





Production : Safer World Communications, SEEDS

Photographs : Sarika Gulati

SEEDS, in partnership with Mittal Foundation and Children's Investment Fund Foundation and, reconstructed 18 schools as part of the Post Flood School Restoration Initiative in Barmer, Rajasthan, India.

he "Ankur" project has been an exhilarating experience for the team at SEEDS. Bringing the smile back on the faces of children traumatized by the torrential rain and floods in 2005 was a task that had to ensure both high standards of professionalism in project delivery and an approach that was empowering for children, teachers, members of the community and the local administration.

This book briefly captures the process, our experiences, the challenges and struggles of working under one of the most hostile conditions. The support we have received from the community, the District Authorities, and our principal donors, The Children's Investment Fund Foundation and Lakshmi and Usha Mittal Foundation, has been reassuring throughout. In particular we would like to thank Mr. Subir Kumar, District Collector, Barmer; Sub Divisional Officer, District Education Officer, Block Development Officer, Block Education Officer and other officials of the District Administration; Gayathri Mishra Oleti, CIFF; Sharda Shekhar, Helen Beckerson, Mittal Foundation; Bashabi Dasgupta (Architect) and our local volunteers. We would especially like to express our gratitude to Mr. Aditya Mittal for taking personal interest in this project.

The millennium development goal of seeking to achieve universal primary education has to be our common endeavour. In striving to achieve it, we have to ensure that children go to schools that are safe, and provide a welcoming environment to learn and grow into responsible citizens. The Ankur project gave an opportunity of restoring schools following the floods. We decided it should not merely be a rebuilding programme, rather a process of "building back better". As this project draws to a close, we feel this initiative has contributed in part to the advancement of the millennium goal.

We, at SEEDS, hope this book inspires you with some lessons and ideas that you may want to share or initiate in the future. Do write in to us at info@seedsindia.org with your comments or suggestions.

The SEEDS team March 2008





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The 2006 floods were the worst in 200 years. They left a trail of destruction and suffering. Schools were hit hard buildings destroyed, classes disrupted and children traumatized.



Barmer Floods: The Impact

The floods were catastrophic not only on account of the lives they took - over 100 people died - but also in terms of the damage they caused to the infrastructure. Widespread devastation occurred, tearing down most of the houses and public infrastructure that came in the way of the flood waters. The damage was magnified because the buildings were not constructed to bear the brunt of this force of nature. None had ever imagined that this face of fury would ever come into their lives in this peaceful and remote desert region.

The school buildings were no exception; most of them suffered damage as they were not designed to cope with such hard rain and swift flow of floodwater. School buildings constructed on bentonite soil were split open due to huge deformations of the sub-soil, which has a tendency to swell when it comes in contact with water. Schools located in low lying areas were inundated for weeks, further worsening the damage.

A largely invisible, yet devastatingly deep, impact was on the education system and the psyche of the children. Schools were initially closed, and then started operating from tents. Attendance fell. Every time a dead body was discovered in the waters, the children would be traumatized.

Unprecedented floods in the desert state of Rajasthan in August 2006 gave rise to one of the worst floods in the history of Rajasthan. Barmer was the worst affected because of heavy rains and downstream flow of rainwater from Jaisalmer. Besides loss of life, livelihood, shelter and infrastructure, the education system suffered a massive jolt. Many school buildings were destroyed and many more were rendered unusable and unsafe due to the resulting damage.



Classes being conducted in the open at Lopal Nadi

18 schools restored, including 5 entirely new constructions

Disaster resistant construction in compliance with technical standards and the local environment

Schools provided with **added facilities** like blackboards, furniture, toilets, kitchen, office, and learning aids

Water harvesting facility installed

Training on **psychosocial care** and **water and sanitation**

Project Ankur

SEEDS, along with its partners Children's Investment Fund Foundation (CIFF) and Mittal Foundation, embarked on the task of restoring 18 damaged schools in the flood-hit region of Barmer. Out of the 18 schools 13 were restored at their original site and the remaining 5 were relocated with entirely new construction. The project entailed a comprehensive survey, wherein not only damage to school buildings was taken into account but also other factors such as the remoteness of the school, the presence of other schools in the area and the number of children enrolled in the school were also considered.

