

Balasore Aashray Yojana

Orissa Flood Resilient Shelter Programme



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SEEDS, February 2009

SEEDS in partnership with
Christian Aid and with the
support from the European
Commission Humanitarian Aid
Department constructed 400
resilient shelters, 200 sanitation
units and upgraded 5 schools to
refuge centers in the flood hit
region of Balasore, Orissa, India.

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We believe in life before death

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SEEDS INDIA



Foreword

This publication captures the efforts to facilitate the construction of disaster resilient shelters in the flood stricken region of Balasore in Orissa (India). The project was undertaken by SEEDS in partnership with Christian Aid (CA) and support of European Commission Humanitarian Aid Department (ECHO).

Floods are an annual feature in the region wreaking havoc each time. One of the poorest regions in the country, people are left with meagre resources to rebuild their houses destroyed by the floods. The intervention was designed to enable construction of shelters that are resilient to recurrent floods while incorporating traditional and environmental features. Likewise, interventions in sanitation were aimed at countering prevalent unhealthy practices. To promote disaster risk reduction, along with trainings provided on disaster preparedness, five community schools were retrofitted to be able to serve as emergency refuge centers for local communities.

We are grateful to our partners CA and ECHO for their guidance and support. We acknowledge the efforts of the local administration for their constant support during the entire project period. The people of Balasore and the local leadership deserve special thanks who willingly took the lead in the reconstruction process.

The project is the tipping point for a greater behavioural change. It is an opportunity to spread the message on the importance of disaster resistant construction. We do hope that this publication inspires readers to further work in the area of vulnerability reduction among poor and marginalized communities. We are grateful to Sarika Gulati, Siddharth Jain, Andrew Edwards and Sarah Ernst for photography. We are also thankful to the project interns Andrew Edwards and Sarah Ernst who as part of their learning extended valuable inputs at SEEDS. For us in SEEDS, it was an exhilarating experience to be able to expand upon a humanitarian response need to build community resilience against natural disasters.

Manu Gupta
Director, SEEDS
February, 2009



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On the waterfront

The unique geo-climatic condition of Orissa makes the State vulnerable to various natural disasters. In addition to this, the Bay of Bengal is merciless with the frequent cyclonic storms and depression. Eighty percent of the state is prone to natural disasters amongst which floods are the most widespread, devastating and recurring. The phenomenon of recurrent floods is most evident in the district of Balasore in Orissa. The Balasore district crisscrossed by the rivers Subarnarekha, Budhabalanga and Jaloka, is severely affected by the annual floods. The unexpected frequency of rains here has resulted in the destruction of the rice crops further escalating the massive food shortage in the State. Once called the “granary of Orissa” (a district of paddy, betel and fish), it is now sinking in the turbulent weather conditions.

Though floods are a common scene in Balasore, the intensity and frequency of flooding has increased over the last few years. Change in climatic conditions is escalating the occurrence of disasters. The 2007 floods proved to be fatal as the district was hit by as many as 7 flash floods within a period of three months. The economic impact of the flash floods in this coastal district was Rs. 508 crores in 2007. Many roads, bridges, houses and paddy crops were washed away by turbulent water of the overflowing rivers. People were forced to run towards higher reaches with their meagre belongings. The homes were rendered uninhabitable as almost 95 percent of them were kuccha houses.





It's unnerving to note that Balasore has been declared disaster affected for about 75 years out of the last 105 years, and the extreme weather conditions have reduced its food production by a staggering 40 percent. With climate change gaining momentum, the frequency of floods in Balasore has increased in the last few years.



The programme aimed to build a resilient and sustainable environment through disaster response. Looking at the situation in Balasore, a need was felt to embed the DRR activities within the scope of construction of shelters and basic infrastructure which are vital during the event of future disasters.

Balasore Aashray Yojana

After each flood, every year families are left to cope with damaged houses and livelihoods with the resources they have left. Realizing this gap, SEEDS in partnership with Christian Aid with support from the European Commission Humanitarian Aid Department initiated a shelter programme in one of the worst affected areas, Balasore. The programme intended to offer greater resilience to its beneficiaries from recurrent floods and hence restrict damage to human life and reduce their vulnerability.

Basta was the hardest hit block in Balasore, which was submerged under water even weeks after the rain stopped primarily because of the topographic depression where it is located. The project intervened in the gram panchayats of Raghunathpur, Kulida, Santoshpur and Paunskuli covering 43 villages. Lying in the catchment area of the rivers Subarnarekha, Jaloka and Budhabalanga, the area is severely affected due to multiple flooding and has the most vulnerable population in need of flood resilient shelter. The improved shelters seek to assuage the present conditions by impacting the physical and mental health of the people. In addition, the shelter will provide a cushion for people, allowing them to divert their existing resources for other fruitful purposes. The programme also addressed the sanitation issues prevailing in the area and increased the reach of its intervention by strengthening the schools and upgrading them to emergency refuge centers.

- **400 resilient shelters** constructed in **43 villages across 4 panchayats**
- **200 sanitation units** constructed
- **5 schools in 4 panchayats** retrofitted as refuge centers
- **200 masons** trained on disaster resistant construction
- Workshop conducted on **water, sanitation and hygiene**
- **Disaster risk reduction training** workshops conducted
- **3500 direct beneficiaries** of the shelter programme



How we did it?

