

GREEN KARAVANGHAR

GKG & Beyond for Disaster Risk Reduction

Darya Khan Shaikh & Uthero

District Khairpur, Sindh



I N T R O D U C T I O N

Heritage Foundation, established in 1980, is a Pakistan-based, not-for-profit, social and cultural entrepreneur organization engaged in research, publication and conservation of Pakistan's cultural heritage.

The Foundation has been instrumental in saving a large number of heritage treasures and, as UNESCO team leader 2003-2005, undertook the stabilization of the endangered Shish Mahal ceiling of the 16th c. Lahore Fort World Heritage site.

Since 2000, its outreach arm KaravanPakistan has involved communities and youth in heritage safeguarding activities.

As part of Heritage for Rehabilitation and Development programme, work on several projects has been undertaken in partnership with Nokia and Nokia Siemens Network for rehabilitation of communities, particularly women, affected by the Great Earthquake in Northern Pakistan. The establishment of KaravanPakistan Institute for Research and Training (KIRAT) in 2008 has helped in carrying out research and training on varied aspects of the earthquake affected areas.

In 2009, the Foundation provided humanitarian assistance to Swat IDPs. From February to June 2010 through UNESCO-UK Aid project, the Foundation worked with 500 women for the revitalization of artisanship in several union councils of Swat.

After the Great Flood that affected all parts of Pakistan, almost 270 housing units (GKG) have been constructed in Swat from late September 2010 to February 2011. The units have been designed as low carbon footprint, low cost units which are built with household participation in order to achieve a sense of ownership and pride.

The GKG initiative was extended to Sindh with support from Architecture for Humanity, who sponsored the initial 25 houses along with a training workshop as well at the publication of this Document. By November, 2011, Heritage Foundation has been successful in constructing over 100 GKG units, two Green Women's Centres, a Health Centre and a Primary School. The additional funding for construction was provided by the Swiss Pakistan Society, while materials and equipment for the enhancement of livelihoods were supported by TIDES Foundation.

This report speaks of the work undertaken in Darya Khan Shaikh, Khairpur and the resultant change that it has brought to the village.

V I S I O N

To promote heritage and culture as a basis for rehabilitation, income generation and development.

M I S S I O N

The mission Khairpur is to build back better through speedy construction of low carbon footprint, low cost structures designed for disaster risk reduction, as part of floods preparedness strategy, enabling post disaster communities to speedily restart their lives and achieve self reliance.



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INTRODUCTION

Background

August 2010, is marked in the history of the country as the start of what may be considered an off-the-charts natural disaster. The flood affected a vast majority of the settlements that have grown along the Indus River and its tributaries. That accounted for nearly 20 million citizens, losing not only their worldly possessions but also hope.

Heritage Foundation began the Green KaravanGhar (GKG) initiative in Swat, constructing almost 270 units in over 17 village clusters. GKGs are low carbon footprint, low-cost nucleus houses, consisting of one room (to accommodate 5 persons), a veranda, kitchenette, W.C. and bath, and are constructed primarily using sustainable materials i.e. bamboo, mud, lime and stone. An eight day construction time line was made possible with the help of community members, teams of artisans and volunteer students. The process of GKG is as significant as the finished shelter itself. The mechanism provides an opportunity to young student volunteers to participate in activities which are technical as well as humanitarian. The sustainable nature of materials being used addresses issues of global warming and reduction of carbon footprint.

As work progressed in the north, it was noted that relief efforts in the province of Sindh were lagging far behind, specifically in the 'kaccha' regions that are in any case prone to flooding. With support from Architecture for Humanity the programme was extended to a small remote village along the river bank, known as Darya Khan Shaikh,

in the district of Khairpur. The Green KaravanGhar was designed to act as a Demonstration Project in the region, employing indigenous materials and involving communities during construction. Workshops for artisans and communities (particularly women) were to be carried out periodically, teaching the local population this 'Green' method of building that is earthquake and flood resistant.

When the representatives of the Heritage Foundation arrived at Darya Khan Sheikh, the squalor, and the lack of awareness amongst the community for hygiene and cleanliness were taken up as being important aspects that needed to be worked upon along with the construction of the units. The community was currently living in very close proximity to their cattle. A vast majority of the community occupied tents that had been provided as immediate relief. Several families huddled close together to share these tents. Tube wells were being utilized as communal washing up spaces, while there seemed to be no proper washrooms or toilets. Children roamed the village without shoes or clean clothes. A make-shift school was functioning from inside a mosque with just a handful of students. The women of the community were limited to their homes (tents) where they seemed to have no activity other than household chores and looking after numerous children.

As customary, loans and investments in the yearly crop destroyed by the flood had caused most of the villages agriculture based economy to fall into heavy debt. The families struggling to make ends meet could not imagine reconstruction of the houses they had lost. A lack of schools and medical facilities in



The fields at Darya Khan Shaikh



Taking produce to a near-by market



The dirt lanes between the village and farmlands



Woman cooking in a makeshift kitchen after Floods, 2010



The squalor caused by cattle living in close proximity of houses



A local attempting to clear away the rubble after Floods, 2010

the region resulted in poor hygiene and lack of education and awareness among the society. Livestock and cattle were not in enclosures, which resulted in a further deteriorated state of hygiene.

The aim of the project was not to simply construct post disaster housing, but to equip the beneficiaries with an environmentally friendly building technique, using locally available materials.

