Post-Earthquake Reconstruction Scenario in the Rural Northern Areas (N.W.F.P.) of Pakistan

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ABSTRACT :

This paper is an analysis of the Reconstruction Scenario in the Rural Northern Areas of Pakistan that took place after the Earthquake of October 08, 2005. These areas included Azad Jammu Kashmir and NWFP Province. It explores the main reasons for this magnitude of destruction, highlighting the immediate issues, the three pronged strategy developed for re-habilitation and reconstruction of the region, i.e. ensuring immediate survival, immediate re-habilitation measures adopted and re-construction. This paper gives an overview of the weaknesses and shortcomings on part of the Government of Pakistan in overcoming the situation. It discusses at length the issues of income and livelihood generation for the affected population. An introduction to Heritage Foundation specially encompassing their project "Karavan Ghar", concentrated in the Siren Valley, NWFP Province, Pakistan. This project addressed the major issue of need for shelter, re-ruiting of water resources, despite severe weather conditions, accessibility issues due to difficult terrain and lack of population density in the mountainous regions, besides conservation and protection of the local heritage, working for the sustainability of the local green and natural environment, catering for the local issues like poor economic conditions, illiteracy, joblessness and lack of interest by local public to undertake training for reconstruction work since they used to get lined-up in front of NGO offices to get hold of maximum aid available, availability of volunteers for such a long tenure. Role of other NGOs has also been discussed who introduced different construction techniques without even considering climatic demands or even environmental serenity. How the people of that region were trained to build earthquake resistant houses for themselves as well as their neighboring villages, using the same techniques as were used by their fore-fathers thus maintaining the local green and natural environment as it used to be before the earthquake. In the end, I have discussed the lessons learnt during this situation and how we can prepare ourselves for any such catastrophe in future. This paper can be helpful to regions which lie on a fault-line and need to be prepared for any time of crisis. It is an effort to share our experience how we turned a tragedy into an opportunity.

KEYWORDS: October 2008, Siran Valley, N.W.F.P. Pakistan, Reconstruction, Indigenous Technology.

1. INTRODUCTION

The earthquake of October 2005 came as a shock to the people of Pakistan, but nobody could imagine the magnitude of destruction till five days later, when transportation links were partially restored. The months that followed witnessed thousands of aftershocks at a rate of hundreds daily.

The magnitude of destruction was 92%*. Total area of the regions in Pakistan, affected by the earthquake, i.e. Azad Jammu & Kashmir and NWFP, is 30,000 sq.km. covering 9 Districts, 25 Tehsils, and 4000 villages. 73,338 people got killed (out of which 35,000 were school kids), 69,412 were seriously injured, while 3.5 Million were displaced. 42,600 families lost their earning members, and made them dependant on society. 600,000 houses, 6,298 schools and 796 (i.e. 48.7%) health facilities were demolished. 6,440 km. roads were damaged (i.e. 45% in AJK & 56% IN NWFP) and 50-70% of the water supply, sanitation, telecommunication and power infra-structure was rendered un-operational.

When the earthquake shook the region, it was October, winter was setting in. The terrain is mostly mountainous. Heavy rainfall started instantly, followed by large scale land-sliding and heavy snowfall. The circumstances made it impossible to carryout the rescue work. There was absence of proper infrastructure.

2. REASONS

The basic reasons for this magnitude of destruction in the rural areas were:

i. *Ignorance / Illiteracy*
ii. *Poverty*
iii. *Poor Infra-Structure*
iv. *Absence of any Regulatory Authority regarding Construction / Implementation / Monitoring.*

The majority of people living in the rural northern areas of Pakistan are illiterate. The literacy rate in these areas is only 5%. Most of them move to the plains of the Punjab province in search of jobs, others are shepherds or farmers. This region being the only forested area of Pakistan, also provides timber for construction to the rest of the country.
These people were ignorant of the professions like Architecture and Civil Engineering except for a few masons and artisans. They used to design and build themselves using the locally available materials, i.e. stone and wood. The local amateur builders did not have any concept of foundation, stone laying / bonding or even mortar. Extreme poverty restricted them from using the prevailing construction technology, i.e. brick & concrete, or hiring local masons or artisans.