The objective of the project was not merely the reconstruction of school buildings. The larger aim was to create a learning environment that would promote the cause of children's education with a wider perspective and in the longer term.

Apart from constructing buildings, the schools were made as safe refuge facilities for future emergencies. They were also built as learning aids, for children to learn the fun way. The process was used to demonstrate appropriate application of construction materials and technologies to the local construction sector. Last but not the least, the process was based on the active participation of the village community and the local government to ensure that the final product matches their aspirations and that there is a local sense of ownership.



The new buildings are more than schools. They are a demonstration of locally appropriate construction, energy and water harvesting technologies. They are also strong emergency shelters for the local residents.

Location of Schools





Khuddal Upper Primary School Devka Upper Primary School

Bisukala Upper Secondary School

> Nagarda Upper Primary School





Sajitara Primary School



Sheo Girls Upper Primary School



Lopali Nadi Primary School Village Education Committees represented all sections of the village people, and took ownership of the school restoration process.



'Our' School - Role of Village Committees

The SEEDS initiative was a bottom-up mission with complete participation and support of the local residents. Mobilizing local people is a crucial element in all of SEEDS' initiatives, which empowers the individual or community at risk to make informed choices for themselves and their families. This core component of community mobilization was also central to the foundation of the Project Ankur. After the preliminary phase of the survey that the number of schools to be covered to eighteen, SEEDS helped each of the eighteen villages to form a Village Education Committee (VEC) that would be their link at the village level for the project. These VECs were the project's local platform for decision-making as well as monitoring of the project activities.

This was a significant step in the project as the local residents were not just beneficiaries, but had an active role in the project. This also helped promote a strong sense of ownership amongst the villagers. They were not merely passive recipients of aid but partners in the reconstruction of schools for their children. Each VEC comprised between six and ten members from a particular village. Initially the project team held meetings with the entire village, orienting and familiarizing them with Project Ankur its objective, implementation process and the role and significance of the formation and functioning of the VEC. Members of the VECs were also chosen by the people in a consensual manner. It included men and women. Besides local leaders, these committees included school teachers, students, local volunteers, NGO workers, and prominent citizens. All in all, the entire project was a school rehabilitation programme that was need based, designed with the local community, built with their involvement, to be monitored and maintained by them. Women formed an integral part of the project. Though hailing from different castes and different living conditions, they were able to come together to improve the lives of their children. They were aware of the growing need of education but always lacked a platform to raise concerns and issues pertaining to their children. Project Ankur provided the much needed platform to speak out for their children. They played an active role in the VECs and voiced their concerns and issues. While construction of the schools was underway, the women collected and fetched water for the construction work as and when required, which was not an easy task.

What constituted a VEC?

40-50% women
Parents
Students
Teachers
NGO representatives
Volunteers
SEEDS social workers

Sometimes, they had to walk up to six kilometres to get water. One major motive behind including women in the VECs was to increase the attendance of girl children in the schools, which has traditionally been abysmal.

The work was carried out in collaboration and cooperation with the local government, under a Memorandum or Understanding signed with the Education Department of the government. The government took charge of operating and maintaining the schools and facilities once the project was completed.

It is not just about new school buildings. It is about the future of our children.



Making of a School - a Complete School



Meeting Standards, and Innovating for Betterment

- Protection from future floods, earthquakes and sand storms
- Multipurpose class rooms with minimum space of 1.2 sq. metres per student
- One class room for every 30 students
- Additional space for office, kitchen, store room and verandahs in a school
- Potable water tanks and toilets as a part of each school compound
- Large black boards on two opposite walls of a class room and in verandahs to offer options for school teacher
- Boundary wall with one entry to offer protection to the school
- Rain water harvesting structure to conserve precious water in the desert
- Installation of fixed furniture in verandahs and provision of movable ergonomic furniture for different classes up to tenth standard
- Window grills converted to abacus, play equipment in open space

When SEEDS started the task of reconstructing schools, the clear focus was to provide a complete learning environment and not just the school building.