Khairpur Scenario

Khairpur was chosen as the project area based on its importance as a historical district with a wealth of heritage assets that have remained hidden from the public view. The District Government proved to be extremely cooperative in providing available data and assistance. Shah Abdul Latif University was also a valuable partner, providing subsidized accommodation to out of town participants and Heritage Foundation teams.

With the help of the District Government and a local Civil Society Organization, a list of beneficiary families was prepared. This list indicated that some 55 nucleus houses would be required. The first 25 units, along with a training workshop would be undertaken with the support of Architecture for Humanity while further assistance would be sought from other donor agencies or the pool of funds already made available to Heritage Foundation for Flood Response for the remaining units along with other service facilities including a Green Women's Centre, a health centre and a school. Furthermore, a livelihoods and empowerment program would also be undertaken. This would include craft skills training, solar dehydrators to produce sun dried fish, vegetables and fruits, as well as

exploring biogas and solar panels for renewable energy options. The Swiss Pakistan Society came forward to help support the additional construction in Darya Khan Sheikh and a later identified neighbouring village, Uthero. The community at Uthero insisted that along with the identified 45 units, a Green Women's centre and health facility must also be provided for them. A soil survey was carried out at Darya Khan Sheikh and Geological test report indicated that an innovative solution such as the GKG was more appropriate, as the soil would be unable to support concrete structures. Prior to undertaking construction, a study was made of local materials and building practices. Upon excavation of the first unit it was clear that the foundation design needed to be revised. Firm soil could not be reached until excavations had been carried out till 5 feet or more.

The usual methodology of constructing foundations up to the firm soil would result in exorbitant increase in cost, especially since stone was not available in close vicinity and would have to be carted from some distance. A study of brick availability was also carried out; however, in view of the cost of brick and use of energy in its production, preference was given to stone masonry in foundations. The project Structural Consultant provided an alternative methodology for construction of the foundations. Accordingly, a replacement technique was adopted through which compacted pure sand would replace the soil thereby decreasing the wall masonry depth to only 2-3 feet below ground instead of the earlier 5-6 ft. In order to take advantage of the prevailing wind, a wind catcher was incorporated, the design of which was based on the studies carried out

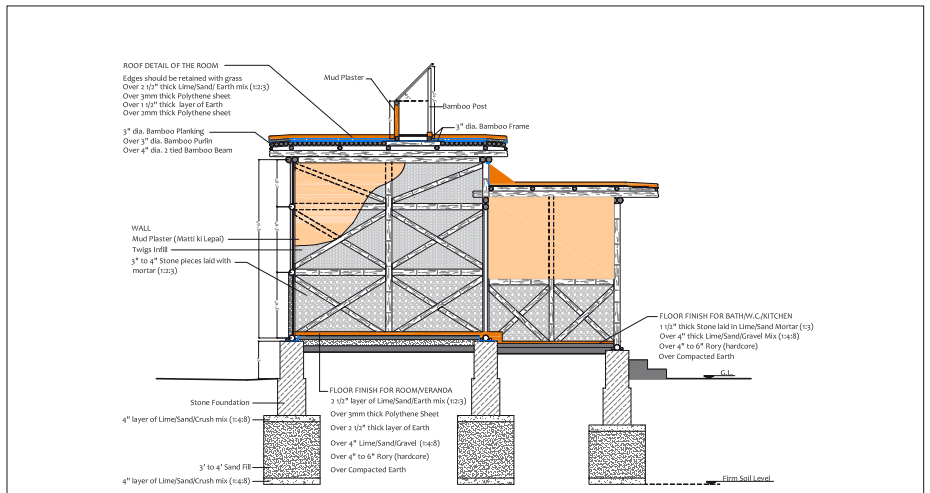
by Yasmeen Lari in the early 1980s, and drawings for which were available in her book 'Traditional Architecture of Thatta'. Another innovation that proved to be time-saving as well as increasing local economy was woven local reed matting. The matting was now made up as prefabricated panels produced in a nearby village. The matting panels were ordered to size which speeded up the construction activity enormously as they arrived as ready to be installed panels for roofs and walls. The weave of reed made it sturdy as well as long lasting. As we continued to build more units, the entire village became engaged in this activity. Since direct purchases are being made locally, this has become a source of considerable income for the community.

Layout markings were begun, with each nucleus family receiving a separate unit. Since this had not happened before, with multiple families living in small cramped quarters, addition space was required. The community members decided that a small farm holding where animal fodder was grown would be given up for the few families that did not have space inside the village.

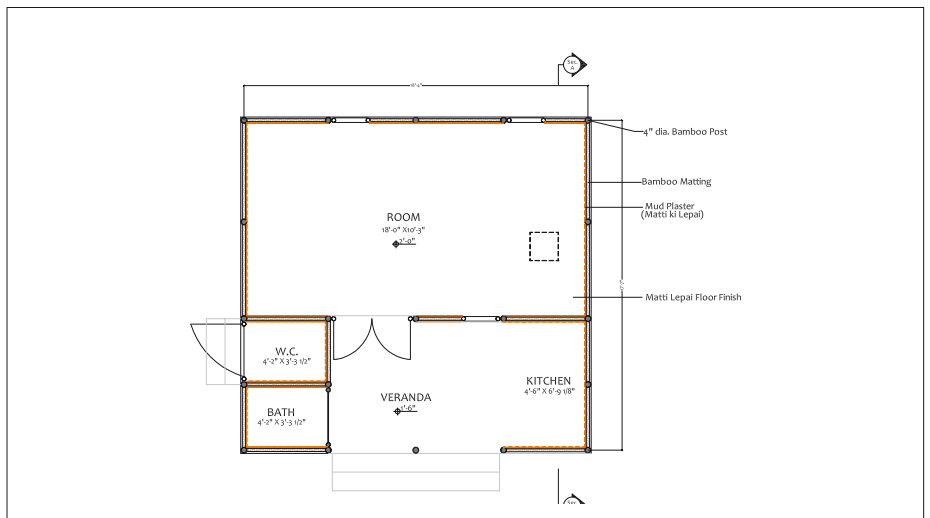
The positive impact of the project has been provision of secure housing to the affected communities. One of the aims of the programme was to mobilize the community and encourage training in building skills. The impact of the training boosted the confidence and sense of self-help and learning capacity of the participants. The whole process strengthened the working partnership between the community and HF staff. Positive impacts also include the psychological contentment of these traumatized communities and their appreciation of the international and national humanitarian support that has been offered to them.