3. DEVELOPMENT / REGULATORY AUTHORITIES :

The administrative setup in Pakistan is as follows:

i. *Province*
ii. *District*
iii. *Tehsil (County)*
iv. *Union Council (Cluster of Villages)*

There was no effective construction regulatory authority before the earthquake. ERRA has now distributed standard designs to the Tehsil Municipal Authorities for implementation.

4. IMMEDIATE ISSUES :

The immediate issues identified were:

i. *Restoration of Access Routes / infra-structure to the affected areas.*
ii. *Inaccessible Mountainous Terrain, continuous Land Sliding / Avalanches.*
iii. *Provision of Food & availability of drinking water for survival.*
iv. *Disposal of Dead bodies, humans as well as animals*
v. *Provision of medical facilities and evacuation of the critically wounded patients.*
vi. *Provision of tentage & beddings to the effected population at mass scale.*
vii. *Relocation of the affectees from inaccessible locations.*
viii. *Preparation for adverse weather conditions including Rains, Sleet and Snow.*
ix. *Restoration of the Government writ and functionaries.*
x. *Restoration of the Law & Order Situation.*
xi. *Removal of debris*
xii. *Co-ordination requirement with the donor agencies / countries and scores of individuals wanting to help.*

5. STRATEGY FOR REHABILITATION / RECONSTRUCTION :

It was a three stage strategy:

Phase – I Ensuring Immediate Survival

To ensure survival of people basic necessities of life had to be provided, i.e. food, clothing and bedding, etc. besides provision of immediate medical facilities for the sick and injured, etc.
In order to do so, the following actions were taken:

i. *Besides the civil government, the Armed Forces were mobilized and moved to the affected locations in their immediate vicinity. Troops from the down country were rushed for rescue operations by air and land routes.*
ii. *Due to the mass destruction of infra-structure, food / medicines / blankets were supplied by air.*
iii. *FWO was assigned the uphill task to restore infra-structure including roads, telephone and electricity.*
iv. *Tentage and beddings were distributed on crash footings by the Armed Forces and various donor agencies besides the general public.*
v. *Medical teams from all across Pakistan and world over, including a contingent of 800 doctors from Cuba, moved in and temporary medical centers were established in tents.*
vi. *Prime Minister's Relief Commission was assigned the task of co-ordination with the donor agencies / countries and scores of individuals wanting to help.*
vii. *The government provided additional officers to affected districts to cater for additional workload.*
viii. *Earthquake Relief & Rehabilitation Authority (ERRA) and National Disaster Management Authority (NDMA) were established.*
ix. *Foreign aid came in a big way. They provided weatherized tents, mobile hospitals, large temporary structures for food storage and special tents for schools and medical facilities.*
x. *Under the prevailing weather conditions, it was not possible to work with cement or construct proper buildings therefore there was an immediate requirement for the provision of temporary shelters with Corrugated Galvanized Iron (CGI) sheets. Though such a shelter was not weatherized, but at least it saved people from rain and snow.*

Phase – II Immediate Rehabilitation Measures

Due to severe weather conditions particularly at high altitudes, a large segment of people were relocated by establishing tentage villages / colonies. Temporary structures for combined public toilets were constructed to ensure proper hygiene & sanitation.
The criteria for selection of locations was; availability of road infra-structure, water, medical facilities and electricity where other necessities of life could be provided.
Some of the rehabilitative measures taken were:

