt about schedules and the need for specified criteria through observation of what was happening at site, rather than through any formal training.

iv. Retrofitting of damaged infrastructure:

Retrofitting or strengthening of under-designed or poorly designed structures was a completely new concept and it was eventually carried out for three damaged schools (of villages Dardkot and Basigiran and in village Sultan Daki, retrofitted during the masons training program,). At the end of the program the trained masons had developed full expertise in retrofitting and were able to handle these projects independently.

Post-Tsunami reconstruction in Coastal Andhra Pradesh – Andhra Pradesh – from Relief to Rural Development (APR2D)

For APR2D, during the course of Need Assessment, the following components of disaster preparedness, mitigation and prevention were prioritized to reduce vulnerability of the inhabitants owing to the geographic location of their villages.

1. Capacity building of the community and community based institutions (relief, response, recovery).
2. Restoration of water resources and community based approaches to manage, operate and maintain these resources.
3. Monitoring of water quality and capacity building of existing community institutions in this regard.
4. Community involvement in management, operations and maintenance, which was seen as an important component to ensure sustenance and appropriate use.

The program worked simultaneously in partnership with the communities and local government for all construction works (restoration/improvement as well as new construction). Key areas for joint decisions and approval were around aspects such as identification of no construction zones, adherence to construction standards, materials to be used, layout and designs. As key issues and actions were identified, action plans were refined to ensure that the designs were environmentally sound and best practices were followed to draw on the most appropriate technology for local conditions for long-term sustainability.

The project promoted community initiatives for repair and maintenance of damaged cyclone shelters and promoted community ownership for use of cyclone shelters through activities such as:

1. Involving community institutions in planning, construction, repair and maintenance of structures.
2. Community contributions for supporting construction activities.
3. Identification of alternate uses of cyclone shelters and allocation of roles and responsibilities to community institutions for effective use and maintenance.
4. Establishing linkages of the community institutions, notably the Panchayat with the Mandal/district level administration and Panchayati Raj Engineering department to support maintenance.
5. Incorporating plans for access and use of community shelters at times of disasters for safety.

Role of Stakeholders: Communities/ Village Development Committees/ Agency

The construction committee within the Village Development Committee was engaged to support construction works. In the event of the construction process being contracted out to a local contractor, the Construction Committee (CC) was given full authority to scrutinize accounts and all operations to ensure transparency, accountability thereby developing a sense of ownership. Members of the CC participated in all the activities related to identification of the land, construction related activities and monitoring processes. This committee was empowered to verify the physical stock and quality of the materials and construction work from time to time. Thus the CC played the following broad roles:

1. Material management (Procurement/ Purchase)
2. Monitoring day to day work
3. Providing safety and security to assets
4. Managing the shelter
5. Reviewing construction quality regularly

Physical Stock Verification and Quality Certification:

The CC verified the physical stock and quality of the materials and construction from time to time. The project team provided necessary capacity building support to the community members. As far as possible the stock at the site was kept under the control of the committee.

Storage and Movement:

To store cement, steel and other construction materials, identification of a go-down close to the construction site was needed. The village-level Construction Committee was responsible for the provision of watch and ward of the go-down.

Display Boards:

In the interest of maintaining transparency at all levels it was proposed that all information regarding use of labor, materials, stock position and time line of construction was displayed at the site with regular updates.

Mainstreaming gender in construction works, and in the use of buildings and future maintenance of the buildings:

During the entire process, efforts were made to motivate village women to take part in construction works, to actively participate in the Shelter Management Committee and in defining the use of the building and maintenance strategies.

The construction of these buildings would have far-reaching impacts towards generating awareness on gender balance, women's empowerment and long-term sustainability.

Program Results

Program results were both qualitative and quantitative in nature. They also varied across different regions. While they showed the existence of ample local skills and resources for post-disaster reconstruction in Jammu and Kashmir, they also indicated a huge gap in skilled resources in coastal Andhra Pradesh.

In Andhra Pradesh 14 Construction Committees were formed with 71 members (46 men and 25 women) from 14 villages. Each committee had a minimum of 5 members with a 3:2 representation of males and females respectively. These committees were sub –committees of the Village Development Committee, which enabled broader community consultation.