An entire village of tents with more than a single family occupying each tent after Floods, 2010



Section of a GKG module



Plan of a GKG module



Before GKG: Presence of cattle creating unhygienic conditions



After GKG: Cattle moved into pens



Before GKG: Living conditions

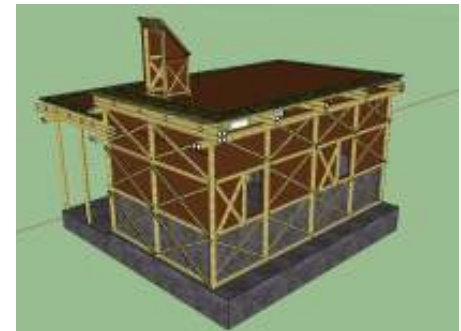


After GKG: Living Conditions

Funding & Support

The work in Khairpur could not have been possible without the help of Architecture for Humanity, Google and the Live4Pakistan concert, an online fund raiser developed by Bubble tank and Virgin Unite who provided Heritage Foundation with the funds so they could start construction of 25 GKGs and a workshop for training nearly 50 participants in Khairpur.

The Swiss Pakistan Society, long-time friends of HF, provided the much needed substantial funds for construction of additional 80 GKGs and along with TIDES Foundation for community buildings in Darya Khan Shaikh and neighbouring village, Uthero.



3d generation of GKG module, Sindh



Before GKG: Grain storage and children's play area



After GKG: Grain storage



After GKG: Children's play area is the GWC ground floor

GREEN KARAVANGHAR

Workshop

Heritage Foundation has always given precedence to the training of local communities and students. The first order of business when beginning the Green KaravanGhar programme in any area has been the training workshop. The Workshop was conducted from 21st to the 27th of February and proved to be successful in training artisans, community members, student volunteers and civil society representatives. Some 47 individuals underwent this week long workshop which included GKG construction techniques, community and participant interactions and awareness activities.

The community was approached by a local Civil Society Organization, while the artisans were recruited based on their experience of working on site and level of interest shown in the program. A registration form was circulated for student volunteers and a large number of responses were received. The aim of the workshop was not only to involve the participants but to interact with the community so that change could be brought about in their current living standard. Training in the building technology was to go hand in hand with community awareness in hygiene, education and women empowerment.

The training involved the participants to understand the materials being employed, and their fabrication and erection techniques. They also learned various skills that are required during each stage of the GKG construction. Teams were formed which comprised of members from all participation groups



Layout marked ready for household member to excavate GKG foundations



Household member after excavation of GKG foundations



Swat artisans prepare materials for GKG workshop



Household member apply plaster to his GKG



Community members assist artisans to complete units speedily



Artisan teams work to complete Green Women's Centre

and were assigned different tasks each day. These tasks were divided as:

- **SURVEY** – Interacting with community to gather general statistics and information of literacy levels, craft skills and other abilities. The survey teams also undertook activities with community children and held daily performances with a special message for the community.
- **LAYOUT** – cross checking excavations for foundations and correcting mistakes.
- **MASONRY** – involved lying of foundation pad, dressing the stone and laying it in proper masonry bonds as well as preparing mortar with lime and mud.
- **BAMBOO** – which included cutting, bolting, prefabrication of beams, joists, doors and windows as well as erection and tying of the structure.

The participants of the workshop came from five distinct groups. These groups were divided equally to form teams to work together at different tasks. They are as follows:

1. Heritage Foundation Skilled Artisans Teams

A 12-member group of workers including masons and carpenters who travelled from Swat and had been trained earlier by HF. This team included artisans who were trained in the Green KaravanGhar building methodology while housing units were being constructed in Swat. It was the first time for all members of this team to be in a different part of the country. They were pleased to interact with

fellow countrymen and teach them the new and sustainable methods of construction. The Swat Artisan Team demonstrated bamboo cutting, bolting and anchoring techniques as well as the principles of stone masonry.

The team of artisans continued to stay and complete construction of nearly 80 units as well as a Women's Centre, with the local community before going back to their hometowns. They had not only enjoyed the experience of working in a different region but were overwhelmed by the hospitality and friendliness of the local villagers.

2. Local Artisan Trainees

12 local semi-skilled artisans were to be trained in the many stages of the construction of the Green KaravanGhar. An initial 12 member team was chosen to participate in the workshop. Members were instructed in understanding each stage and then were later told to focus on tasks that they were particularly skilled at. The trainees received a stipend equivalent to the standard daily wage. By the end of the week long workshop more local community members wished to be trained in this unique yet simple construction technique. They learnt how to cut, bolt and anchor bamboo as well as dressing and lying stone masonry foundations.