i. *Facilities were provided to make local educational and medical services functional.*
ii. *Arrangements were made for making government offices operational.*
iii. *Restoration of infrastructure was given priority so that supplies, medical aid and personnel required to exercise various functions could reach the required areas.*
iv. *Provisions were made for Veterinary medical support, malaria and epidemic control. Fodder was made available for livestock.*
v. *Forward Food storage depots were created in the area to cater for any infra-structure blockade due to landslides etc.*
vi. *Where possible, electricity and running water facilities were restored.*
vii. *Government pledged Rs. 0.15 Million per family as financial aid. Rs. 25000/- were distributed immediately and it was declared that rest of the amount was to be distributed upon reconstruction of their house as per revised building codes / recommended designs.*
viii. *A determined effort was undertaken to motivate affectees to resume their livelihood as soon as possible instead of becoming totally dependant in "Refugee Camps" like the Afghan refugees.*
ix. *The magnitude of destruction was far beyond the capability of the Government of Pakistan to compensate / undertake the reconstruction by itself. An International Donors' Conference was held in Islamabad in which Pledges of approx. US $ 6 Billion against a loss of approx. US $ 8 Billion.*

Phase – III Reconstruction

According to the experts, it takes 10 yrs. to restore the infra-structure and the previous level of facilities and services. Due to various reasons it was incumbent to reduce this period to the minimum otherwise a whole generation would have been adversely affected.
Some of the measures taken in this regard were:

i. *Designs using various kinds of earthquake resistant techniques were proposed, building codes were revised & Priorities were laid down.*
ii. *Reconstruction of Schools, Medical facilities and essential Govt. Offices were taken on priority.*
iii. *Infra-Structure restoration, repair of culverts, bridges and retaining walls, besides soil stabilization were undertaken and most of these tasks are still in process.*
iv. *Resumption of electricity, identification of new water sources, and restoration of destroyed water works are still continuing.*
v. *Various shortcomings like mobile phone services and activation of dormant air-fields, etc. were identified and removed.*
vi. *The interaction with so many donor agencies, foreign nations, number of UN offices and local donors forced the government to move into the direction of e-governance system.*

6. Overview of Weaknesses / Shortcomings

i. *When the policies were developed, the general public was not consulted which resulted in development of grievances among the masses. Also, there was no feed-back mechanism. At times, the public had to agitate to get their grievances redressed. e.g.*
    a. *The proposed construction technology was in-appropriate, costly, and impractical.*
    b. *A major city of Balakot was ordered to be relocated to a new place.*
    c. *The compensation package does not take into account the ground realities of land ownership etc.*
ii. *The rectification of road Infra-structure should have been top priority. Although major roads had been repaired, however most of the rural roads are nothing better than a dirt track. This is resulting in extra fuel, vehicular wear'n'tear, lost transit time, if calculated into money is many times more than the cost of the repairs.*
iii. *No worth while reforestation effort has been undertaken.*
iv. *Soil Stabilization through environment friendly methods like plantation of trees is yet to be done.*
v. *A program should have been launched to upgrade the Hygiene and Sanitation conditions and educate the people regarding clean water usage instead of contaminated water from springs and streams.*
vi. *Land reforms should have been introduced thus providing rights and protection to the poor farmers.*
vii. *Although a large number of basic health units have been reconstructed, the presence of doctoral and paramedical staff at the basic health level is much below the desired criteria/ standards.*
viii. *Similarly, large number of teachers are still absent from schools*

7. INCOME / LIVELIHOOD GENERATION

This area has tremendous potential for enhancing the income or livelihood level of the incumbent population however a worthwhile effort is required.

i. *Climatic conditions in this region are quite similar to Southern Europe, Portugal / Italy / Greece which produce the best citrus, Olive and Fruit. Fruit Nurseries need to be developed and setup.*
ii. *A serious effort is required to upgrade agriculture for Livelihood, present level is not sustainable.*
iii. *Up-gradation of Livestock and poultry will make public self-sufficient in Milk, Meat and eggs etc. This will not only add to the quality of life, but it will also raise their income.*
iv. *Tourism Potential needs to be harnessed by introducing Forest Huts, Lodges, hiking trails, rock and mountain climbing, fresh water streams and fish farming.*
v. *Seminars, conferences and workshops should be held here in order to support the locals financially.*

vi. *Due to the geographical terrain, there is a lot of scope for a Hydro-Electricity generation. This could give a jump start to the local cottage industry, like weaving or wood crafts, embroidery, fruit drying and packaging.*