KULIDA PANCHAYAT

115 shelters

54 sanitation units

2 schools



DRR workshop



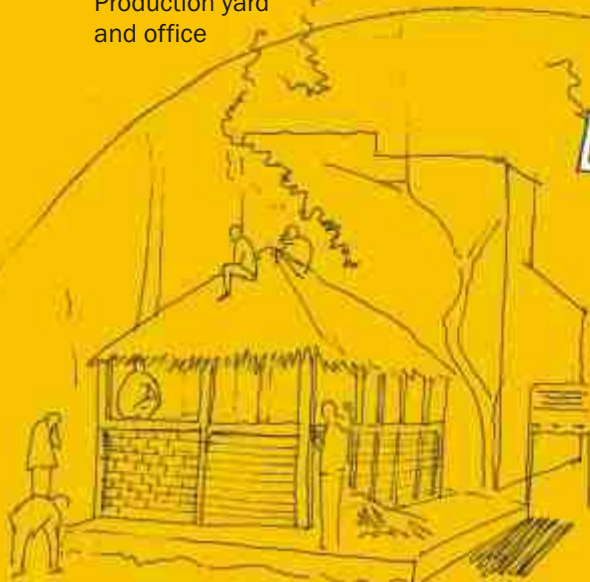
STOCKYARD

Beneficiary registration and material distribution



BALASORE

Production yard and office



demonstration shelter and mason training



SANTOSHPUR PANCHAYAT

92 shelters
45 sanitation units
1 school

DRR workshop and 4 panchayat water and sanitation workshop

RAGHUNATHPUR PANCHAYAT

117 shelters
57 sanitation units
1 school

DRR workshop

PAUNSKULI PANCHAYAT

76 shelters
44 sanitation units
1 school

DRR workshop

key:



Leading the way

SUNIL KUMAR SENAPATI

Sarpanch, Kulida gram panchayat



Sunil Kumar, Sarpanch of Kulida gram panchayat, welcomes the Orissa Flood Resilient Shelter Programme and has done everything in his power to support the process and mobilise the resources required. He believes that the initiative has helped the most vulnerable people within the community who would have otherwise struggled to reconstruct their own homes. Sunil recounts the disastrous floods when the rainwater fell 5-6ft in the first few days and reached 10ft after just 4-5 days. He explained that the rainwater comes from Bihar and gets trapped by the National Highway around Balasore.

Sunil did his best to warn people to move to higher ground during the last flood, and then worked tirelessly as part of the rescue team with a powerboat provided by OSDMA to reach people stranded within the villages. The rescue team made up of the police and other individuals rescued people from their rooftops and did everything they could to reach even the most treacherous places where victims were stranded. Once rescued the community took refuge on the National Highway until the water receded. Sunil helped to organise a food kitchen and the government provided rice, and other NGOs provided dry food, polythene and basic sanitary products.

He believes that it was the most dangerous flood that the people have faced in 100 years and almost 8 months later he thinks that some of the community are still not settled. The majority of people do not own their own land and rely on leasing land and sharecropping to sustain their livelihoods. While the timing of the flood actually had a positive impact on crops, the damage to peoples' homes and assets outweighed any advantage from the bumper crop.

The Sarpanch during the course of relief and rehabilitation worked with several NGOs including SEEDS. Initially he disagreed with the responsibility put on the household to organise roofing materials, but later realised that the process aimed at partnership and not donation, would create a sense of ownership. He agrees that while SEEDS still have a presence in the community some people expect roofs to be provided. Only when SEEDS would leave some people would be motivated to fix their own roof. He discusses the benefits of the shelter and says that the beneficiary selection followed a very clear and transparent logic. Though it involved the local leaders, it made an independent assessment for selecting the final beneficiaries. The Sarpanch expresses his happiness over the employment that the project generated for the locals.

Sunil pragmatically notes that only time will tell how the SEEDS' shelters cope in the harsh local environment. He is waiting for the first rainy season and dry season that these shelters face to be able to comment further. Sunil really wants SEEDS to continue its involvement in the area, and enable more people to benefit from a safe flood resilient shelter. His long term aspiration is for an additional rescue shelter to accommodate a greater number of people.



The upgraded shelters seek to assuage the present conditions of the beneficiaries. The shelter will serve as a cushion, allowing them to divert their existing resources for more fruitful purposes than rebuilding the same house every year.



The beneficiary selection procedure followed a transparent but rigorous logic. Though local leaders were involved, independent assessment was carried out for selecting the final beneficiaries. Beneficiary families were chosen from the most marginalized households who are left out in the usual relief process.

Reaching to the most needy

SEEDS champions the causes of communities and believes that their future security is dependent on the involvement and ownership of the project. The shelter, by design called for the participation of the beneficiaries, making them an equal stakeholder during the construction. The SEEDS approach was bottom-up, starting with the complete participation and support of the local residents. SEEDS worked with the most marginalised households and encouraged them to take part in on-site construction activities.

District Administration of Balasore identified and compensated victims of 2007 floods based on the damage incurred on their houses. These victims were identified under Fully Damaged (FD), Severely Damaged (SD), Half Damaged (HD), Partially Damaged (PD) categories based on the degree of damage incurred during floods. This list not only gave an insight into the actual damaged households but also offered challenges as the community questioned the authenticity of this data. Thus, the team required support from the community to eliminate non-deserving and add excluded cases to ensure it reached the neediest.

A three-stage process was followed for the selection and to verify individual needs. This process was based on strict criteria under a strong vigil of the project team. Once the elimination process was complete, the team asked for additions from the community and local panchayat. The ward members and Sarpanch along with the village elders identified victims from the community and forwarded that as an additional list to the project team. The project team again verified these individual cases under the three-stage process. During this process, special emphasis was laid on women and children who constituted an integral part of the programme.

survival through adversity



S. K. PHAPAUJDIN

Masada village, Paunskulli gram panchayat

SK Phapaujdin is 40 years old and is part of the Muslim community residing in Masada village of Paunskulli panchayat. He is physically disabled and lives with his mother who is in her 70s and is blind. Their story is one of survival through great adversity.