The local artisans are now well trained in the construction technique, after completing over 105 units, two Green Women's Centres and a school and Health Care in the district. They have been able to generate a stable income while the programme was running, thus upgrading their financial situation immediately after the floods. With the employment of local bamboo matting

for walls and roofs, an entire village was involved in prefabricating matting for the Green KaravanGhar Units. Another village has been engaged in the production of kanats or screens woven with date palm strips, that are used as an alternative to doors.

3. Student Volunteers

University students majoring in architecture arrived from Karachi University, Mehran University of Engineering and Technology and Beaconhouse National University, while students majoring in conservation participated from host Shah Abdul Latif University.

These participants conducted surveys and involved the local community in various activities including a daily performance (with a specific message); mural painting and pottery making for children, hand-washing and other hygiene related activities. They also participated in the construction of the GKG, under the instructions of the skilled artisans' team from Swat. This hands-on training in building methodologies and community development gave the students a rich experience in both technical and social interaction.

The presence of the students in the village added an extra strength to the project. The local community was uplifted in seeing help arrive from different parts of the country in the form of young people. The presence of both male and female students working the materials and interacting with the locals created a sense of awareness of the importance of education and equality. Their interactions with village children not only left an impression on the young minds but also brought the winds of change to the village.



Student Volunteers and Heritage Foundation staff after meeting with Dr. Nilofer Sheikh, VC, Shah Abdul Latif University



Artisan Trainees learn prefabrication of bamboo joists



Swat Artisans and Khairpur Artisan Trainees work together on Demo Unit



Female household members prepare mud plaster



Senior Artisan demonstrates stone masonry technique



Children gather to watch daily performances

4. Civil Society Organizations

Two local organizations, the Khairpur Civil Society and Indus Resource Centre were also involved during the workshop as trainees. These members were taught the methods of construction, how to use the sustainable materials and the way to organize this modular self-help program, as well as in community activities involving students and others.

5. Community Participation including Women

For any housing programme to be successful it is very important for the local community to embrace and participate in its construction. The workshop that was held in Darya Shah helped in training the villagers in the methods of construction of GKG and helped them to familiarize with the use of sustainable materials.

The beneficiaries were asked to excavate their foundation and generally participated in helping build their own houses. Since women are traditionally skilled in laying mud plaster, it provided them an opportunity in finishing their house, this way the whole household would have a sense of pride and ownership. They also participated in various activities arranged by the students and were made aware of many issues that had to be addressed relating to hygiene and education.

A literacy and craft survey carried out by students based on the survey form developed by HF. The survey was carried out amongst 45 women in the village. All surveyed individuals were married and had several children. Although the women informed that they could read the Holy Quran, it was clear

that their literacy level was extremely low. The women were mostly involved in activities within their homes, looking after the cattle (consisting of 4-5 buffaloes or cows), and also worked in the field during harvesting. In their spare time they made handcrafted products such as *ralli*, a cotton blanket made of patchwork which could take two weeks to several months to complete depending upon the intricacy of the design; woven *charpoy*, a bedstead of woven webbing or hemp stretched on a wooden frame on four legs, baskets and clothes. In spite of the hard work they put in, they earned no income as there were no marketing opportunities. With the construction of Woman Centre both in Darya Khan Shaikh and Uthero, furnished with sewing machines, the local women are now successfully making handmade crafts and selling them.

It was found that there was only one individual in the village that had completed his matriculation (up to grade 10) and 90% of the female population had never attended school. However, in the recent past, more girls were being sent to attend classes than before. The local female population is elated in having a space that was specifically made for them. This has caused a positive change in their attitudes. The women set up a Committee, which ensures that the centre is maintained. A fish drying process has gained momentum, which is not only improving the daily diet of the families but is also creating an added income activity for the village. The community asked for a boat so that they could catch more fish to dehydrate as well as easily visit the lands on the other side of the river. With support from Swiss Pakistan Society a boat was handed over to them with the

promise that if they were to raise fifty percent of the cost of the next boat, Heritage Foundation would supplement the additional cost. The Women's Committee worked out a fifty rupee monthly rental cost of the communal boat for each family. They also devised a method of deducting five hundred rupees from each household's income from HF's construction programme and were able to generate the fifty percent cost of the second boat within less than a month. A second boat has now been provided to the village with support from the Tides Foundation.

SUCCESS OF THE WORKSHOP

When Heritage Foundation first arrived at the village, it was seen that the community was in despair. Harsh summer months were close approaching and they had been living in the emergency tents or over six months. Not only were there feelings of abandonment amongst the community, but also a lack of trust when it came to outsiders. The region was prone to petty theft and dacoits, and aid had not yet reached the flood affected. Small NGO's and Civil Society Organizations had arrived earlier and given immediate aid, and constructed washrooms without much interaction with the community, leading them to believe that this latest influx of people would be similar. At the beginning of the workshop, there was an initial hesitance amongst the community, but as the days progressed, and increased interactions with the HF skilled artisan team and students with the locals caused a great bond between the three groups. Friendships were formed, discussions were held and problems were discussed openly.

1. Health and Hygiene

Each students' group took upon the task of a performance which involved the community members. Performances included issues of health and hygiene, such as the importance of wearing shoes or sandals, washing hands, personal hygiene, environmental cleanliness, and the importance of keeping the livestock at a distance from the house. A hand washing activity was undertaken after a mural painting and a pottery session was held, encouraging the children to wash up after various activities.