8. ROLE OF ORGANIZATIONS, INSTITUTIONS, NGOs & VOLUNTEERS

In November 2005, the **Department of Architecture & Design, COMSATS Institute of Information Technology**, Islamabad, held a seminar on "Earthquakes and Architecture". At the conclusion of the seminar, Ar. Yasmeen Lari (Chair-person of the Heritage Foundation, Pakistan) shared her idea of initiating reconstruction of permanent structures in the rural areas of the north using locally available materials. A presentation was made by the consultancy team of Engr. Amin Tariq regarding the proposed structural design.
Heritage Foundation is a Pakistan-based, not-for-profit, social and cultural entrepreneur organization engaged in research, publication and conservation of Pakistan's cultural heritage. It was clear that as a heritage organization and with preservation and conservation expertise, the **Heritage Foundation** had to be there to help people build improved shelters using their age-old construction techniques and materials. Thus, it was that the "Karavan Programme for Indigenous Technology" was devised in October 2005. It resulted in the construction of guided self-built "**Karavan Ghar**" in over 75 villages of the Siran Valley in District Mansehra, during the emergency phase.
The faculty and students of Department of Architecture and Design, COMSATS Institute of Information Technology, assured Ar. Yasmeen Lari of their full support. They joined hands with the Heritage Foundation in their reconstruction program as volunteers. Ar. Syed Ehtesham Husain, i.e. the author of this paper, the then Head of Architecture Department, CIIT Islamabad campus, made available all his resources and links for arrangement and transportation of building material to the affected sites. The students visited the affected area and became the first group to help in the reconstruction activity by staying in the affected zone. They were assisted by Architects and Engineers from Pakistan Army Corps of Engineers and National Engineering Services of Pakistan (NESPAK).
Professional Architects from America, UK, Ireland, Iran and Nepal also put in their effort, architecturally as well as structurally. Students from various architectural institutes from across Pakistan also joined in as volunteers, they helped in building and supervising the reconstruction process. These institutes were Comsats Institute of Information Technology, UET Peshawar, UET Lahore, Oriental College Lahore and NCA Lahore. A group of student volunteers from Macintosh School of Architecture, Scotland, and American School of Architecture, Sharjah, also participated in the effort.

8.1 STEPS TAKEN

Posters were printed in which photographic illustrations were used to guide and educate the illiterate people of the villages. Same sites were used for reconstruction, where earlier structures had collapsed, the primary concern being ownership rights. Wherever possible, sites were relocated to leveled lands instead of steep hill spots.
In the first phase, residential houses for widows were selected to be built as samples by the volunteers.
In the second phase, schools and mosques were built. Sample houses were built using the rubble of the demolished houses but careful selection of stones was made, a factor which had earlier been overlooked. During the earthquake, streams changed their courses. Since construction could not carryon without water, steps were taken to restore water supply system by laying new water supply lines from channels and streams to the old water supply systems of villages.

8.2 TRAINING SESSIONS

Training sessions were conducted regularly across the villages with special concentration on the following issues:

i. *Concept of Foundations*
ii. *Selection of Material (Stones)*

iii. *Placement / bonding of Stones*
iv. *Preparation and application of Mortar (Mud, Lime and Straw)*
v. *Use of Fly Screen at corners and junctions of walls*
vi. *Introduction of light weight wooden beams at Sill and Lintel Levels*
vii. *Introduction of Pillars, and light weight frame structure.*
viii. *Light weight roof structures.*
ix. *Use of chicken wire mesh along inner sides of load bearing walls.*

8.3 TRAINED LABOUR / MANPOWER

During this time period, most of the men used to line up whole day in front of NGO field offices in hope of free groceries and daily life necessities. Others went to plains in search of jobs. Under such circumstances, it was very hard to get these people to build their own houses.
So, we had to employ the men who had been trained. This step proved to be a great success, these people were locals and were permanently stationed in the hard areas which were otherwise difficult to access by NGO volunteers coming in from urban locations.
These teams of trained men were a great source of inspiration and guidance for rest of the local public in neighboring locations.
This development led us to move on to the next phase that was construction of schools, community centers and mosques. Simultaneously, women of these areas were encouraged to commercialize local handicrafts, those products were marketed by the administration of "Karavan Pakistan" and its volunteers. The funds generated from these products were later distributed among the crafts-women thus lifting their economic pressures.