Till now the two had been sharing a small house which sits in a dilapidated condition close to agricultural land. Due to the nature of the building fabric; comprising of mud and thatch, the house was vulnerable to the flooding in 2007 and 2008. The house and the small homestead land on which it sits, are the only assets of Phapaujdin, and so the stress of the flooding was even greater. Although Phapaujdin receives a disability pension from the government of Rs.200 a month, he has been forced into begging to additionally support his family. His disability prevents him from standing for long periods of time, so he has to be accompanied by another family member when he begs.

It is no surprise that in such conditions living and maintaining a livelihood is a constant challenge. With no agricultural land to cultivate, nor resources to generate income, he is reliant on any assistance that his brother can provide to support them. It is hard to imagine how the two were able to escape the flooding in 2008 when the water level in the area reached above shoulder level.

The situation was closely observed by the SEEDS team during the identification phase and it was decided to include S K Phapaujdin in the beneficiary list. Phapaujdin and his mother are not yet able to start living in their shelter as they have been unable to procure the material for the roof. They are desperately hoping to complete their new shelter before the commencement of this rainy season.

a new home to be proud of

ANUPAMA DAS

Jhunbalda village, Kulida gram panchayat

According to the Rural Development Institute:

“Women comprise a disproportionate share of the landless and rarely hold legal rights to land”.

Laws on land ownership in India continue to discriminate against women – and this reality is felt particularly when a woman loses her husband. What choices does she have for herself and her children? This dilemma of the Indian society is reflected in the story of Anupama Das.



Anupama Das is a resident of Jhunbalda village in Kulida Panchayat. Her husband left the family 12 years ago leaving her alone with the task of raising their daughter. She has no agricultural land and the ownership of the homestead land still remains with her father-in-law, who passed away 25 years ago.

The socio-economic condition of this family is very poor, and each day is a struggle for survival. Anupama's primary source of income comes from manufacturing leaf plates, while at times she has been able to earn money as a wage labourer. Although Anupama's income falls below the poverty line she does not have any kind of supportive entitlements, like BPL card and cannot avail rice and necessary commodities from the government helping them to sustain. Exposure to these circumstances has left the family in a vulnerable state. Anupama's daughter is in the 10th class but her access to education is dependant on her mother's income. She also supports her mother to sustain their livelihood.

The house that Anupama was living in up till now is consistent with the typical housing pattern in the area - a thatched roof and mud walls. The house was damaged by floods in 2007 and Anupama has struggled since then to find adequate resources to reconstruct the shelter. The financial assistance by the government has been insufficient.

Being a single mother with a young daughter, it was very difficult to move to a place of safety during the flooding, and the two were forced to take refuge on the highway until the water receded. They then spent 3 months living under a makeshift polythene tent as their home was submerged under the flood water.

SEEDS recognized the precarious economic and physical condition of the family and considered them as a potential beneficiary for the shelter and toilet. Material from her old home was used to build up the plinth of her new home to protect against the inevitable future flooding. Alone she would have struggled to build the plinth, and assistance by a cousin brother was greatly appreciated. He was also able to help her with the construction of the roof, which saved the labour cost, and has made it possible for her to start living in her new home. Anupama Das is very proud of her new home and sanitation unit. She looks forward to the time when she can upgrade the bamboo to a more permanent material when she has sufficient resources.

Building together a resilient future

In an effort to improve the resilience of people against floods, the project team designed an intermediate shelter for rehabilitation of 2007 flood victims. SEEDS decided to build intermediate shelter as it offered better living conditions and strength compared to a temporary shelter. In a recurrent flood scenario, a shelter design is needed that is not only robust, but also dynamic and flexible to adapt to various threats offered by rising water.

The shelter design includes a plinth which is protected on all sides by a retaining wall that offers stability and protects the foundations from mild or moderate floods. By adding sandbags to the door openings, the beneficiary can make a water tight seal up to the sill level and protect their belongings if the water rises further. The roof design offers the potential for the beneficiary to add an attic which can be used to store their belongings if the water rises further and they are forced to evacuate.

The houses built are in complete compliance with local environmental and cultural nuances both in terms of the design and technology used. At the same time, hazard and vulnerability profile of the area was also considered to ensure safety from future disasters.





These shelters are a statement of being an appropriate
“Socio-economic Sustainable Abode” for the poorest of the poor.

Building components

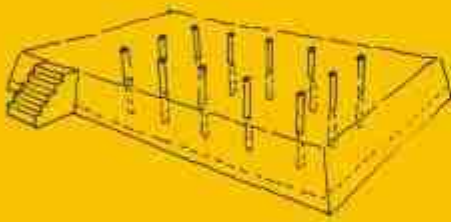


PLINTH

The raised plinth is constructed by the beneficiaries to bring the level of the shelter above the prevailing flood level. It provides a stable base and is protected against future erosion by a retaining wall of blocks and mortar.