It is well known that the students in rural areas suffer from lack of a proper study environment and amenities. According to several researches on success of learning, the success of students is affected adversely due to lack of sufficient tools and equipment. For this reason, not only the building and teacher, elements enriching the environment of the child must be invested in as well. Keeping this view in mind, an interactive and multipurpose classroom design was adopted. Classrooms equipped with blackboards were constructed. The classes have been provided with ergonomic furniture and seating arrangements. Window grills have been modified to be used as an abacus, a mathematical learning aid as well as aesthetic element.

To avoid classes from getting hampered during the searing summer months, shaded verandahs with backboards have been constructed as cool refuge areas. Boundary walls have been constructed around most schools, giving the feel of an enclosed environment.

The widely prevalent mid day meal scheme initiated by the Sarva Siksha Abhiyaan is one of the largest nutritional plans in the world. Under the initiative children in schools are provided with lunches free of cost. The scheme has been immensely popular and has been able to address the issue of absenteeism. In alignment with the scheme, kitchens were constructed inside the schools to cook fresh meals under the scheme.

Previously, the schools did not have proper office space and stores. This made it very difficult for the school administration work to be done, and materials to be stored. Office rooms and storerooms have been added to the schools. The concept of barrier free design was also introduced to facilitate easy access to children with disabilities. This will help to bring children with disabilities into the mainstream and allow them access to the same education as their counterparts.



The new schools have shaded areas, blackboards, ergonomic furniture, educational games, kitchens and stores to support mid-day meals, all leading to an overall pleasant environment for the children.



Happy, healthy, well-fed and able to learn. This is the image of the child who will be able to get maximum benefit from any school system. Thus the system must ensure these conditions for the children!

Cultural factors, lack of water resources and even lack of proper knowledge of hygiene are some of the factors leading to open defecation. This is the key causative factor behind the high prevalence of diseases. Eighty percent of all diseases such as diarrhea, cholera, malaria etc. are caused due to lack of safe drinking water and proper sanitation. Toilets have therefore been constructed in the schools as part of the restoration process. Workshops were also conducted for the students and teachers to promote good hygiene and sanitation.

Interactive and multipurpose design	
Classrooms with blackboards	
Ergonomic furniture	
Verandah with blackboards	
Kitchens for mid-day meals	- Pe
Office for admin work	
Window grill modified as abacus	
Universal design for children with disabilities	NA. PARA
Storeroom	
Boundary wall	-
Toilets	Real Property lies



Bringing Back Smiles

Besides the physical loss, the floods also brought mental trauma. The matter was more complicated because floods were an altogether alien phenomenon which the people of Barmer had never encountered. They had just heard stories about floods but had never witnessed such devastation with their own eyes. The highly impressionable minds of small children were the most affected. They cried silently, and refused to go to school. To bring them back into the mainstream of life it was essential to take some decisive steps. Initiatives were taken to build local capacity of teachers and councilors to deal with child trauma and psychosocial care. Training in the form of workshops, lectures and group sessions was carried out. In the workshops people were trained on the counseling techniques to deal with various degrees of trauma. Teachers, parents, community counselors and children took part in the workshops. Games and exercises formed an essential part of the workshops.

Most children had seen such deluge, suffering and dead bodies for the first time in their lives. This rude introduction to death and destruction troubled their impressionable minds. Psycho-social interventions were the way to help them find their childhood again.



Prepared for the Next Time Around



- Each individual school assessed for damage type, structural concerns, soil type, identifying future threats and community engagement. School specific plans worked.
- Three different foundation construction technologies used for three different soil types namely, sandy soil with low bearing capacity, hard rocky soil, and bentonite soil with high swell pressure.
- Anomalies in local construction techniques resolved, and standard construction guidelines adopted. RCC roofing, and plinth and lintel beams used for structural stability. Additional key stones used at sill level.
- Local masons trained on safe construction practices.