8.4 CONSTRUCTION WORK BY OTHER NGOS / ORGANIZATIONS

The construction techniques utilized by other organizations were:

i. *Concrete frame structures with G.I. corrugated sheet roofing resting on steel – trusses with thermo-pore false-ceiling underneath. Hollow-block filling in between the pillars.*
ii. *Concrete hollow block walls with G.I. corrugated sheet roofing resting on steel – trusses.*
iii. *Load bearing brick walls with steel re-inforcement at corners, wall-junctions and window openings. G.I. corrugated sheet roofing resting on steel – trusses with thermo-pore false-ceiling underneath.*
iv. *Pre-Engineered Structures consisting of Light Grade Steel structures with Cement – Fibre Boards having glass wool insulation filling, G.I. corrugated sheet roofing resting on steel – trusses with thermo-pore false-ceiling underneath.*

Every organization was keen to begin its reconstruction activities which lacked consideration for local cultural norms and traditions. We should be apprehensive of the vast danger through the imposition of, what could be considered culturally inappropriate interventions, which are likely to further destroy the cultural cohesiveness among the post-disaster vulnerable population. Of course, it is possible that in the long term the communities would be persuaded to accept new and alien solutions but which are likely to result in loss of their own cultural traditions. Two years after the earthquake we can see that most of the buildings that are being built appear to be alien to the environment, and are likely to negatively impact the cultural landscape in the area.
There was a danger, even in the early days and was so expressed by the Heritage Foundation, that the authorities' promise to provide new, modern structures to replace the traditional habitat was sending negative signals – as if what had been practiced for centuries by people themselves was unworthy. What was really required was to rebuild confidence among the people in their own traditions and culture by restoring pride in vernacular construction, in the importance to continue using traditional techniques and materials, with built-in safety factors that will result in safer buildings.

9. LESSONS LEARNT & PREPARING FOR FUTURE

i. *We need to be mentally as well as physically prepared and consciously aware of the fault line dangers.*
ii. *Basic education should be tailored for local requirements. Technical Education needs to be promoted and awareness regarding fault lines, their effects and precautionary measures be taught at all levels.*
iii. *Restoration of the Infra-structure should have been given top priority.*
iv. *Building codes in lieu with the local terrain requirements should be public friendly and easily understandable for a common man.*
v. *Continuous efforts for environmental up-gradation should continue.*
vi. *Local governments should be well equipped and made to promote community culture and assign responsibilities to all within its fold.*
vii. *Emergency Medical facilities and support services should be aligned to the task required to be performed.*
viii. *Institutions like Civil Defense, Red Crescent and NDMA should be strengthened through capacity building as well as deep rooting.*
ix. *Pre-planned storages for food, medicines and essential commodities should be undertaken.*
x. *Detailed SoPs should be made for such catastrophes.*
xi. *Usage of local materials should be promoted and rectification of the indigenous construction technology should be given priority. Such construction systems should be introduced as are environment friendly and whose repair & maintenance services are also available.*
xii. *There should be a well-organized network of quality assurance, be it construction materials or construction supervision / monitoring.*
xiii. *Cost effective construction techniques need to be introduced keeping in view the financial status of the locality.*
xiv. *Rescue operations last for only months, so the proposed solutions should be long term. The materials used, technology introduced and finishes applied should be in close conformity to the existing natural environment.*
xv. *Attempt should be made to train the locals in the technology being introduced. Volunteers cannot stay there forever, so in the end it's the local public who is left to help themselves. That is where the vernacular solutions come in.*
xvi. *Efforts should be made to minimize cutting of trees and sustainability of the natural built environment.*
xvii. *Required construction materials should be made easily available in abundance at short distances at discounted rates.*

10. CONCLUSION

When the Earthquake struck Pakistan, we were woefully unprepared for such a disaster. Though the Government of Pakistan, Armed Forces and ordinary public in particular rose to the occasion, Pakistan went through this period with confidence, was able to surmount a great task before them and mitigate the sufferings of the affected public to a large extent. We were able to identify our shortcomings however we are not removing them in a determined manner. In case we do not overcome our weaknesses, we are in for another disaster with a much more lasting impact.