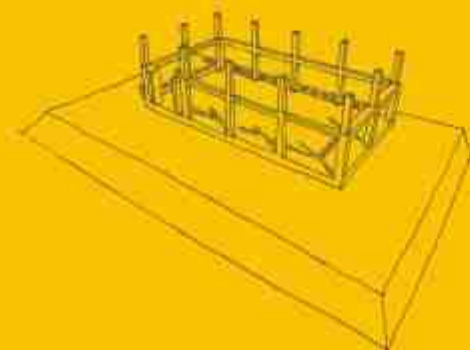
FOUNDATIONS

The foundations are constructed from reinforced concrete additional pipes filled with concrete and reinforcement rods. These foundations increase the lateral stability of the structure to resist cyclonic wind pressures, fast flowing flood water, and also the adverse affects of weak sub soil.



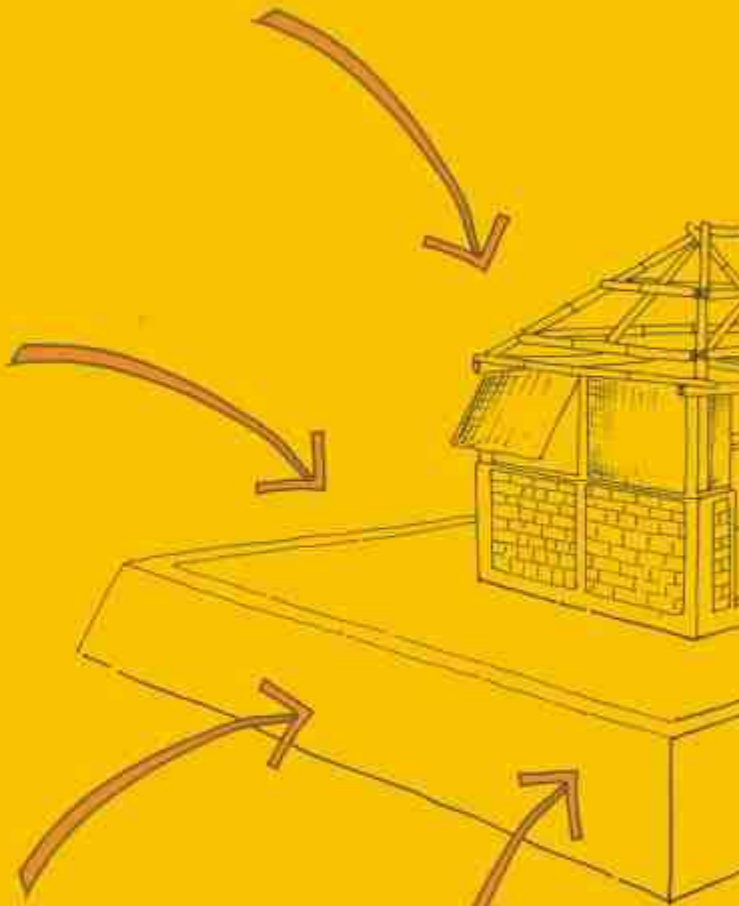
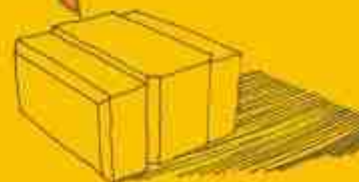
PLINTH BEAM AND SILL BEAM

The plinth beam not only provides a stable structure, but also provides a level base for block walls and a watertight seal ensuring that flood water does not penetrate the shelter. Both the sill beam and plinth beam hold the structure together and provide lateral stability against extreme winds and flood waters.



FLY-ASH BLOCK WALLS

The blocks are made from fly-ash, a waste product from coal fired factories. They also have a lower embodied energy in comparison with traditional bricks as they do not require firing. In addition, the blocks require no mortar due to their 'lock and key' design.

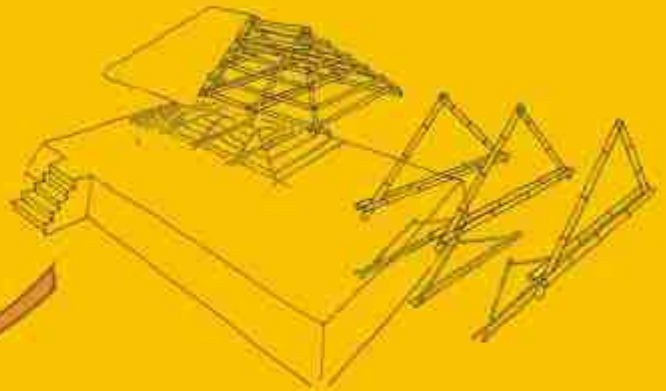


ATTIC

The roof structure offers the potential for the beneficiaries to add an attic to provide additional space within the shelter for storage. During times of flooding this raised floor will provide safe refuge for their belongings.

ROOF

The roof has been designed with the traditional building materials of bamboo. Three primary roof trusses are manufactured offsite as a single component and can accommodate the beneficiaries' choice of thatch, tin sheets or terracotta tiles.



FLOOD RESILIENCE OF SHELTER DESIGN

During a mild or moderate flood the raised plinth and plinth beam will provide suitable protection from flood waters

During a moderate to severe flood it is advised that the cement bags provided are filled with sand to create a water tight seal around the entrance