During the course of the workshop, it was noted that the community was taking steps towards better personal hygiene, insisting that their children wear shoes and clean clothes. On subsequent visits by Hon. Project Director, Yasmeen Lari, she noted a great deal of enthusiasm for improving their environment. An almost transformation was noted a month after the project had started. Mr. Faisal Khokhar, EDO, District Government of Khairpur commented that the transformation was unbelievable. Not only had various families decorated their houses, they had made a lot of effort to keeping the spaces clean, with regular removal of animal waste. The women also showed a great deal of pride in their clean and decorated houses, and were keen to show the visitors around.

2. Extra Curricular Activities for Children

Following the tradition that Heritage Foundation had set since Earthquake 2005 during its work in post-disaster communities, student volunteers organized several activities for the commu-



Student Volunteers learn how to lay stone foundations



Civil Society Officials learn bamboo cutting technique



Community children gather for Mural Painting

nity. Two of the daily performances were based on education and female literacy and were greatly appreciated by the community elders. Students that had arrived from many different cities of the country also included young women, and that proved to be a great motivational factor in creating awareness for female education. Arts and crafts activities organized for the children in the community introduced the concept of play during learning, as children realized their artistic abilities. The school teacher was enthused to learn that simple crafts such as pottery would spark such an interest in the students and expressed that he would continue to hold such activities with them. When the final assembly was held, the colourful murals painted by children who had never held a brush in their hands was a source of wonder. The clay objects, many resembling the clay objects found in close by archaeological site of Mohenjo-Daro, showed the potential that exists if opportunities are provided to young people.

3. Education and Vocational Training

As part of Rehabilitation, women were being trained in many different skills that would increase the income of the household. A solar dehydrator fashioned in bamboo was assembled and the method of building and then dehydrating food items such as fish, vegetables and fruit was taught to one of the women, who went on to teach others the use of the machine. Solar dehydrators are being distributed with the assistance of the Swiss Pakistan Society (SPS). The Green Women's Centre, funded by SPS, has provided a haven for the women of the village as it acts as a gathering and training centre.

Through the assistance of Tides Foundation the Green Women's Centre has been equipped with sewing machines and a Women's Literacy Centre is nearing completion in the village.

4. Community Involvement

At the completion of the Demonstration Unit, the community members displayed much appreciation. Initially they were opposed to the idea of attached bathrooms, having never used them before. Participants and Heritage Foundation personnel discussed the hesitance of the local community and explained to them the increased ease and level of hygiene that the attached bathroom would provide. Some women were also skeptical of attached kitchens but once the first few houses were constructed and kitchen put into operation, the advantages of such an arrangement came into view.

As the men in the house began to dig foundations, it was clear to see that an atmosphere of excitement was growing with the artisan teams completing unit after unit. The beneficiary families were asked to begin finishing the units. Traditionally, women have been involved in preparing plasters and applying it to their homes. The HF artisan teams added lime to the mud plaster, while the women added their own traditional ingredients – cow dung and straw, giving the plaster its own unique indigenous texture and identity. Photographs could not be taken to illustrate the involvement of women due to cultural constraints. Each family painted their units in unique colours, as suggested by the local "colour consultant" – the school teacher, and hung unique handcrafted 'rallis' (patchwork cotton blankets) on the doors and windows. Art work such

as floral and animal motifs adorned the exterior walls of some houses.

The interest shown by the community displays the satisfaction of the beneficiary families and the people from the surrounding areas. Upon moving into their GKG units families have been provided with packages of Non-Food Items that were received from the National Disaster Management Authority (NDMA). These packages include household items such as bedding and kitchen utensils.

In the case of Swat, the Green KaravanGhar units were remotely located in small clusters or single units, hence the tangible impact of the Heritage Foundation efforts were not as visible as in the case of Darya Khan Sheikh. Here the village is close knit, and the affects of an educated and rational intervention through organized systems and methodology have resulted in a marked improvement in the living standard of the locals. The community has become aware of basic human issues such as hygiene, literacy and women's rights. Further development will be closely monitored and regular interactions with the community will ensure that the conditions in the village continue to improve.



Completed GKG Unit

PHILOSOPHICAL BASIS

Drawing upon experiences in working with post-disaster communities, the following formed the philosophical basis of the post-flood project:

- Use of indigenous resources, heritage and traditions for building.
- Use of sustainable materials for low-carbon footprint, low cost housing units.
- Optimizing use of building materials available locally.
- Maximizing utilization of indigenous techniques and local workforce.
- Through improved methodologies and safe buildings, restoring confidence in local building techniques.
- Design to correspond to lifestyles, income group and cultural context.
- Maximizing community participation; fostering sense of ownership and pride.
- Enabling communities to build low cost, low –tech structures themselves according to their needs.
- Conservation of environment, tangible and intangible heritage,



Hand-washing activity for hygiene awareness



Community members add straw, lime and other key ingredients to make unique plaster



Two completed GKG units built side by side for extended families who wish to live close together

THE PROJECT

The parameters for shelter and rehabilitation consist of the following:

- Low carbon footprint, low cost shelter, the Green KaravanGhar – as the starting point for rebuilding lives.
- Revival of livelihoods for women's economic empowerment crafts and agro-based products.
- Primary hygiene and health care regimen by instilling requirements of clean water, hand-washing and hygiene procedures.
- Literacy among adults particularly women as well as children. The Green KaravanGhar has been designed around four components:
 - Guidance through HF trained skilled Artisans Team;
 - Training and capacity building of local artisans;
 - Student Volunteers;
 - Community participation tasks performed by women.