In Jammu and Kashmir the local masons were respected by the communities and were strong opinion leaders when it came to advocating building technologies in the community. Thus the newly trained village master masons became the conduit through which safe construction technology was disseminated in the community. This led to faster acceptance of the method and also created a skilled work force, which would continue the practice of safe construction. Another major advantage of creating a skilled work force was that it helped to overcome the acute shortage of competent contractors for carrying out infrastructure building activities. Teams of trained masons were entrusted the task of building schools, health centers, irrigation canals, sanitation units and water supply systems. This helped to create a sense of ownership among the community towards the interventions that were being carried out. It was then also very feasible to gain community inputs and feedback on the designs and construction methods being employed. Other added advantages were the help and cooperation that the community offered for the creation of this infrastructure. Local trades benefited through providing their services for material supply, safe storage, and transportation over hilly and difficult terrain and in some cases by offering a part of their own land for locating the village infrastructure. A long-term impact of this method of implementation would be a well-coordinated and strongly cooperative village community.

The AKDN Earthquake Reconstruction Program conducted 5 training programs for village masons on earthquake resistant construction techniques in 2007. Experienced consultants in earthquake resistant construction techniques conducted these trainings. A total of 97 masons were trained, and of these 25 employed on the AKDN Earthquake Reconstruction Program to support the reconstruction of homes for vulnerable families and provide technical assistance for earthquake resistant reconstruction. Refresher training for these 97 trained masons was organized in 2008 and conducted by external consultants focusing on earthquake resistant brick construction as well as the use of local material (stone and mud mortar). This focus was in response to an increasing demand for brick construction in the program area by the communities.

In all, the trainings would lead to improvement in the quality of life for communities living in 17 earthquake affected villages and help to mitigate future disasters in this seismically active area, in a sustainable way. Techniques of bitumen preservation of timber, triangulation of the roof, and revival of the dhajji dewari system were developed through the housing reconstruction program.

For reconstruction of public buildings, there were issues of private ownership of land (requiring in one case donation of private land for construction of a public building) and of the vulnerability of land to natural hazards. It was on account of the latter, that the program did not support the reconstruction of a middle school in village Shahdara, where the existing site for the school was not deemed safe on account of its proximity to a cliff.

The Village Development Committees that were proposed to supervise community participation were mainly comprised of important local individuals and there was no formation of public bodies such as the gram sabha, and hence they did not perform as public representatives, except in compact homogeneous villages/hamlets. AKDN therefore changed tactics to form user groups – around the kuhl (irrigation channel) restoration, for example, with more direct access to AKDN and circumventing the traditional leaders.

Dissemination of Good Construction Practices:

The construction methods that were jointly developed with the participation of the local masons and artisans and which adhered to national building codes while retaining the local construction practices of Kashmir needed to be documented and disseminated to the communities in Jammu and Kashmir. This need was met through the publication of pictorial construction manuals in Urdu for village masons that were easy-to-use and comprehend. In addition, master masons from the villages were interviewed in radio programs over local radio stations to give a first-hand account of the new techniques that they were promoting to achieve seismic resistance in structures that they were reconstructing.

Another interesting development was the creation of a demonstration kit for promoting seismic resistant construction. The kit consisted of a scaled model of a typical house, which could be assembled to show the various structural elements, which add safety to it. The kit was accompanied by pictorial representation of the sequence of construction and the significance of the various elements in providing seismic resistance. It could be used to demonstrate the concept of seismic resistant construction to users of all ages, from school children to construction workers, masons and homeowners.