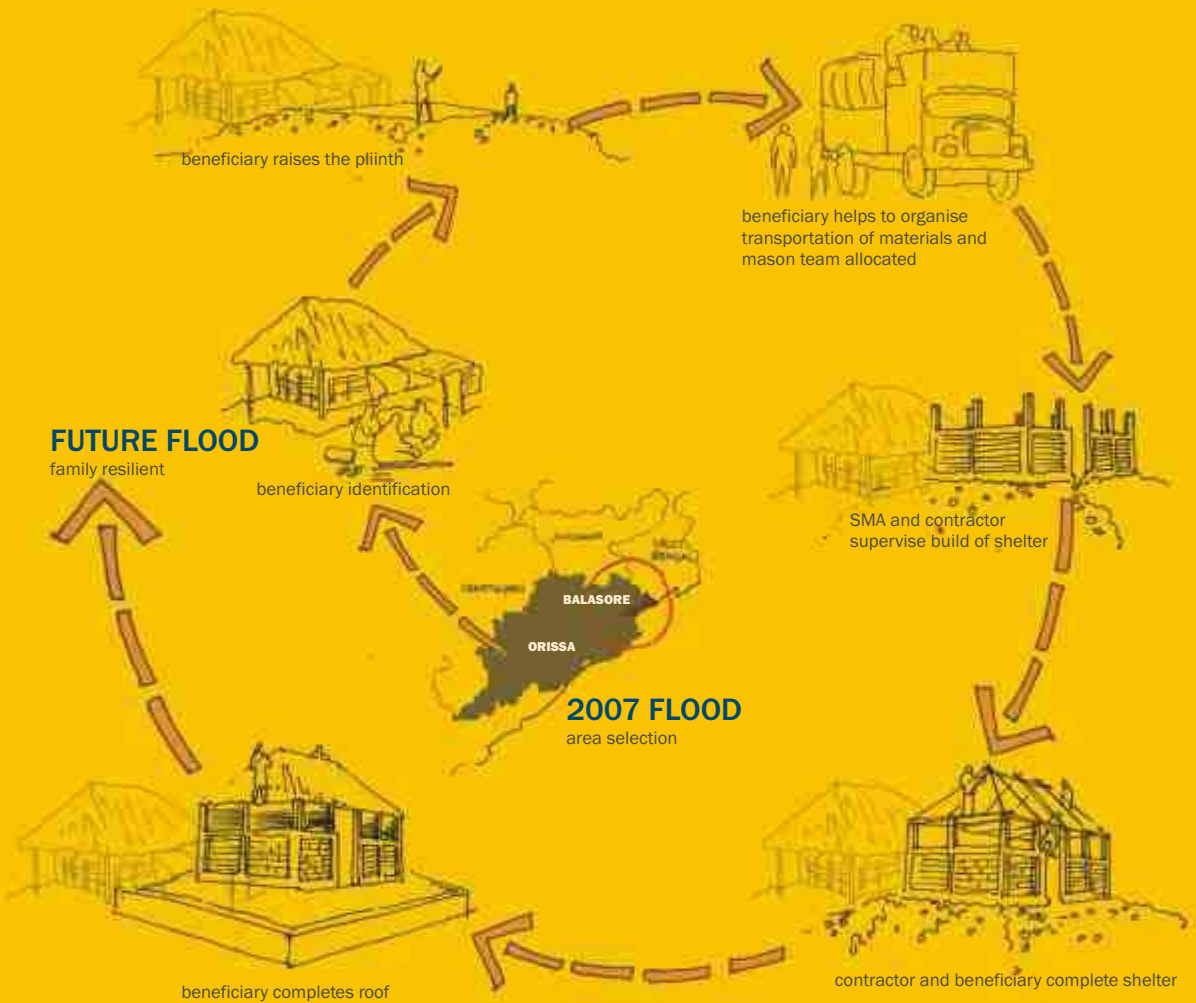
During extreme and sustained flooding it is advised that all belongings are stored at attic level and the family moves to higher ground

OPENINGS

The design of the openings is left to the beneficiaries to install their own traditional doors and windows. To maintain a water-tight seal around the door sand bags will be provided with each shelter.



Breaking the loop



Acceptance of the design by the community and beneficiaries was a driving factor during design development. The design allows beneficiaries to express themselves and make each unit according to their own individual needs. The shelter unit calls for beneficiary participation for roof, door, windows and extension of walls.

driving the design forward

NITIN VERMA

Programme Officer, SEEDS



People in Balasore live in houses that bear marks of flood damage over and again. After each flood, every year, poor communities are left to cope with damaged houses and livelihoods using their own meagre resources thus leading to their further impoverishment.

While designing an 'Interim Shelter', SEEDS realized the recurrent phenomenon of floods and developed a design that is not only structurally stable but also incorporates 'Disaster Risk Reduction' components to make it disaster resilient against all future threats. Hence breaking the vicious cycle of flood, damage and poverty and offering its beneficiaries a chance for sustained development and economic growth.

Other design considerations included short duration for on-site construction to enable the project to rehabilitate its beneficiaries within their homestead. Thus the project opted for off site pre-fabrication of the building components that can be assembled on site within 4 to 5 days to construct an interim shelter.

Nitin describes that these units to be safe, beneficiary family first needs to raise a platform as high as the highest flood mark, and then SEEDS protect this platform with a retaining wall to make a stable plinth for the interim shelter. Above that a prefabricated structure is erected on 12 pile foundations connected with a plinth band that can bear the pressure of expanding and contracting black cotton soil prevalent in the area.

The walls above the plinth band are constructed up to 4ft high but prefabricated pillars supported by pile foundations and plinth band rise up to 7ft in height to support bamboo roof under structure. The walls and the pillars are tied with a sill band that provides resistance to the structure against seismic loads and sustained water logging. Beneficiary has to complete construction of an attic and roof covering.

Verma elaborates that there are even better reasons why SEEDS provided an interim shelter rather than a full house. The half finished and adaptive shelter display sustainable shelter in practice. The doors, attic and roof coverings that have been added by the beneficiary families are mostly built using the retrieved material from the flood damaged houses or locally produced material such as bamboo, tiles and sheets etc.