Four completed units built on farmland provided by community for families who did not have space inside village for GKG units



Community women gather at Green Women's Centre for meeting with Ar. Yasmeen Lari



Artisan Trainees gather to listen to Workshop closing speeches

PROGRAM SUCCESS

The site was mobilized on 20 February by which time the skilled artisans teams from Swat had arrived. The delivery of all the material including bamboo supplies, bolts, lime, polythene sheets etc. had been arranged which had become available by the time construction work was undertaken.

The workshop participants arrived on 21st February. The inaugural briefing regarding the programme was given by Ar. Yasmeen Lari, CEO, Heritage Foundation on 22nd at the site, where a shamiana (awning) had been erected where banners and photographs of GKGs built in Swat. The briefing was followed by details of the participants and their organization by HF Project Coordinator, Ar. Mariyam Nizam. The details of how the GKG structure is put together including demonstration through a training kit was provided by HF Project Manager, Naheem Shah.

Heritage Foundation went above and beyond with the innovation of Green KaravanGhar to help the people of Khairpur by not only providing them with safe, sustainable houses but also a sense of security. Not only did HF provide the people with hygiene awareness but also provided them with activities such as painting and performances so they could gradually recover from the trauma. The use of mud plaster that is mostly applied by women, gave them the confidence to begin decorating their own units with shelves and other elements to personalize their houses and focus on value of education particularly for girls. The importance of hygienic environment conveyed



Artisan Trainees work on Primary School building



Children enjoy painting the pottery they have created with the local guide



Inspection of completed units by Ar. Yasmeen Lari

through daily skits brought about the necessary awareness.

The students' workshop that was conducted with the support of Architecture for Humanity played a major role in showing solidarity with villagers. Participating in fieldwork, students explored local materials and learnt to make friends with a disadvantaged population. The villagers agreed to confine all animals in one area, thus creating a much more hygienic environment in the village. The skill training component has been extremely successful. Two teams brought from Swat (a cold mountainous area) to the flat area in Sindh (extremely hot), proved to be a step towards integration as both groups were surprised at the hospitality and warmth that was expressed for each other. Twenty local Sindh artisans have been trained who, after the return of the Swat team, are now engaged in carrying out further work. Due to Heritage Foundation's innovative use of reed, a village where they make reed panels, has become the supplier for prefabricated roof panels for the GKG programme and an entire village is now able to generate a great deal of income through supply of local roof panels and another village cluster is engaged in making date palm colourful screens which are being used in bath rooms. This little but significant economic regeneration would not have happened if we had brought concrete and alien roofs of galvanized iron sheets.

The completed Green Women's Centres on stilts, supported by Swiss Pakistan Society and TIDES Foundation, have allowed village women to get together on the first floor for discussion and work, while the ground floor, being the coolest place in the whole vil-



Solar Dehydrators fabricated for woman of GKG units 18 and 19



Completed Green KaravanGhar units



Interior of GKG unit

lage is being used as a school. The stilts structure has been designed to provide an elevated safe haven for women and children in case of future floods. Journalist Zofeen Ibrahim reported:

But if you ask the village women, what is the best thing that has happened to them after the floods, they all point to the women's centre, a hexagonal structure on stilts.

"We never had a place of our own and we never got together the way we do now," says Shabun Bibi, 30. "Here we listen to each other's problems and try and find solutions to them." (After the Floods, Green Homes, IPS, 28th July 2011)

One their request we are providing them with a boat so that they could fish in the river, four sewing machines to make patchwork products and to stitch clothes, electrical pumps for each cluster, so that women could water with ease their own vegetable patch.

In view of lack of the basic facilities, a primary school and health centre are nearing completion. It is hoped that through the provision of these facilities, the neglected community will be able to have access to their basic needs.



Household members decorate houses to personalize their GKGs



Community member shows sense of pride and achievement as he looks upon his own GKG unit



Packages for community from TIDES Foundation & PDMLA



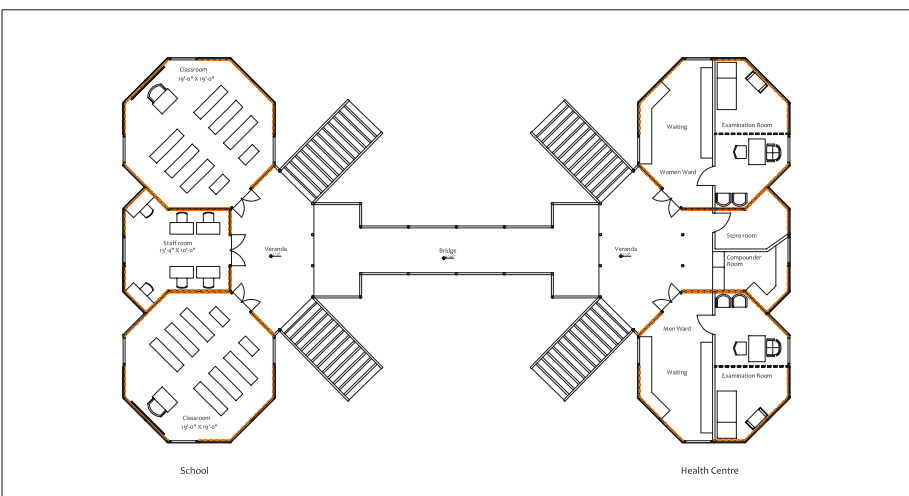
Green Women's Centre



Primary School Building on stilts



Under construction bridge which connects the Primary school building to the Health Centre being constructed



Plan of Primary School and Health Centre, village Darya Khan Shaikeh

DISASTER PREPAREDNESS & DISASTER RISK REDUCTION

For many years disasters were considered as one off-events. Once they happened, government and nongovernment organizations scrambled to provide relief. Today, disasters are occurring on an increased scale around the world, and Pakistan seems to be confronted with calamities on a regular basis. The Earthquake 2005 was an unprecedented disaster with an unimaginable human toll. The Floods in 2009 and later in 2010 engulfed the entire country with unparalleled human misery. Seen in the context of global weather change, Pakistan is among the countries assessed to be the most susceptible to the adverse affect of climate change.