One of the reasons of large scale damage caused to schools during the flood was anomalies in local construction techniques. Project Ankur realised during its course that certain local construction practices were not strong enough to withstand extreme weather, especially continuous and heavy rains.

At Barmer local communities have mastered the art of construction in hard sandstone. Stones are used to construct foundations in random rubble and walls in course rubble above plinth. Long stone slabs are used as spanning members over walls to construct roof. During the rains the joints in such roofs start leaking, resulting in damage to other parts of the construction. Similarly, artisans follow constructing stone walls with coarse rubble on the outer face for a clean and neat finish and random rubble on the inner side of the wall. This essentially is done to utilize small sized stones. The practice is effectively like constructing two walls alongside each other without any connection in between to hold them together. This type of wall is highly vulnerable to total collapse in an earthquake, and is a cause of concern as Barmer falls in the moderate damage risk zone according to the national seismic zoning map of India. 'Project Ankur' introduced an additional layer of through stones in the wall to add to the strength of the wall.

Construction on high swelling 'bentonite soil' was an engineering challenge. The most viable solution to counter the upward thrust generated by the soil, when it comes in contact with water, is to exert more load then swell pressure of soil, i.e, construct heavy structures like Ground + 2 storey, along with under-reamed piles as foundation. For a small project with limited resources it was not possible to go for such options. Project Ankur adopted a strategy of segregating the structure of class rooms from each other to limit the damage caused by swelling to individual parts of the school. It also replaced the existing construction pattern of continuous footing foundations with individual column footing to concentrate load of the entire room on limited locations. An additional layer of mechanically stabilized material was also added to increase load bearing capacity of the sandy soil.

Elaborate 'plinth protection' was also initiated all around the school to disallow water to percolate in the soil beneath foundations and minimize damage due to upward lift. To offer maximum resistance to floods, the plinths of the school buildings have been constructed high after a careful study of level of the sites and water catchments areas in the vicinity.

To avoid any casualties during mass evacuation during earthquake tremors or fires, all classroom doors have been made wide enough, and reoriented to open outwards in compliance with the evacuation design standards of public buildings.

Environment Friendly Design

Project Ankur aimed at restoring schools with a design that is not only generous in space but also is environment friendly and offers maximum comfort even in dry and arid climate of the region. Special elements have been incorporated in the school designs to make it environmentally appropriate and comfortable for young children.

In most schools, since young children sit on ground and are short in height, the project pulled windows to a lower sill height to allow breeze to blow through the room at a comfortable level. To cut sand content in the air during swirl winds lower windows have been installed with cement jaalis. Above the window additional ventilators have been installed in opposite directions to allow cross ventilation and easy escape of hot air from the class room.

The walls have been constructed with stone rubble masonry that is 380 mm (15") thick to increase the insulation of walls to allow a longer time lag for transfer of summer heat from outer surface of walls to inside the room. Apart from this, shading devices extend in length and breadth of the walls to cast shadow not only on long and wide opening windows but also on the entire wall. These shading devices have been kept at 800 mm and are tilted at an angle to cast shadow over 4 feet deep on the walls during the hottest hours of the day. This essentially means that comparatively cooler walls help in maintaining the room temperature inside the class rooms at comfortable level.

New constructed schools have been so oriented that the classrooms face North direction and hence the verandahs are protected from harsh day sun from south and prevalent east-west winds maintain temperatures and comfort levels.

Rainwater harvesting introduced in the restored schools in Barmer is a boon for children in more than one way. The school building acts as a catchment area for water that is cleaned and is collected in a water tank called 'tanka'. As this water passes through the settling chamber, it is clean and potable for most part of the year. A separate 'tanka' collects water from ground surface and school compound for cleaning and other purposes.

The climate is not friendly in Barmer. To top it, climate change threatens the little subsistence this harsh land offers.

Project Ankur, through its modest interventions, attempts to bring in concepts of thermal comfort through appropriate materials and designs. It also promotes sustainable practices such as water harvesting.



Water and sanitation is a big challenge in this parched land. Yet, it is critically important, particularly for women and the girl child.