Another interesting factor of the shelter design was making bricks from fly-ash which is an industrial waste. Besides making an environmental statement of preserving top fertile soil in the disaster hit region it offered a brick stabilised with cement that gained strength after sustained submergence in water in a flood prone area.

It's my home!

One of the strengths of the programme is the theme of owner-driven construction that has run throughout.

At the start, each beneficiary submitted their land documents to the project field office and then once their registration was complete they began to organise the transportation of materials to their site. From there they were responsible for dictating the height and proportions of the plinth, the orientation of the shelter and the position of window and door openings.

As the shelters were largely built on the site or close to the beneficiaries previous homes they were aware of the level of water during previous floods, prevailing winds and access routes. The beneficiaries had to mobilise the labour and materials to build their plinth before the team of masons could commence with the shelter construction. The roof was the aspect of the design that offered the most potential for permutations and expression by the beneficiary as they were responsible for the choice, procurement and construction of the roofing material on the truss roof structure. The stage at which the beneficiary completes their roof is the point at which they take full ownership over their shelter and begin to start living in it.

These examples show some of the creativity and individuality that has emerged as the beneficiaries have transformed their shelter into a home.





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 there is a local sense of ownership.

Acquiring new skills

Construction artisans are key agents for spreading sustainable construction practices in rural scenario. There was no local capacity in terms of skills and tools to construct shelter in a cost-effective way using local materials and technologies, and catering to the prevailing environmental and disaster risks. The project aimed at harnessing the capacity of local masons by engaging them at all levels of the recovery and rehabilitation process. The project team imparted training to the local masons and artisan groups. These trainings generally addressed issues like technology upgradation, safe building practices against future risks, DRR components in the design and prevalent anomalies in masonry and construction techniques in the area.

During the long presence in the region, the project team conducted these trainings in a sustained manner over a period of time. To start with, sensitization workshops were conducted where the upgraded building material and technologies were introduced and these artisans were trained on construction techniques. These workshops were followed with hands-on training by allotting a shelter unit each to construct. SEEDS technical staff frequently visited these units and thrashed out anomalies during the process. Before allotting more units for construction a short discussion session was conducted to answer their queries and to rehearse the entire process.

These groups of artisans are a force to reckon as some of these have become trainers and started imparting knowledge to other groups. Their productivity has increased and most importantly the message of sustainable construction is spreading beyond intervention areas.



Local masons and artisans were trained on disaster resistant construction. Training workshops were organized with hands-on training on safe building practices and incorporating DRR components in the design.



steep learning curve

SAMEER KUMAR NAYAK

Contractor

Up until the SEEDS project began, Sameer had never considered a career in contracting and had been working as a labourer.

He happened to be in the right place at the right time, when the SEEDS team first arrived on site after the June 2008 flooding and immediately became a useful source of local knowledge. Sameer was able to help the team navigate the communities with the government lists, and began identifying those beneficiaries most in need.

The Project Coordinator recognised the contribution that Sameer had already made, and his enthusiasm for the project, and set him the challenge to be a contractor. He was invited back to Balasore, and told to bring with him a team of masons. There he was shown the demonstration shelter and asked whether he thought he could reproduce it. At that time Sameer had only Rs. 600 to his name, and had to borrow from his brother and take an advance of Rs. 5000 from SEEDS.

78 shelters down the line, and Sameer is a very happy man. The process to reach the end of the project has been a steep learning curve for Sameer. He knew little about contracting at the start of the project, and has learnt a lot about construction, management and finances. He has developed good relationships with the labourers and masons, and hopes to create future opportunities for them to work together. Sameer proved to be very skilled in mobilizing the beneficiaries to raise their plinths and dealt with challenging beneficiaries with patience. He speaks very highly of the SMA and field staff that supported him through the process and steered him in the right direction.

Sameer has dedicated the last 6 months to the project, and would have liked to construct more shelters. He did not believe that he would ever have this kind of opportunity, and sees his future in contracting. Sameer has been recognised by SEEDS not only for his contribution and construction of the 78 homes (the most by any single contractor) but for his confidence, commitment and ability to work alongside the field staff to mobilise beneficiaries.





Unhygienic practices like open defecation and lack of awareness on appropriate sanitation are a major cause of poor health and epidemics, which is further magnified during a flood. Constructing sanitation units aimed to bring about positive behavioural changes, which was further reinforced by sensitization workshops.

Towards a cleaner and safer world

Open defecation is a widespread practice, be it men, women or children. Cultural factors and lack of proper knowledge of hygiene are some of the factors leading to open defecation. Women specially are the worst sufferers with regard to sanitation and especially in conditions of flood when families are lodged over the roof tops for weeks.

In an attempt to address this widespread problem of open defecation, 200 sanitation units were constructed for 400 households on a twin sharing basis. That essentially means that two neighbours share a sanitation unit and need not travel long distances for defecation. The 'Orissa Flood Resilient Shelter Programme' offered sanitation units on a plinth close to the shelter. Primarily a unit had to be located on a site easily accessible to all its beneficiaries, without being the source of conflict between neighbours.

The programme understands that mere construction of the units was not enough but it was also important to sensitize and re-orient the residents of these villages to the new habit they have to get accustomed to. Hence, SEEDS conducted sensitization workshop for the community.