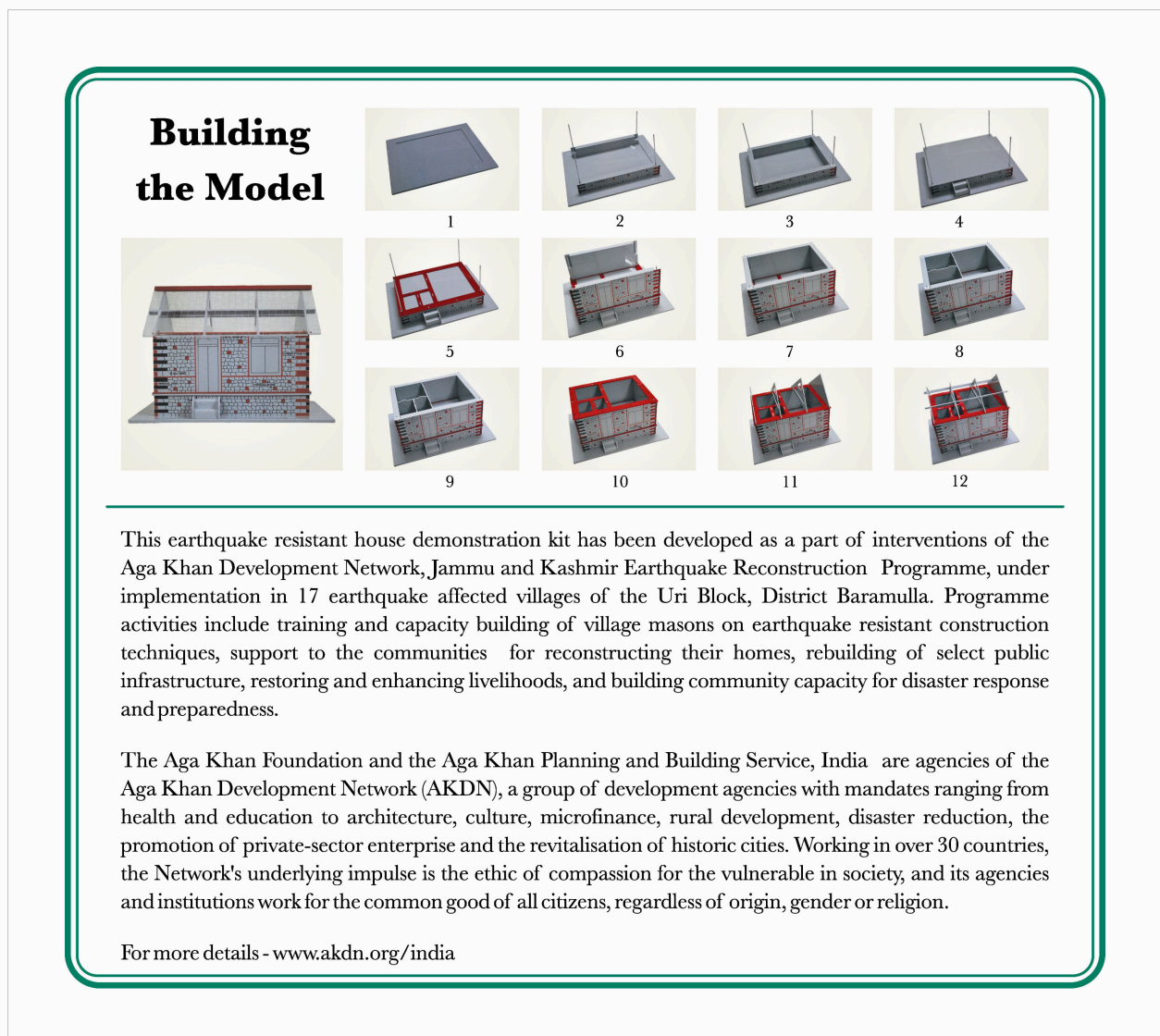


Fig.1. Demonstration Kit developed to promote seismic resistant construction

Discussion and Conclusions

Key Lessons Learned:

- Reconstruction program strategies are dictated by the specific skills and capacities existing in local communities.
- Scientific construction technology adapted to local building practices and using local skills results in more sustainable acceptance.
- Good practices in construction demonstrated through real-life models receive community buy-in more readily – “Seeing is believing”.
- Capacity building linked with livelihood generation provides better acceptability.
- Time required for construction should be in addition to the time required for mobilization of communities.
- Need to build post-program impact analysis after completion of project.

Program results from both locations demonstrate the fact that reconstruction strategies are dependent upon the skills and capacities existing in those communities. In order to involve communities in the reconstruction process and to ensure their involvement, activities have to be tailored to their needs and capabilities. The common element in both instances was a need for extensive community mobilization and awareness generation as well as capacity building initiatives.

Reconstruction programs are usually time-bound for a period of three to five years. It is evident from both case studies that the time taken for initiating the actual construction activities after adequate community mobilizing and capacity building is often very short towards the end of the program. Moreover, the community's readiness for participating on a large scale is evident only towards the final phase of a time-bound program. Hence there is a sense of incompleteness, despite the significant achievements that are made both qualitatively and quantitatively, whenever these programs come to an end.

Since the most significant aspect of post-disaster reconstruction programs is their sustainability after the exit of the agencies from the location, it would be useful to build in a post program impact analysis after a period of five to seven years for sharing their findings across networks. These studies could be an important pointer and could help validate programs for the benefit of stakeholders such as participating governments, NGOs, implementing agencies, academia and the donor community.

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Author's Biography:



Surekha Ghogale has participated in developing strategies for implementing post-disaster reconstruction programs in the states of Jammu and Kashmir, Andhra Pradesh and Gujarat, India. Drawing from the experiences of training experts and earthquake engineering professionals, she has worked with her teams at transmitting this knowledge to local communities. She has developed the concept for preparing a user-friendly demonstration kit for promoting seismic resistant construction for children, masons and other members of the community.

She has been a research guide to students of Industrial Design for designing temporary and permanent shelters using bamboo. Her team is currently working with village masons to develop appropriate technology for multi-hazard resistant structures.