Most of the time, government and NGO response to rehabilitation continues to focus on expensive, 'high quality housing' and 'model villages'. Regrettably, the scale of the disaster and severe resource constraint in the country are overlooked. More than one year after the Great Flood 2010, a vast majority of the affected population remains without adequate shelter or WASH and other facilities. Excessive rains and flooding in Sindh in 2011 is a reminder that communities must be equipped for disaster risk mitigation. We know that poor communities will continue to be vulnerable, living as they do in areas prone to disaster, such as the katcha tracts in Sindh. We need to devise low cost, sustainable solutions that cater to the need of safety and refuge. Accordingly, since Earthquake 2005, Heritage Foundation continues to devise mechanisms to reduce vulnerability to

hazards, at the same time to reduce risk by improving the community's capacity to deal with them. HF believes that in addition to providing relief and shelter, it is equally important to empower the community for disaster risk mitigation management. In order to assist in disaster preparedness, HF has been working on methodologies in this direction.

The following steps have been taken in the villages Darya Khan Shaikh and Uthero, Khairpur, Sindh. These villages are prone to annual flooding and special attention was paid to design structures to withstand such disasters.

1. Building Green KaravanGhar (GKG)

Built as sustainable structures with almost zero carbon footprint (cost less than USD 1000) which have the following attributes:

- These have been tested as very strong, almost 300 of them having withstood 3'0" of snow and excessive rain in Swat winter of 2010-2011.
- They could be modified to incorporate wind catchers for the control microclimate.
- They are sturdy, strong and resilient that were likely to withstand flooding.
- Since local materials are used, even if any damage occurs, the community would be able to repair the houses and will retain their shelter.

2. Elevated or Floating Community Buildings for Refuge

- Community buildings such as Women's Centres/Literacy Centres, a Primary School and Dispensary linked with a walkway, have all been designed

on stilts. During flooding, when all other areas would be under water, the vulnerable population would be safe in elevated buildings.

GKG RESPONSE TO SINDH FLOODS 2011

The survey carried out soon after the rains that have lashed the province of Sindh during the month of August and September 2011, when Khairpur has also been heavily affected demonstrates the effectiveness of HF strategy for disaster mitigation. On the visit of HF Project Manager Naheem Shah in the first week of September 2011, he noted the following:

- The GKG Sindh has been able to resist the onslaught of rains and flooding effectively. Wherever mud plaster was damaged, it has been repaired. The families have been able to continue to live under their own roofs.
- The elevated structures have served their intended purpose. The completed women's centre and partially completed primary school has provided refuge to aged, sick and women where they remained safe and secure even as the grounds were flooded.
- One drawback was the loss of their food rations. Two weeks supply of food supplies to the families has been provided. It is clear that more floating structures are required for other aspects.
- The community has felt safe and secure. They informed that this is the first time after flooding that they were not displaced and did not have to seek shelter in tents.
- The families were able to repair any minor damage to their houses themselves, because their capacity for repair

and maintenance had been developed.

- Saifullah Badshah and Hadi Bux reported that earlier the community would take two months before they could pick up the threads, after this year's flooding as soon as the waters receded they were able to restart their lives within a couple of days.
- Other steps that have been taken are clearly contributing to the resilience of the community in the face of disaster. These steps have also helped them to become resilient and self reliant.

OTHER ASPECTS

1. Economic Regeneration through Vernacular Construction

By using local materials and artisans' skill training for construction of houses and social infrastructure buildings, considerable economic regeneration has been achieved in several villages – the beneficiary villages, as well as those providing reed matting for roofs and walls, and reed screens for houses.

2. Women's Economic Empowerment

Special attention to making women earning members of their household has enabled women to take a leading role in becoming in dealing with calamities.

3. Environmental Improvement & WASH

Emphasis on community hygiene and children's non-formal education have helped in fostering better living habits. Filtered water supply and sewerage has been arranged. Household clay water filters and expertise in making chlorine by villagers are being developed by Rehan Khan, member SPS and volunteer HF.



Young girl prepares food on a Solar Cooker



Women and children seek refuge from floods, 2011 at GW/C



Families stake food supplies in GKG which resisted floods, 2011

4. Use of Renewable Energy

Solar cookers have been installed with success. Use of solar panels for lighting is being explored.

5. Other Steps for Disaster Mitigation

- Construction of more floating structures to provide safety of food, drinking water, livestock and feed in case of flood disasters.
- Disaster Risk preparedness programme to enable the communities to deal with the disaster more effectively.
- Placing a warning system for preparedness.
- Training in first aid.

The model of low cost vernacular construction and elevated public structures can be replicated in other villages. Depending upon the highest recorded level of floods, these floating structures could be raised above that level, to provide refuge for at least the vulnerable groups.

Our aim should be to build disaster-resilient communities so that they are able carry out community disaster mitigation management themselves.