As SEEDS completed the construction of toilets, it undertook a workshop to introduce the people to a new routine and to make it easier for the women. To propagate the mission of water and sanitation, sensitization workshop was conducted. The workshop aimed at different groups within the community and included students, teachers and mothers. The primary objectives of the workshop were to address the following areas: personal hygiene, family hygiene and cleanliness of the house. The workshop, during its course elaborated 'WHAT' are the actions involved and 'HOW' hygienic sanitation practices can be achieved. The workshop explained to the community that emphasis on human health critically depends on safe handling of human excreta and that sanitation has three components - toilets, waste handling and general hygiene. The gender dimension in sustaining the efforts was also stressed.

changing behaviour

APURBA DALAI

Aagarda village, Kulida gram panchayat

Whilst the shelter design has been easy for people to adapt to and recognize the similarities with their current ways of living, the sanitation units have been harder for the beneficiaries to adjust to.

The Water and Sanitation Workshop addressed this issue by making connections between poor hygiene, sanitation, health problems and diseases in the community. The workshop highlighted the benefits of improved water and sanitation practices, and the importance of these during times of flooding, and for future generations. While there had been some issues arising from beneficiaries about the process of sharing a sanitation unit, the resource person explained how the community if they want can access additional subsidized sanitation units from a local organization.

During the discussion with Apurba, she suggested that there is a very gradual shift in behaviour towards trial and investigation of the new sanitation units. Whether this is evident in their use by certain members of the family or on certain occasions it can only be a positive indication of a degree of acceptance.



Rebuilding schools as refuge centers

SEEDS recognizes the role of schools in the community and the role that they can play in a disaster as a refuge or distribution centre for relief. Schools, as one of the major infrastructures in the community are used as 'safe havens' or 'safe shelters' during disasters. The project upgraded 5 schools as Emergency Refuge Shelters to be available to the community in a future disaster increasing the reach of the benefits of the programme beyond direct beneficiaries

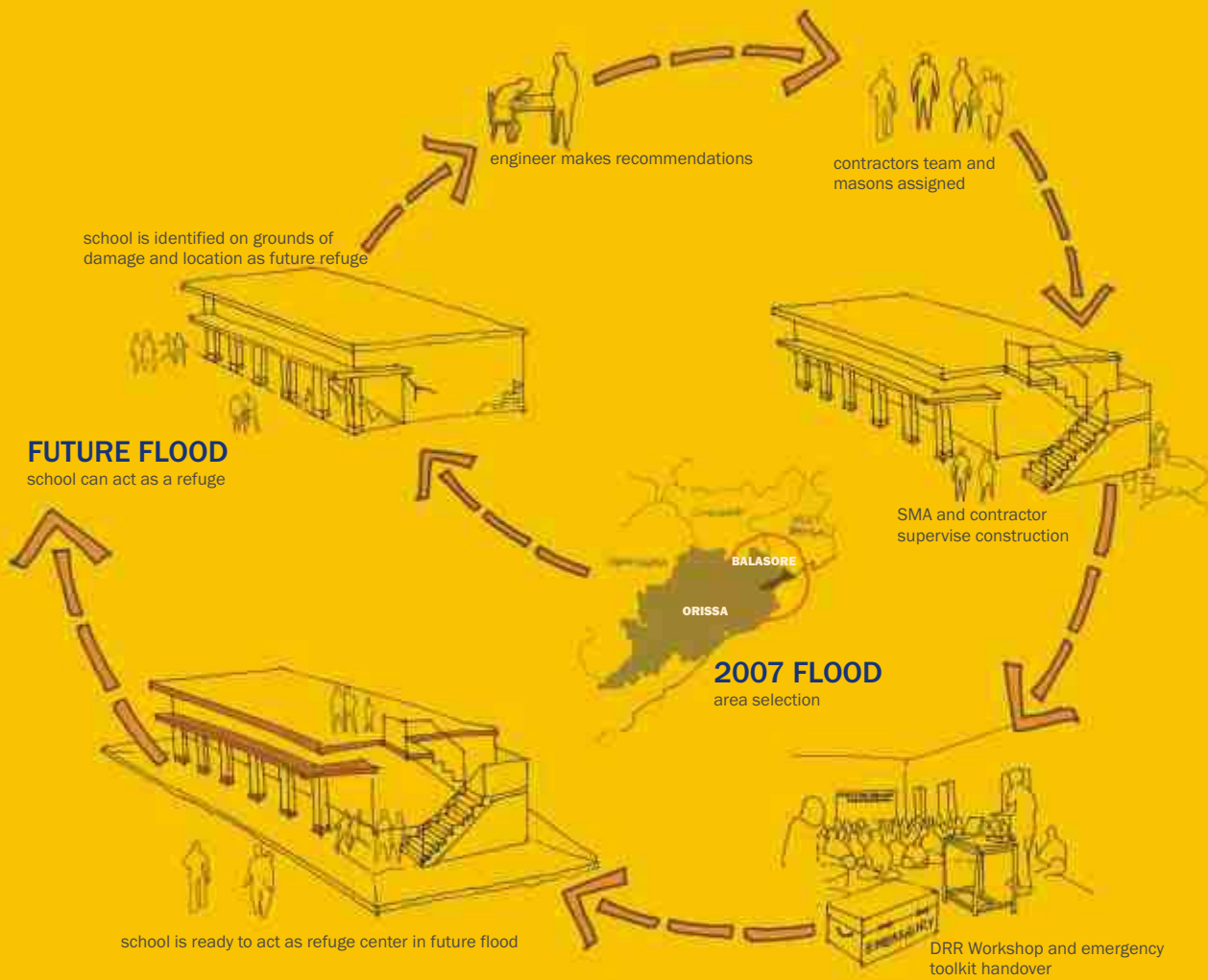
5 schools were identified across the 4 panchayats after a process of Rapid Visual Assessment (RVA) by the SEEDS Structural Mitigation Response Team. They were selected on the grounds of damage from the 2007 floods and suitability as a community refuge based on location, size and surrounding topography. All five schools were retrofitted to make them suitable to act as refuge shelters in future disasters. The level of damage from previous floods varied from school to school and the work was a combination of reconstruction, restoration and precautionary strengthening measures. Where appropriate SEEDS constructed staircases for students, staff and the community to take refuge on a flat roof. Plinth protection was a key element of the retrofit of all schools to prevent future water penetration of the foundations. Sanitation units were also built at all 5 schools for use by the students and community. The work was carried out by local masons, supervised and trained by members of the SEEDS Mason Association.