It is high time we overcome our prejudices and tackle the challenges before us. Throughout the Post-Earthquake Reconstruction Scenario in Pakistan, there had been a strong debate whether it's the earthquake which kills people or is it the other way round.

I'll close my presentation with the conclusion that It is not the earthquake but the ignorance that kills.

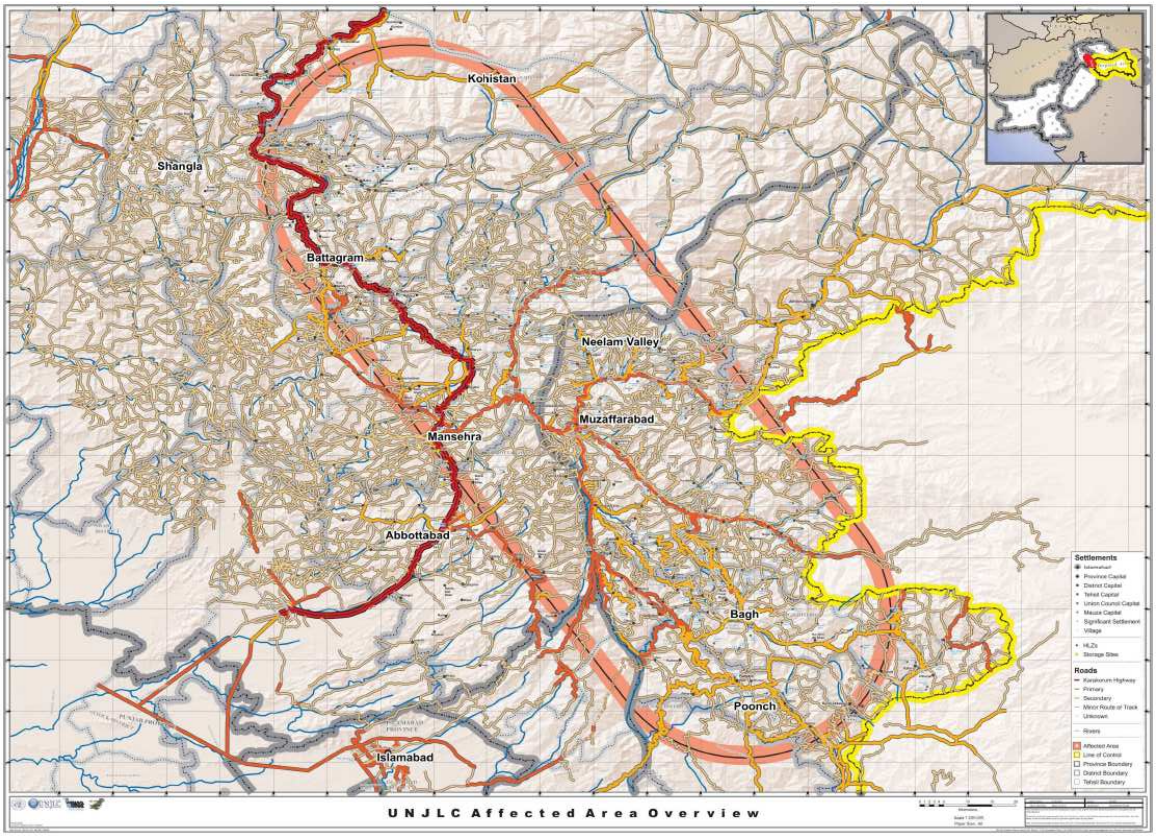

Figure 1 Location Map of the Area affected by the Earthquake of October 8, 2005.

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