Water and Sanitation

Water is a precious commodity in the desert of Rajasthan. Realizing this fact, Project Ankur initiated an attempt to conserve every drop of rainwater that would fall in each school. The school building is thus converted into a catchment area that collects potable water through a settlement chamber. The compound feeds another water tank from which water is utilized for other activities round the year.

To address the issue of sanitation, toilets were constructed inside school complex. This helped in curbing the widely prevalent problem of open defecation. Separate toilets were constructed for girls, thus creating conducive conditions for their use for the first time in these parts.

To propagate the mission of water and sanitation, sensitization workshops were conducted. These workshops were aimed at different groups within the community and included students, teachers and mothers. These workshops elaborated the concepts of water purification, rainwater harvesting, water borne diseases, public health and personal hygiene.

Every single drop of rainwater is planned to be conserved though a well organized rainwater harvesting set-up!



Are Things on Track?



Community involvement was central to the reconstruction process. People were involved at all levels and times during the entire process. They not only pitched in for the construction but also kept a check on the work regularly.

The process was initiated with a survey of the area and field verifications. A string of surveys were carried out before drawing up a final list of the schools in which the restoration work was to be carried out. Several factors were considered for selecting the schools, like damage caused by the floods, remoteness of the school, need for the school, the number of children studying in the school and number of classes in the school. Several of the schools had a diversified authority status. Various portions of the same school were owned by differed authorities. Hence permissions were sought from each one of the various owners, which was a cumbersome and time consuming process. Land was donated by the owners to the government, which in turn donated it for the construction purpose. Once the school site was selected, the project team started the construction work based on the design finalized by the technical experts and approved by the local authorities and the villagers. The task was accomplished through a combination of processes. The material was procured from the surrounding cities of Jodhpur and Jaisalmer. Local contractors and masons were trained on the disaster resistant construction for which an onsite training programme was established. The contractors were the same local masons who had been trained during the Barmer Ashray Yojna, the SEEDS shelter restoration project carried out earlier in the year. Due to this training, they have been able to acquire new skills and enhance old skills and have thus been able to considerably raise their standard of construction.

Frequent meetings were organized to keep a regular update on the construction work. Contrary to the corrupt labour system wherein wages given are usually a pittance, project Ankur facilitated a uniquely equitable system where the workers themselves finalized their own working rates.

The construction work was closely monitored at all levels and on all locations. A special dedicated team worked day in day out to accomplish the task in the stipulated period. Technical experts from SEEDS constantly supervised the construction work so that mistakes, if any, could be rectified immediately. The monitoring was real time, participatory and facilitated quality construction.



We demystify technology

Today local masons know ring beams, through stones, plinth protection and other concepts in their own language the language of working with their hands. And villagers know how to keep an eye on the quality of work!





Making a Difference - for the Long Run



The initiative has struck a chord with the people of Barmer. It is not only expected to help raise the level of education in a region which has one of the lowest literacy rates in the nation, it has made the people look at their lives with a positive perspective.

- The rate of attendance has increased after the initiative.
- Government took the initiative to construct roads leading to the schools.
- Status of the schools has been upgraded thus improving the government support and quality of education.

The initiative promises to be a propelling force in improving the standard of education in a region which is among the bottom ones in the literacy ladder of India. Project Ankur has paved this way not just by building schools, but by involving the community and raising the level of awareness amongst them about the importance of education in their lives.

Since the commissioning of the new schools, the teachers have reported that the rate of attendance has increased. Parents are taking keen interest in their children's education and they make sure that their children go to school regularly. Teachers who previously were disinterested with the infrastructure and the number of students attending school are showing new spirit.

The government has started taking interest in improving existing conditions. Roads leading to the schools have been constructed by the government, making the schools more accessible. There have been frequent visits by the government officials to the schools. The development of infrastructure has led to the upgrading of the status of the schools. The primary schools are being upgraded to middle schools and the middle schools are being upgraded to secondary schools. This will mean improved access to government support and provision of quality education to local children without traveling to far off places, leading to an overall increase in the standard of education.