Disaster Risk Reduction workshops were another component of the programme reaching out to schools and the community. They took place in each school in February 2009 and were attended not only by the beneficiaries of the shelter programme, but school authorities, Sarpanch, ward members, local champions and students. The workshops explained the retrofitting work that had taken place in the school and were an opportunity to discuss the role of the school as a refuge in a future disaster. Emergency toolkits (including material for search and rescue and first aid) were distributed to each school for use in the event of a disaster.

The workshop was a platform to connect the retrofitted schools and their administration with the Sarpanch of the panchayat who is responsible for relief distribution. Together they can now develop evacuation plans for the community, and plan how they will organize the school into a refuge and distribution centre for relief material.



Amongst its multiple functions, schools perform a crucial role as refuge centers during disasters. The project aimed at structural retrofitting of schools and equipping them in a way that they successfully transform into safe refuge shelters during any emergency.



lessons from school

SRIKANT DAS

Teacher,
Ban Bhari Lal High School, Gudhikal



Srikanta Das is a teacher at Gudhikal School which was established in 1980. The building of the school was damaged by the 2007 and 2008 flooding and the school authorities were unable to get it repaired due to financial problems. It was this reason that the school is very grateful to SEEDS for selecting it for retrofitting and converting it into a probable shelter in a future flood situation. Srikanta also recognises the contribution that SEEDS has made to shelter in the area, providing people with a shelter that they can transform into a more permanent home.

The children at Gudhikal School are very much aware of flooding, most having experienced at least two major floods in their lifetime. After the 2008 flood the handpump on the school grounds was not useable for a period of time and water was collected from elsewhere while the pump was reconstructed and cleaned by the Panchayati Raj Department. Apart from the damage to the school buildings, all school records were lost in the flood.

Srikanta believes that the retrofit has had a positive impact on both teachers and students, as it has created a conducive environment to teach, and now there is more space for students to sit and read. Two of the new rooms will be used as a hostel, and the others as teaching spaces. He is also excited about the two staircases which have been added to the school. This staircase would allow teachers, students and members of the community to take refuge on the roof during any crisis situation. He expresses his content over the work that SEEDS carried out, including raising the awareness level of his students. The students and teachers now feel better prepared to face any disaster in future.

a step towards sustainability

SARAH ERNST

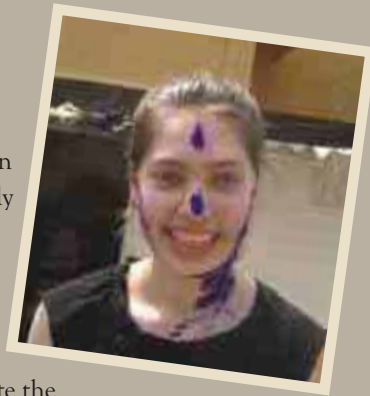
Architecture student and intern with SEEDS

The challenges faced within the programme have been linked to the elements of the approach that will ultimately determinate its sustainability within the community.

While many examples of rehabilitation after disaster opt for relocation of beneficiaries and production of uniform complete shelters, this project has moved away from the norm. The project has endeavored to rehabilitate the families affected by the flooding close to the site of their existing homestead, to minimize disruption in the community. At the same time the shelters encourage involvement and adaptation by the family in order to transform an otherwise uniform shelter into their own home.

Both of these tasks have involved an enormous amount of work for the teams on the ground working with 400 individuals or families, spread across 43 villages in 4 panchayats. They have been responsible for negotiating with and encouraging each throughout the process, dealing with complex issues and challenges but for the most part building strong relationships within the community. While some beneficiaries have gone beyond their required contribution as they begin to live in their new home, it has taken longer and more encouragement for others to avail the necessary resources to complete their roof and begin to take ownership.

However, the results of such an approach -which are already visible suggest that these shelters are being adapted incrementally in similar ways to traditional local houses and are therefore blending into the community. This process, which is likely to continue, demonstrates the successful integration of the shelters and technology, and the empowerment of the individuals involved. Time will tell how the shelters and community cope with a future flood - and how the new technology will continue to be adapted and replicated.



Challenges faced

The recurrent floods in Balasore were a challenge in themselves. While the programme was on the ground assessing the damage and identifying victims of the 2007 flood, three floods in June, August and September 2008 took place. These floods washed out important road links between Balasore town and Basta Block and further to beneficiary villages. This added to the challenge of working in 43 villages in an area of 125 sq km.

Being unfamiliar to the area SEEDS had to be sensitive to the local caste and political dynamics in the region. The team had to take extra care to not let local politicians mould the programme for their benefit or influence the beneficiary selection process. At the same time the poverty in the region meant that the process of beneficiary selection was even more challenging.

The climatic conditions and availability of masons added pressures to the timescale and forced the team to think creatively to complete the shelters within the original time frame. Overcoming these hurdles, the programme was timely implemented and will provide a sense of security to all the beneficiaries before the rainy season commences.



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