In view of the experience gained by HF over the last 6 years in rehabilitation of post-disaster communities, we believe it is essential that appropriate methodologies for construction are utilized in order that communities are not displaced during disasters such as the Sindh Floods 2011.

Through use of appropriate floating structures, it is clear that as soon as the waters recede the people are themselves able to pick up the threads to re-start their lives.

CONCLUSION

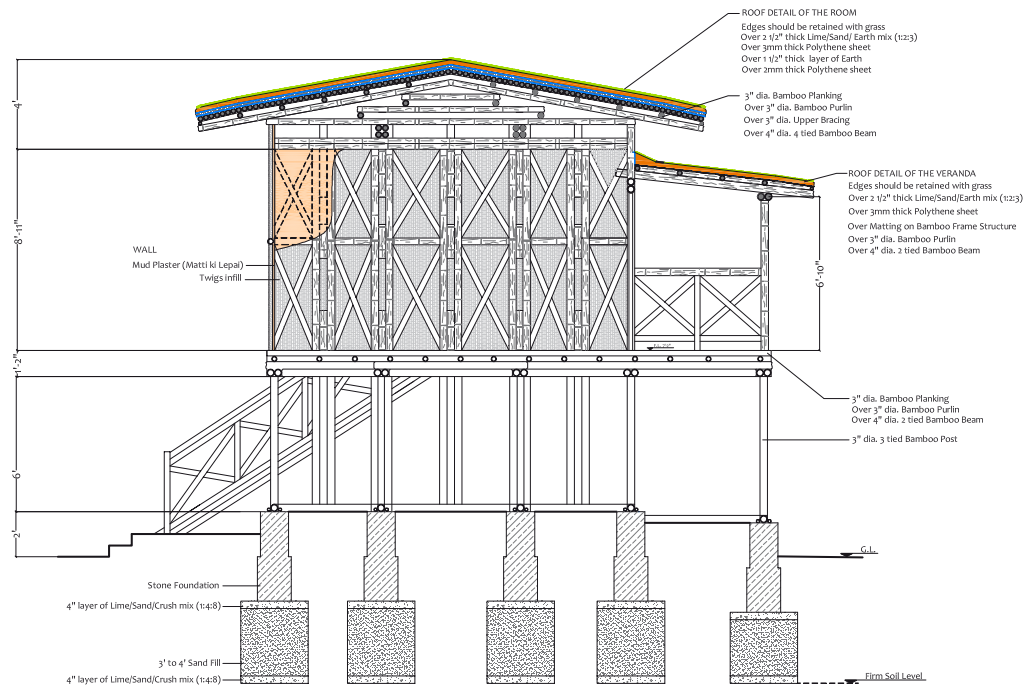
The successful Khairpur model, comprising GKG (cost US\$ 2.5/sft) and elevated community structures, can be replicated with comparative ease.

As part of floods preparedness strategy our aim should be to speedily build low carbon footprint structures designed for disaster risk reduction, enabling post disaster communities to speedily pick up the threadsm and achieve self-reliance.

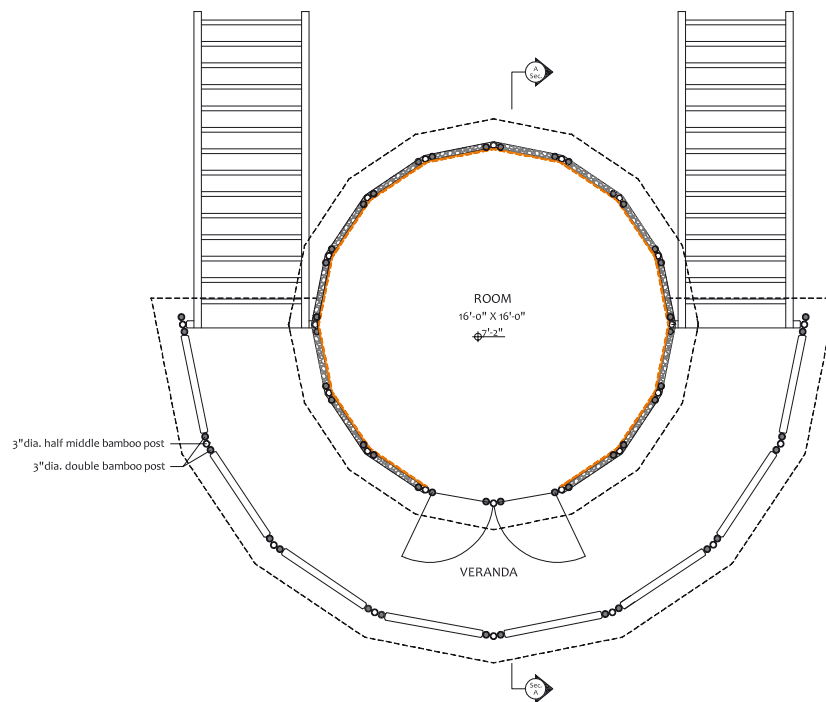
The HF focus on further research and development related to DRR (Disaster Risk Reduction) and BBB (Build Back Better) is expected to contribute to saving lives and livestock as well as economic regeneration of affected communities.

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Yasmeen Lari, *Sitara-i-Imtiaz*
CEO. Heritage Foundation &
Hon. Project Director
Karachi, September, 2011



Section of Green Women's Centre on Stilts constructed in villages Darya Khan Shaikh and Uthero



Plan of Green Women's Centre on Stilts constructed in villages Darya Khan Shaikh and Uthero

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Women's gathering at Green Women's Centre, Khairpur