The initiative has also been successful in addressing the scarcity of water in the region. Water harvesting structures built under the initiative will show the way of resolving the problem to a large extent. Children who otherwise spend a lot of time collecting water, with improved water management, will be able to save time and use it for more productive activities.

Village Education Committees formed under the initiative have brought various sections of the community under one fold. The committees have been functioning in most villages even after the project completion.

The safe construction practices employed in the construction of school buildings have helped to build capacity of the local masons and contractors. The community has also become aware of the need for disaster resistant buildings. The buildings are expected to play the role of models, and positively influence building construction in the region in future.



A new beginning

Children of Rampura village had to travel several kilometres on foot every morning to attend their classes. Naresh was no different from the lot. Hailing from Tilokaniyon Ki Dhani, he and his siblings Kavita and Sev shared the same fate. Covering such a long journey was a painful task. They had to go in groups to the school. And if somebody fell ill they all missed their classes. There was only one teacher in the school who also traveled 40 kilometers by bus everyday. Further, the effort also seemed quite futile as the school was running out of a one room dilapidated building that was nothing more than a shack.

But things had to change. The Rampura school came under the fold of the Project Ankur. Under the initiative the school was relocated to an entirely new location inside the village. The new school had several new classrooms. Naresh and several others like him are an excited lot. "We don't have worry to about sending our children to school", said Naresh's mother Matko with a smile.

Now I don't have to travel so much to go to school

Naresh, Rampura Primary School 7



Giving wings to dreams

Prakash has dreams of going to college and studying further so that she can become a teacher. Her friends Rekha and Ujjwal aspire to join the army and serve the nation. They study in the Secondary School Kotra in Barmer. One year ago the floodwaters had nearly washed away their dreams. Kotra was one of the worst affected villages in the flood, and suffered extensive damage to life and property. The school building was completely destroyed, hampering the classes. Kotra School being one of the main schools in the area, the impact on education was huge. At this juncture Project Ankur came as a silver lining to the cloud. Under the project the school was not only reconstructed but various amenities were also added to make way for a joyful learning environment. The project also collaborated with the various stakeholders teachers, parents and community members, so that attendance of the girls could be increased. "The project has been a boon for the children. Many new girls have started coming to the school," said Gaimer Singh, the teacher of the school. In Ankur the children of Kotra have found a renewed hope. It has given wings to their dreams.



I want to become a teacher when I grow up

Prakash, Kotra Secondary School



Challenges Faced

The project was riddled with challenges at all levels and all stages. The team worked through the most trying of working conditions, through heat and rain, and worked day and night to ensure that the project meets it target date and quality standards, so that the children get the new classrooms promised to them.

The work area was spread across an undulated terrain of 250 kilometres without any proper connectivity. Managing logistics was an arduous task. Many a times the vehicles carrying materials used to topple down or get stuck in the sand, with no help for miles around.

Difficult and tiring weather conditions made the task very strenuous and exhausting. People had to take regular breaks so as not to succumb to the wearisome weather, as the summer temperatures hovered around 50 degrees Celsius, making construction activity very difficult.

Different authorities owned different parts of the same school building. This diversified institutional ownership required us to seek permission from the various owners resulting in bureaucratic hassles and waste of precious time. Further, identifying new land for school building and going through a string of cumbersome processes was a major bottleneck. Some sites required more than seven levels of approvals. Occurrence of the unexpected natural phenomenon of bentonite swelling soil posed a major jolt to the process. The problem came to light when the foundation was being dug. As a result the designs had to be modified to counteract the swell.

Building material was scarce in the region and had to be sourced from outside, which took considerable time and effort. The region also suffered from a huge scarcity of water, which is a critical component required to strengthen cement based construction activities.

Road Ahead

The true reward comes when the people say "we did it ourselves". Community mobilization was a crucial element of Ankur that aided in its successful completion within the set period of time. This is not the end of the road. People have become aware of their needs and their rights, and have realized how important education is for their own development. This story will go on in the desert land of Barmer.

